

# My Own Crosswind Landing Practice

Brad Whitsitt

April 3, 2010

## Perfect Weather

There was a time in my flying career when a direct crosswind of 18 knots gusting to 26 would have caused a knot in my stomach and would have kept me on the ground. But after years of flying and research on crosswind landings, developing a ground based crosswind trainer, and founding a company dedicated to crosswind landing training, I feel a little better about crosswind landings.

Yesterday, I went out in a Cessna 172 (N45EF) searching for crosswinds to keep my skills sharp and to add to my research on the subject. I actually had some very good conditions at the Frankfort, Indiana airport. The wind was 180 at 18 gusting to 26 and I did 10 landings on runway 27. It is important to set the stage for you and then I'll offer some observations.

I listened to AWOS on the field numerous times during my trips around the pattern and the reported winds bounced up and down just a little from the numbers above. Even though AWOS reports these numbers, we are not always landing in these conditions. Many times, we don't know exactly what the winds are at the touchdown point due to terrain or buildings shielding the landing area, etc. The AWOS hardware can be nearly a mile from the landing point. In this case, the fields are quite open in the area where the wind was coming from and I was probably seeing most of the wind at touchdown.

I took off from KTYQ and practiced 10 landings at KFKR and got back to KTYQ with 1 hour of rental. I spent \$130.54 on that flight on April 2, 2010. With only 10 crosswind landings, I only achieved 50 seconds of experience (assuming 5 seconds per landing attempt). Each crosswind landing second cost me \$2.61!

It is a little unusual to get 10 landings within about 50 minutes. I had to fly to the alternate field to get the right winds and fly back. It turned out that nobody was at the alternate field (due to the winds) and with it being wide open space to the south, I could turn crosswind quite early and reduce my time around the pattern. If I was just learning, I would have been highly stressed just getting around the pattern and avoiding overshooting the centerline, etc. I would not get as many attempts in the same time.

As I hurried to the airport to rent the plane, I was worried that the wind was dying down. All afternoon, the winds were gusting near 30 knots but they had really dropped off at my house by the time I could leave. Luckily, the wind held up at the practice field, 20 miles away.

A point to notice here is that it is hard to get the right conditions and to get adequate practice even when you are very determined to do so.

Today, I was researching controllability with various flap settings. I tried landings with all flap settings, 0, 10, 20, and 30. Here are my findings and my opinions.

## Approach

I really like full flaps for approach. During gusty crosswinds, it feels much better to use a steeper approach and very little power. This is a very safe attitude for the airplane as we fly down through the turbulence. I'm a long way from the ground, further from ground turbulence, less likely to stall, very inclined to get to the field if the engine quits, etc. It is much safer to "dive" at the runway than it is to bounce along the treetops in rough weather. I highly recommend a steeper approach when it is rough and windy.

During the approach, plenty of extra speed feels better. We usually talk about 1/2 of the gust. In this case, this would be only 4 knots. I don't think this is enough for comfort in a little airplane. As I saw wind shear and changing airspeed, I would rather be looking at 75 or 80 knots if it is really rough rather than 65 knots. So, I recommend adding 10 knots minimum.

My one big caution is that you must be patient and willing to slow down to land even if you approach fast. Being unwilling to slow down is the number 1 flaw of most pilots doing crosswind landings.

Do not plant the airplane on the runway at high speed. If your runway is limited, aim at the grass in front of the runway and help burn off speed during the roundout.

Having said all of that, I don't find that full flaps is as easy during landing. So, I recommend 20 degrees of flaps (1 notch less than max).

## Landing

My landings with full flaps required a more work than those with less flaps. This is why I recommend 20 degrees on the flaps for approach and landing in gusty crosswinds. It is important to note that you can land OK with full flaps. It just requires more attention and a little more effort.

I don't like the no flap landings at all. It requires a more shallow approach to regulate speed and it puts me right where I don't like to be - close to the ground in rough gusty weather. I don't see any great advantage to no flaps during the landing. No flaps requires a little more nose up attitude during landing which restricts the visual field. I just don't find it easier. It may provide a little more rudder authority because you can land with an extra knot or two. But this is offset by the restricted visual field.

