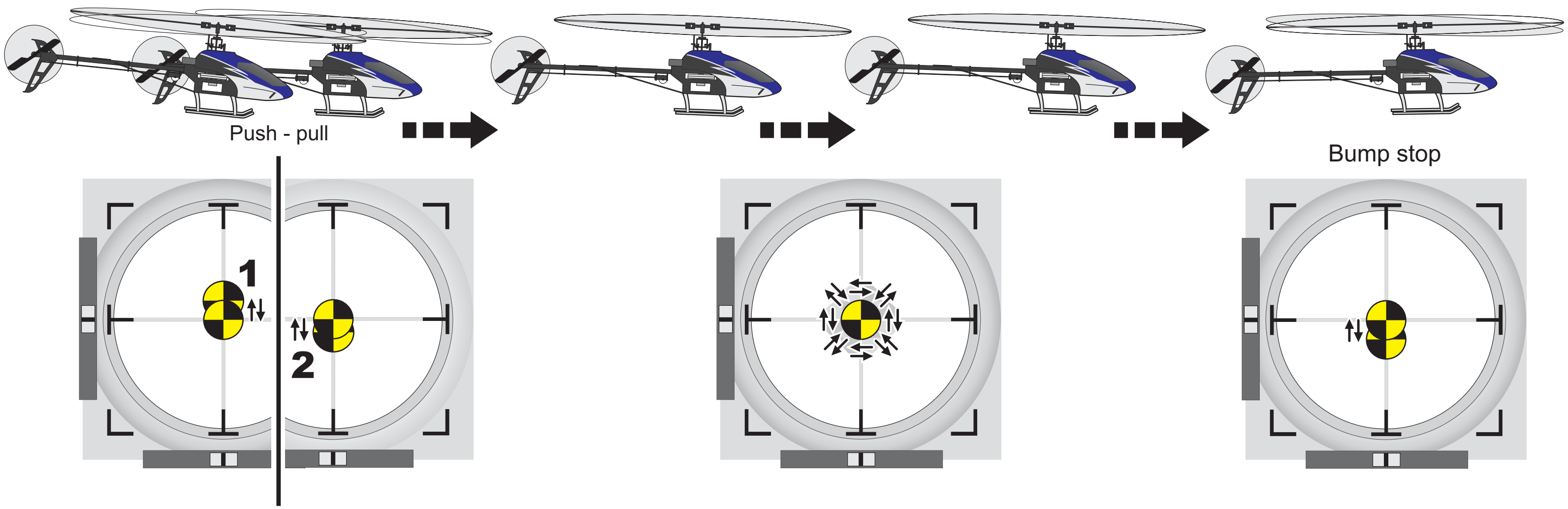
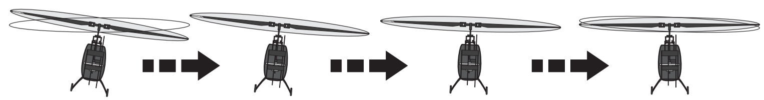
Moving Forward During Hover

To move forward or backward while hovering, tilt the heli with a small brief bump of elevator immediately followed by an opposite bump to keep the heli from moving too quickly. Nudge the throttle to control height and use tiny bumps to fine tune the speed and direction of the movement until it's time to stop with a bump of elevator.

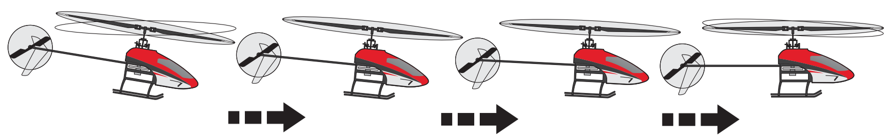


Note: The technique used to move a highly stable fixed pitch heli is slightly different than that used to move a collective pitch heli; A pilot still initiates the movement by tilting the heli with a small bump, however, the helicopter will gradually return to level on its own. There's certainly no harm to inputting an opposite bump after the initial bump, and it's good to get experience with the technique required to reposition a collective pitch heli, but inputting a counter bump after the initial bump isn't mandatory with entry level helis.

Once again, this training program mainly emphasizes the control techniques required to fly more agile collective pitch helis, with the understanding that learning the techniques required to fly a collective pitch heli in a sim will make flying a highly stable fixed pitch seem like child's play in the real world.



Reposition an entry level fixed pitch heli with a single smooth small bump of aileron or elevator, then bump as needed to control the speed and direction of the movement until stopping the movement with a small bump.



