TEACHING SOARING

BY STEVE du PONT

Off-field Landings on Unlevel Ground

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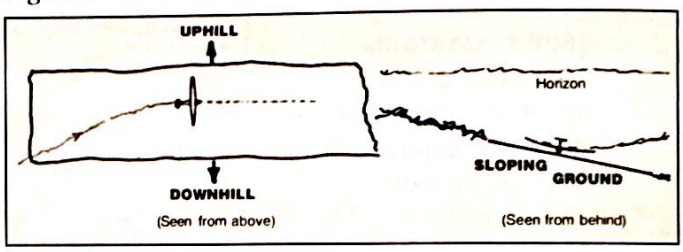
One of the frequent problems of landing off field is having to set down on ground that is not level. Sloping or uneven ground is difficult to detect from altitudes at which glider pilots begin to select a place for an outlanding. Certainly 1,500 feet is too far to clearly assess the slope of the ground below. Binocular or stereoscopic vision fails to work at approach pattern altitudes (see page 4 of *Safer Landings Through Understanding of Visual Pattern Angles*, an SSA Safety Committee pamphlet). Furthermore, most gliderports and airports are level. How then can we instruct techniques for non-level ground landings?

The famous WWII fighter pilot "Pappy" Boyington provides us with a clue. Asked in an interview if fighter pilots think while they fight, he replied that indeed they must think, but it has to be done between, not during, combat. He said that afterwards, he was always preoccupied with what he had done wrong and pondered a great deal about how he should have acted. Then during the next fight, when there was no time to consider tactics, his actions instinctively reflected what he had been thinking about previously.

Landing out may be a little like that. And so here is some food for thought.

Look at Figure 1. The slope of this field is across rather than lengthwise, but it is too narrow to land across. It may be possible to come in on a diagonal that brings us partly uphill. The problem then is to avoid hitting a wingtip either before the wheel touches down, or afterwards at high speed. If we can land the glider in a shallow turn at the moment of alignment with the middle of the field, the banked wings will also be aligned with the slope and the tips will not hit. The glider is being landed while turning, and the wheel brake applied promptly and firmly as soon as it is on the ground. If it is necessary to initiate a ground loop to stop or avoid an obstruction, this will still be in the uphill direction.

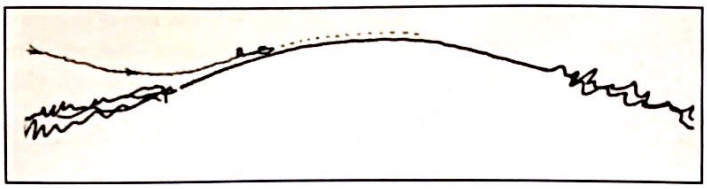
Figure 1



Now let's consider landing on a knoll or across a ridge as in Figure 2.

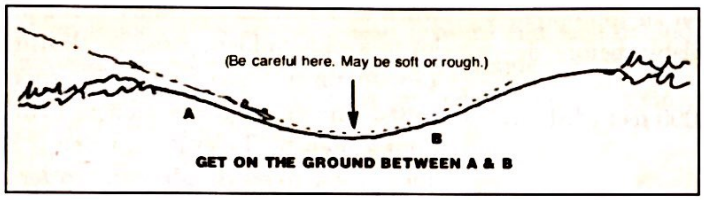
In this case it is imperative to get the glider onto the ground on the near side of the upslope and to apply as much stopping force as possible with the wheel brake (and skid, if you have one). The idea, of course, is to avoid going over the crest and starting down the other side with enough speed to become airborne again. A ground loop may be necessary to stop, but it must be uphill because if it is on the downslope, it may cause the aircraft to swing across and topple downhill, dropping the downhill wing and heading the pilot downhill towards trouble.

Figure 2



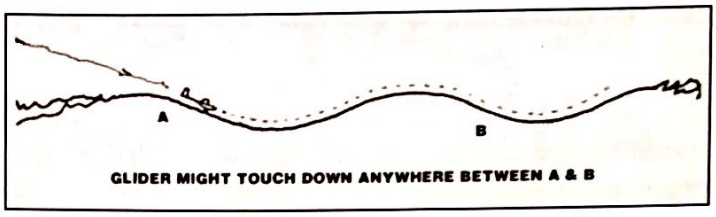
When landing uphill, we must consciously avoid contact at a glide angle that will bring the glider abruptly into the side of the hill. It is best to bring the glider into a flight path that becomes nearly parallel with the ground slope (Figure 2). It will probably be necessary to retract the spoilers to accomplish this maneuver, applying them again very gingerly to cause the ship to land promptly, as it should when going uphill unless you are going excessively fast. With high-deflection flaps useable as dive brakes, pilots should practice at the home field so they will know how to apply them to go through the smaller deflections without the annoyance of ballooning.

Figure 3



When landing into a bowl or across a trough (Figure 3), it is best to fly down the nearside slope with spoilers out, taking care to fly close and nearly parallel to the ground contour. If we can get the wheel on the ground and apply wheel brake on the nearside downhill slope, we should do so. If that is not possible, then we must fly the glider (or land it and roll) across the contour at the bottom, staying close to the ground and maybe actually touching down in the bottom (but beware of gulleys). This would prevent striking the uphill slope at a sharp angle.

Figure 4



Undulating ground is handled the same way (Figure 4). Fly the glider along the surface, following the contours as you lose speed with the airbrakes. It may be helpful to ease the airbrakes off as we establish this flight path. Put them on again carefully. If the undulations are too close together, you may be in trouble.

During the 1974 Unlimited Nationals, I made an outlanding in a field where several gliders had already landed. Their presence was an indication that the field was landable, and I made a straight-in approach, dispensing with the usual pattern to survey the terrain. The ground turned out to consist of three hills separated by dips. Flying the contour produced a satisfactory landing. One of the pilots who had landed before me came to help with the ship. "How did you know how to manage the uneven ground?" he asked. "I had a rough time of it!"

Flying the contour made it uneventful for me.