20 degrees of flaps seems to be a good compromise.

Over and over, I keep finding that the roll input does not need to be aggressive if the feet are working hard. 90% of the time, the roll action of my hands could be fairly limited. I just needed to work hard with my feet to make sure to point my nose with my toes at the far end of the runway.

On one landing, I dropped the airplane a little too hard on the upwind wheel which quickly forced the downwind wheel to hit the ground and then the upwind wheel rebounded so that the airplane was placed in a downwind bank momentarily. This further emphasizes my point that you never want to plant the airplane hard. It is much better to attempt to touch the upwind wheel on the ground and keep flying. Several other landings were great in that the upwind wheel touched and then I consumed energy/speed while flying on one wheel. These were extremely smooth landings. This flying on one wheel should be maintained as long as possible. As long as the airplane is on one wheel, the plane is in a great position for control and energy is being burned off safely.

With good knowledge and practice regarding the slip just prior to landing, touching the upwind wheel and flying on one wheel becomes routine. However, on nearly every landing, my hardest point of concentration and work on this day was after the plane slowed down and all three wheels were on the ground. The wind was strong enough that the plane wanted to weather vane into the wind on some landings after the plane was on the ground and both back wheels were down.

So far in my career, the closest I have come to a crosswind accident was in this condition. The plane touches down and has just set down on both mains with aileron fully into the wind. The plane slows about 10 or 15 more knots and it becomes harder to maintain directional control. The nose wants to move over to point into the wind. At least on 3 landings, I had to apply downwind wheel brake to keep the nose pointed at the far end of the runway during rollout.

Here is my point. After you learn to control the aircraft in the side slip, your next biggest challenge is to control the aircraft after it is on the ground. This may in fact be the most important limiting factor to how much crosswind you and your airplane can handle. Can you maintain directional control during rollout?

In each landing, I let the airplane slow down enough that I could wrestle with this rollout problem before I would go around. On 3 of the 10 landings, I had to add downwind wheel brake or I would have gone around because I was not able to control where the nose pointed with the rudder alone.

## Takeoff

I discovered one more slight concern that I had forgotten. When power was added to go around, the nose was very happy to dart downwind. Since I was inputting nearly full rudder during rollout, as soon as power was full, the prop blast pushed my nose right (in this case) because I was holding right rudder. It was surprising how much I needed to let off of the rudder after power was applied to stay on the centerline. This again emphasizes that you must do what is needed with the rudder no matter how strange it may seem to keep the nose pointed at the far end of the runway. The plane was transitioning from not enough rudder to too much rudder when power was applied. It is your job as the pilot to react quickly to keep the nose where it should be in order to maintain control.

Also, during takeoff, I was reminded that the plane handled much better if I aggressively kept the aileron fully into the wind and encouraged the airplane to lift off of the runway early. Many will try to hold the airplane down and yank it off at a high speed. I recommend gently encouraging the plane to lift off the ground not hold it on the ground. I was constantly watching to try to get the downwind wheel off of the ground first. When I aggressively applied this effort and lifted off early rather than late, I usually saw a very nice takeoff in a gusty crosswind.

As long as I pointed the nose with my toes down the runway during rotation, there was almost no tendency for the plane to roll too much into the wind even with substantial aileron input.

## Summary

This is about as much wind as I want to tackle in a C172. I could probably land until I was wore out and the outcome would not be in doubt for me in these conditions. However, there are many reasons why this could be too much for me on a different day:

1. Illness
2. Medication
3. Stress
4. Fatigue
5. Emotion
6. Low Visibility
7. Currency
8. Runway Contamination
9. Sensitive Passengers on-board

Can the plane be landed in more wind than this? The answer is most likely yes. However, you must be able to recognize when you are on beyond control and you must be able to react quickly enough to get out of trouble such as going around without being at risk of wrecking an airplane.

The stronger the wind or gust, the more likely that a landing will need to be aborted to stay safe.

My goal in all crosswind training is not to tackle winds gusting to 35 knots but to be confident when winds are gusting to 20 knots.

**Remember the big rule - Point your nose with you toes!**

I hope this provides some insight.

Brad Whitsitt - Xwind, LLC

brad@xwindsim.com

xwindsim.com