

Flight Lesson: Crosswind Takeoffs and Landings

Objectives:

1. exhibit knowledge of the elements relating to the takeoff and landing in crosswind conditions.
2. be able to perform a crosswind takeoff and landing with minimal assistance from the instructor on a consistent basis.

Justification:

1. develops the student's ability to control the plane on the ground and the air.
2. develops the student's ability to use the airplane controls during transition from ground operations to in-flight operations.
3. required for flights in crosswind conditions.
4. consistency is necessary for solo flight

Schedule:

Activity	Est. Time
Ground	0.5
Preflight/Taxi	0.25
Flight	1.25
Debrief	0.25
Total	2.25

Recommended Readings:

AFH	Ch 5: 5-5 to 5-8 Ch 8: 8-13 to 8-17
AOPA	http://www.aopa.org/asf/publications/sa18.pdf

Elements Ground:

- crosswind takeoffs
- crosswind landings

Elements Air:

- crosswind takeoff and landing pattern work

Completion Standards:

1. when student exhibits knowledge of the elements relating to crosswind takeoffs and landings
2. when the student is able to perform crosswind takeoffs and landings with minimal assistance from the instructor

Common Errors:

- does not maintain proper alignment during takeoff
- does not maintain proper alignment during landing

Presentation Ground:

Crosswind Takeoffs

PTS Standards	
Δ airspeed	Vy +10/-5 kts

- when the wind is blowing across the runway, the plane will have a tendency to weathervane into the wind. this is corrected by proper use of the rudder
- wind blowing across the runway will also have the effect of lifting the upwind wing.
 - this is corrected by holding aileron “into the wind”
 - initially, full into the wind
 - As aircraft speed increase, less aileron will need to be held into the wind because of control effectiveness.
 - aileron deflection helps maintain ground control
- control input on crosswind takeoff are as follows:
 - keep aircraft “leaning” into the wind with aileron
 - keep aircraft straight with rudder
- on liftoff
 - downwind wing will rise first, then upwind wing
 - keep plane aligned longitudinally with the centerline until safely airborne in case the aircraft settles back down.
- after safely airborne, maintain a wind correction angle (“crab”) into the wind appropriately on each leg to keep the plane on a rectangular ground track.

Crosswind Landing

PTS Standards			
initial airspeed	approach speed	Δ airspeed	+10/-5 kts
touchdown	-0/+400 ft	tchdown speed	≈ V _{so}

- on final, crab into the wind so as to maintain the extended centerline of the runway.
- short final technique 1: wing low/side slip
 - on short final, align the plane with the runway using rudder
 - use a side slip to maintain ground track
 - side slip :a slip in which the plane would move sideways in a no-wind condition.
 - forward slip :a slip in which the plane would maintain the same ground track in a no wind condition.
 - we will be using aileron and rudder separately
 - they are separate controls used to maintain lateral position and longitudinal alignment respectively
 - control drift (left to right) using aileron
 - control longitudinal alignment using rudder
 - during touchdown, keep leaning into the wind as necessary to stay on centerline
 - the upwind wheel should touch down first. the other wheel will settle to the ground as the plane slows
 - keep the plane aligned with rudder, and apply brakes

3. short final technique 2: crab, then transition to wing low/side slip

- (1) the pilot delays positioning the plane into the wing low/side slip until the flare
- (2) easier control of the plane, but more to do during a critical phase of the landing
- (3) eventually, this is the technique that is preferred

4. notes on side slip

- (1) pitch controls airspeed
- (2) power controls approach angle
- (3) ailerons control lateral position
- (4) rudder controls alignment
- (5) in significant crosswind, flaps should be set to 20° or less to reduce the disturbance of airflow over the horizontal stabilizer

Presentation Air:

1. Crosswind takeoffs and Landings

- (1) see above for procedure