

## **SOFT-FIELD TECHNIQUES**

For most pilots the arrival of spring is a joyous occasion. By the time the temperatures start to moderate, the burdens of winter operations have, at least for me, become very old. Unless you reside in southern climes, by the time spring beckons, you are most likely tired of having to bundle up to the point of immobility in order to be comfortable while you preflight your airplane. You are probably weary of having to preheat not only the engine but also the cockpit of your airplane. Perhaps you're ready to scream if you have to de-ice your airplane and shovel out your tie-down one more time before you can go flying.

With the advent of spring, you no longer notice the lack of warmth that the primitive heating system of your pride and joy failed to deliver. Now that you no longer have to wear those felt-pac boots, your feet can finally renew their acquaintance with the rudder pedals that for the past few months you never really felt.

Whereas the onset of spring is cause for celebration, especially after a long, cold winter, for those of us operating out of airports with grass or dirt runways, spring does present a few challenges, especially if your airport is located in a northern clime. During the winter, perhaps the runway was covered in snow and you were able to operate with skis. Maybe the runway was plowed, and in that case it was probably frozen harder, though not necessarily as smooth, as concrete. But now as the temperatures start to warm up and the frost goes out of the ground, that runway can turn into a quagmire.

It is quite possible that there might potentially be a week or two when the runway will become unusable because it is so soft that even taxiing on it would leave axle-deep ruts. But the time will definitely come when the runway, although soft will be usable, and a pilot's eagerness to be airborne will be overwhelming. It is at this point in time that they had better have their soft field takeoff and landing techniques down pat. Since that time of year is upon us, let's review the soft field techniques that we need to use and teach.

Whereas every practical test for a pilot certificate from Sport through Commercial requires the demonstration of soft-field takeoff and landing techniques, the vast majority of pilots, including some flight instructors, have never operated on a truly *soft* field. In fact many airplane rental policies forbid operations on any surface other than a paved one, let alone a soggy grass runway. Therefore the learning of these techniques quite often rarely goes beyond the rote or understanding level. We, as instructors, have the responsibility to take the learning all the way to the correlative level.

Our techniques have to start before we begin our taxi. If the field conditions are truly soggy one might get stuck if stopping to run-up before taking off. Therefore it would be best if the run-up and before takeoff checks are completed prior to

starting to taxi. Considering the immutability of the rule of primacy, shouldn't we incorporate the teaching of run-up and before takeoff checks being completed prior to the start of taxi as part of our initial "soft-field" training? Observing what I see demonstrated on practical tests indicates we are not doing a very good job of teaching this important step to pilots-in-training.

In a tricycle gear airplane full back pressure on the stick or yoke will need to be maintained all the time one is taxiing. In the case of the nose dragger we are endeavoring to keep the nose wheel as "light" as possible, thus keeping it from sucking into the muck and bringing one to a stop. In a tailwheel airplane a "neutral" stick position should suffice while taxiing.

It is quite possible that it will require full power just to taxi. If that is truly the case one might want to reconsider whether it will be possible to accelerate to flying speed. It might be best to taxi back to the tie down or hangar and wait a few more days for things to dry out some more. That would be much better than getting out on the runway and rutting it up, and perhaps even getting stuck. (Please don't ask me how I know!)

Ensuring that no one is on final approach one continues onto the runway and commences the takeoff roll without stopping. In a tricycle gear airplane, don't ever relax pressure on the stick as full take off power is smoothly applied. In the case of the tricycle geared airplane we want to get the nose wheel out of the muck and mire as quickly as possible. As we accelerate, we will need to slowly relax the back pressure once the nose wheel starts to lift, and then maintain that pitch attitude that keeps the nose wheel just off the ground, until we lift off. In a tailwheel airplane holding full back pressure on the stick will only serve to drive the tailwheel down into the mud, significantly reducing our acceleration. (The only benefit of that would be that you'd have a nice furrow in which to plant your early peas.) So in a tailwheel airplane one needs to maintain just enough back pressure on the controls to provide directional control through the tailwheel, but nothing more.

