

Great Take Offs

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A primer for Radio Control (RC) pilots wishing to perfect their takeoff skills which we all know, can be challenging to say the least! This is a collection of suggestions from many of our accomplished pilots that, over the years, learned many of these things the hard way (can we say rebuilding skills also help 😊) This has been compiled by Earl Aune from the edits of our pilots from Fern Prairie Modeler's

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There are many challenges the RC pilot faces that are different than the full size pilot. We don't feel a thing as the plane gyrates around the sky. Not being in the cockpit requires good hand/eye coordination to overcome the optical illusions of altitude, heading and positions that require a lot of practice to keep the skills up. You don't use it, you lose it.

The main elements of a great take off can be broken down into a few sections. Of course, there are also some tricks and tips that the experienced guys are willing to share in this paper so here we go:

Before flight

Preparation is key to a successful flight and especially the take off. Wheel collars that are loose seem to fall off during the takeoff roll (along with the wheel) making the "Great Landing" not so great.

1. **Hardware.** Check all fittings, wheel collars, alignment (no bends from the last landing) and that the retracts go up and down nicely if they are installed.
2. **Steering.** Ensure the model travels straight when pushed forward (and rudder is straight). Many times rudder trim is used to straighten the roll out which creates surprise yaw conditions on lift off. The best method is to install a separate servo for steering only and slave it to the rudder channel using a rotating knob on the transmitter. This allows the knob to adjust direction on the ground plus extra turning power for turning around on tight runways (separate expo adjustments work very well).
3. **Engine.** The engine should be broken in (min ½ gallon of fuel) before flight is attempted (avoid dead sticks!). An unreliable engine creates a constant worry distraction during the flight and the focus on how the plane handles is diminished. Ensure the fuel system is clean (no balsa dust or debris inside) and use fuel filters on the inlet to the carburetor **and** one on the pressure tap as the dirty exhaust shouldn't be allowed into the clean fuel tank. Also, especially on 4-Stroke engines, and on board glow system is highly recommended to keep a reliable idle during taxi (and on final). Be sure the glow plug lights evenly (no dark spots) when placed on a glow ignitor. If not, replace it.
4. **Wheels.** Typically, 2 degrees of toe in is recommended to cause straighter tracking down the runway on rollout. The theory is the drag induced by each wheel stabilizes the yaw tendencies as the tail lifts up and the plane rolls on the mains. Also, if the wind bumps the right wing up for example, the left wheel toe in steers the aircraft to the right setting it back down. Another trick to induce a bit of drag is to slice off a 1/16" piece of silicone fuel tubing and place this between the wheel and the oleo and then slightly compress the wheel into the tubing while tightening the wheel collar.
5. **Control Surfaces.** It happens to us all at some point, the ailerons are backwards or not working after doing some repairs and the lift off is a big surprise (and big

disappointment as well). Take the time to verify the control surfaces direction and amount before starting the engine. It's easy to reverse a control on the ground 😊

6. Center of Gravity. Ensure the CG is within the range of the manufacturer's recommendation. The rule of thumb is to balance it in the center of the range and that it is slightly (5°) nose down. A good website with detailed information and a Center Of Gravity calculator for both CG and wing loading is here:
https://rcplanes.online/cg_calc.htm

Starting up

When the engine is determined to be reliable, the hardware checks out and the control surfaces are correct start the engine and let it warm up a bit before going to full throttle.

SAFETY FIRST: Be sure no one is standing directly in line or in front of the propeller arc as a thrown prop can be deadly (especially prone to 4-stroke engines; a tip on that later). It is highly recommended to paint the tips of the prop bright yellow, as they are easier to see as they spin. Use tie down straps or a person holding onto the tail to keep things stable during the starting procedure. Use extreme care when removing the Ni-Starter and/or adjusting the needle valves as it can be easy to lose focus on the prop when looking at the item trying to be fiddled with.

Taxi Out

Before taxiing out be sure and check the sky, the runway and with other pilots prior to accessing the runway. It is sometimes hard to see a plane on final or someone just starting to taxi out as well.

1. Use full up elevator on tail draggers while taxiing to keep the tail wheel planted and steering effectively. Note that if taxiing downwind (with the wind at your tail) full down elevator works as long as the engine is idling (a burst of throttle can cause a nose over with full down elevator).
2. Taxi out near the edge of the runway to about 45 degrees downwind before turning into the wind. Line up the plane in the center of the runway and stop, take a deep breath for some needed oxygen and then check once more for any planes on final (dead sticks) or other obstructions on the runway.
3. Use slow and constant throttle for scale realism during taxi. Full size aircraft do not tend to give bursts of power when maneuvering around the tarmac 😊

Rollout

1. With full up elevator, slowly advance the throttle to about ½ power. As the plane begins to move forward resist the urge to steer it for at least the first 10 feet as this establishes the trajectory of the mass.
2. Crosswinds. Tail draggers like to point themselves into the prevailing wind so not only is the gyroscopic effect trying to mess up the take off roll but crosswinds as well. The suggested tactic to prevent crosswinds that can tip the plane over as it picks up speed is to apply a small amount of aileron in the direction of the crosswind. This keeps the wing from rolling the plane over if a gust hits it (better to scratch the bottom of the wing than cartwheel (and pick up pieces!)).
3. As the plane picks up speed relax the up elevator and allow the tail to come up then, just a bit of right rudder at the same time advancing the throttle to about ¾ power. For mode 2 radios this is tricky as advancing the throttle without changing the rudder can be

a real challenge (especially with the shakes of a maiden flight!). A good tip a lot of guys use is to practice this “dance” between throttle and rudder at home in a recliner to train the motor skills needed for the left hand.

4. Keep applying that “little bit” of right rudder to counter the gyroscopic effect of the prop mass as it torques the plane to the left. If too much right rudder has been applied, and the plane is heading to the right of center, just **relax** the amount of right rudder and avoid the temptation to give it left rudder as this can cause uncontrollable ground loops (and repairs). If relaxing the right rudder isn’t enough, shut down the engine and start over.

Liftoff

1. As the plane becomes lighter and lighter going down the runway, slowly apply a small amount of up elevator (while keeping the same amount of right rudder that was established during rollout) and be sure the plane is ready to fly before applying additional up elevator.

Note: Every airplane has a minimum speed for liftoff. Do not let the wheels leave the runway until that airspeed has been achieved. A lot of crashes could have been prevented if the airplane had just picked up the correct amount of speed before the liftoff (attempt!).

2. Keep the climb out angle shallow and keep it going straight with rudder.
3. Use the ailerons to keep the wings level and **avoid** aileron turns during climb out.

Departure

1. As the plane leaves the ground keep applying the small amount right rudder and use small amounts of aileron control to keep the wings level.
2. Keep the plane tracking straight and true during the climb out until about 50 feet in altitude before beginning the turn.
3. Slowly move the rudder to the direction of the desired turn and use small amounts of aileron to keep the bank angle scale (not too steep). There might even be some “cross control” conditions using left rudder to establish the left turn and a small amount of right aileron to keep the wings at about 20 degrees of bank angle.
4. Be cautious of overfly areas and ensure your plane remains within the allowed air/ground space to keep the neighbors happy!

As we enjoy this wonderful sport we have found (knowing that it can also be very unforgiving) we practice our skills to become better with each flight. Skills are a funny thing, if you don’t use them, you can lose them 😊

