2014 SAFETY PROGRAM

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Stamping out the low-slow approach

Visit any glider port and sooner or later, you will see someone making a low-slow approach. In this approach, the glider just clears the fence, flying at minimum sink speed (or slower) with little or no spoilers. The glider touches down and brakes to a stop with a minimal ground roll. That is what happens most of the time; other times the glider strikes an object or lands short while on this low final and substantially damages the glider.

When questioned, the pilot will usually tell you that he is practicing for that eventual off-airport landing where it is important to land with minimal energy in order to stop as quickly as possible. While touching down with minimal energy is the goal, that does not mean that the approach has to be low and slow!

A steeper approach – with an airspeed high enough to deal with winds and wind gradients – doesn't mean a long landing roll. It simply means that you understand the factors involved in safely flying a glider and are the master of your aircraft.

Let's consider the hazards associated with landing an ASK 21 at maximum gross weight, using the minimum sink speed of 44 knots in a no-wind condition. We'll also assume that you are using a 30 degreeTLAR (That Looks About Right) angle, and you enter the pattern at 1000 ft AGL. Further assume that you will make the turn from downwind to base when the glider pilot is looking back at a 45 degree angle to the aim point.

According to the ASK 21 flight manual, the stall speed at maximum gross weight is 40 knots clean, and it goes up to 42 knots with the spoilers fully deployed. This means we are flying 4 knots above stall, and deploying the spoilers brings you yet closer to a stall. Flying this close to a stall gives the pilot very little margin for error in controlling the airspeed or dealing with wind gusts.

Using the 30 degree TLAR angle puts the glider a little over a quarter nautical mile (NM) from the runway. Using the 45-degree look-back angle to turn base means that the glider will be the same distance from the aim point (a little over a quarter NM. Once on final, you have a real problem. At 44 knots, it will take you 24 seconds to fly the final leg, and you will lose 51 feet of altitude.

To make this work, either you need to make the turn from base to final at 50 feet AGL, move the base leg out over 1 NM, or use spoilers (which raises the stall speed and reduces any safety factor you might have had.

Clearly, all of these options puts you in a very dangerous situation, and completing the turn from base to final around 200 feet AGL is a more normal approach.

Let's see what happens when we use the recommend approach speed of 1.5 times stall speed. For the ASK 21 at max gross weight, that would be 40 knots + 20 knots, or 60 knots. Turning final at this speed would make the final leg last 17 seconds, and you would lose 57 feet of altitude. Again, you need to deploy spoilers to get down, but you are now 18 knots above stall, not 2 knots. This gives you plenty of margin to deal with wind gusts or other unexpected events.

As you approach the aim point and begin the flare, the glider will begin to slow down. With more spoilers deployed, and at a higher airspeed, the drag is greater so the glider slows down quite rapidly. With a little modulation of the spoilers you can touch down on the same spot you would have on that low-slow approach, at or just above the 42 knot stall speed. Since you are touching down at the same speed, the ground roll will be the same in both cases.

Remember, these flight times and altitude loss values are for a no-wind condition. Landing in a steady state or gusty wind condition will cause a change in both, and increases the hazards associated with low-slow approaches.

Making a safe approach is a skill we all need to master. Striking a tree, fence, or other object just off the end of your home airport is the leading cause of glider accidents in the U.S. Making a steeper approach keeps you away from these objects and doesn't mean a longer landing distance. If you don't believe this, then get your favorite instructor to demonstrate this to you and practice it with him/her until you are comfortable making good approaches. You will be glad you did.