Once we lift off, we now have to level off and accelerate while we are still in ground effect. If we don't relax pressure on the yoke, reducing the angle of attack, the possibility is dire of climbing out of ground effect, stalling, and finding oneself back in the mire. Once  $V_x$  (if obstacles are present) or  $V_y$  speed is achieved the rest of the climb out is the same as for any other take off.

But as the old saying goes: what goes up must come down, and so we now have to deal with landing back on this sodden piece of terra not so firma. It is important to teach the necessity of keeping the approach speed slow, no faster than 1.3 times  $V_{so}$ , and to touch down as lightly as possible. Many pilots will add just a touch of power as they break the glide and dissipate the energy. Keeping the nose high, they cut the power just as the main wheels touch down. This allows them the soft touch down that is needed.

But “it ain’t over ‘til it’s over” as Yogi Berra used to say, and the fat lady hasn’t even cleared her throat yet. Unless you want to be “clearing the throat” of your airplane it is imperative that you keep the stick all the way back, keeping the nose wheel out of the mud (or the airplane from nosing over, if the little wheel is in the back) for as long as possible. It might very well be possible that you will need to add some power to keep the taxi roll going.

So there are the techniques for a soft field take off and landing. But then I have to ask... how many pilots will ever operate into or out of an airport that is really that soft? How many pilots are eager to coat their beautiful bird with a layer of slime and goo? In fact it is quite possible that with one exception, (which I’ll get to shortly) the only time they will use these techniques is during a flight review, or practical test. Unfortunately I see this as leading to a potential disaster.

Almost every pilot and instructor I know uses the technique of either carrying a little power all the way in to the landing, or of adding a little power during the flair to soften the landing. If you are indeed intentionally landing on a truly soft surface, such as a sodden grass runway, or perhaps off airport on a beach or other unpaved surface of unknown consistency, the addition of power is fine, and as it should be.

I would further add that I teach my clients to not use full flaps if flying a tricycle gear airplane, since full flaps would only serve to drive the nose wheel into the goo on touch down, which could, in the worst case scenario lead to flipping over. I advise the use of only partial flaps, using a forward slip as necessary to lose altitude, and carrying the appropriate slight increase of airspeed to compensate for the slightly higher stall speed that partial flaps yield.

But now we get to the one exception I mentioned earlier about when we might need to use a soft-field landing technique. For the vast majority of pilots the only time they might be landing on a soft surface, such as a mucky meadow, or a sandy beach, or a recently plowed field is after the engine has gone quiet, and refuses to restart, and the airplane has turned into a glider. As Murphy would have it, it might be that the only place available to land is a truly soft field. To add to the problem it might have trees at both ends, or power lines, or some other type of obstacle, and if Murphy is really having sway it probably isn’t too terribly long either.

For those pilots that have only practiced soft field landings, using power to cushion the landing, they might now find themselves nose deep in doo-doo. So I would suggest that you teach the techniques of a **power off** soft field / short field / steep approach landing. Teach them how to effectively use either a forward slip and / or flaps to control the glide path and controlling speed with pitch. Show them that by combining the proper use of pitch, configuration, and the forward slip they can still remain “on target, on speed”.

The timing of breaking the glide in a power off, or dead stick soft-field landing is critical. There has to be enough energy left to hold the nose high throughout the touchdown, and roll out. A typical error I see is that pilots tend to flare too high in this power off landing, sometimes running out of energy while barely getting in to ground effect, yielding a touch down that is anything but soft. I teach my clients to start their roundout just as they enter ground effect. Obviously flaring too late might very well end up with the airplane inelegantly inverted in terra unfirma.

So with the arrival of spring and the softening of winter retreating behind us, it is important that you review with your clients the proper soft field takeoff and landing techniques. Remember that even if they do not normally operate off of a non-paved runway, the situation might occur that results in their having to land on a surface that is anything but hard. Knowing, practicing and being proficient in the proper techniques will allow them to get up in the air to enjoy... blue skies and tailwinds.

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