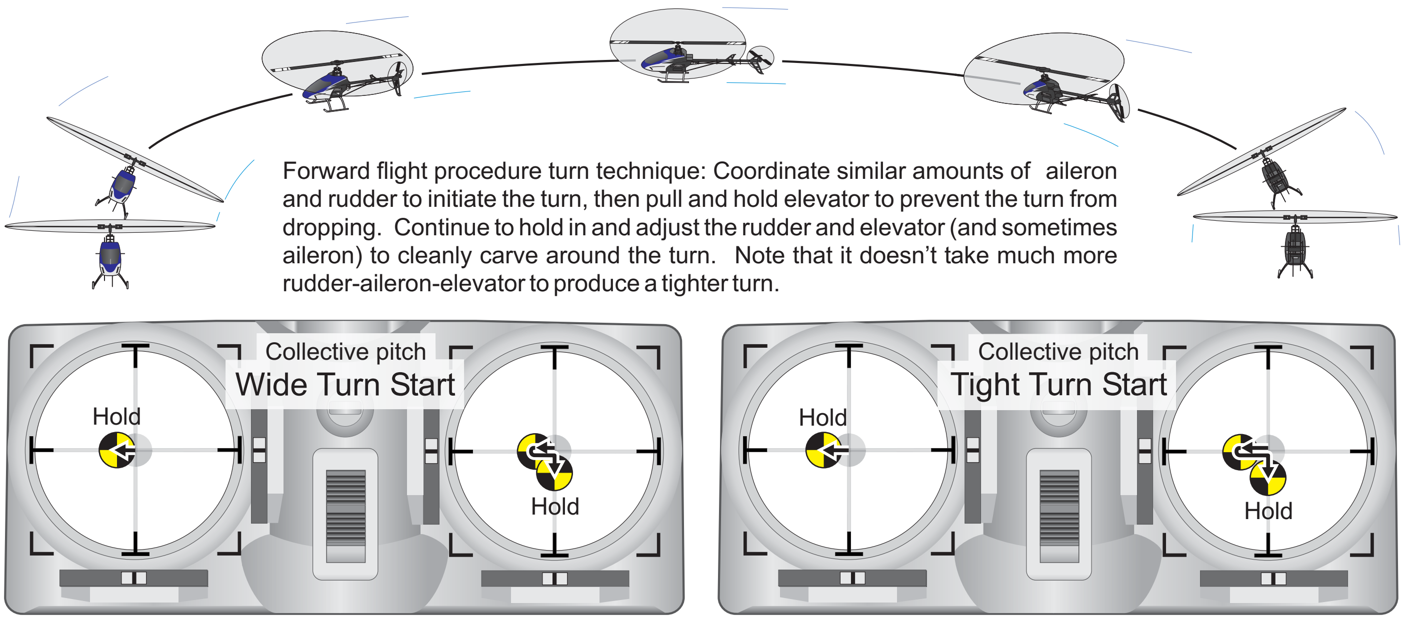
KPTR: Once the movement has begun, fine tune the pace and flight path with tiny bumps.

Basic Procedure Turns

The first turn every heli pilot learns is a pirouette using the rudder to point the nose in a new direction while hovering. These turns are usually limited to 90 or 180 degrees so they are over with before needing very many adjustments. Executing a forward flight 180 degree procedure turn using the aileron to bank the heli and holding in rudder and elevator to carve around the turn is much more intricate and requires techniques very different from those used to hover:

First of all understand that the rudder is held in throughout a procedure turn and that the amount largely determines how wide or tight the turn will be. I.e., proficient pilots commit to holding a small rudder input when intending to perform a wider turn, or a slightly larger rudder input when intending to perform a tighter turn. The bank angle then goes hand in hand with the rudder input. For example, holding a small rudder input requires a shallower bank (smaller aileron input) to gently carve around the turn without skidding, whereas a slightly larger rudder input requires a steeper bank to cleanly carve around the turn. The bank angle then determines how prone the heli is to losing altitude and thus how much elevator is required to keep the turn level, i.e., the steeper the bank, the more inclined the heli is to dropping, and thus the more elevator you'll need to pull to keep the turn level, and vice-versa.

Altogether, the first step is to establish moderate to high speed forward flight, then initiate a procedure turn by coordinating small amounts of rudder and aileron, followed by pulling elevator. The rudder is held in and adjusted to cleanly carve around the turn without skidding while the elevator is adjusted to keep the turn level. The turn is then completed by removing the rudder and elevator while applying opposite aileron to return to level.



Forward flight procedure turn technique: Coordinate similar amounts of aileron and rudder to initiate the turn, then pull and hold elevator to prevent the turn from dropping. Continue to hold in and adjust the rudder and elevator (and sometimes aileron) to cleanly carve around the turn. Note that it doesn't take much more rudder-aileron-elevator to produce a tighter turn.

KPTR: The amount of rudder that you initiate the turn with corresponds to the size of the turn and other inputs.

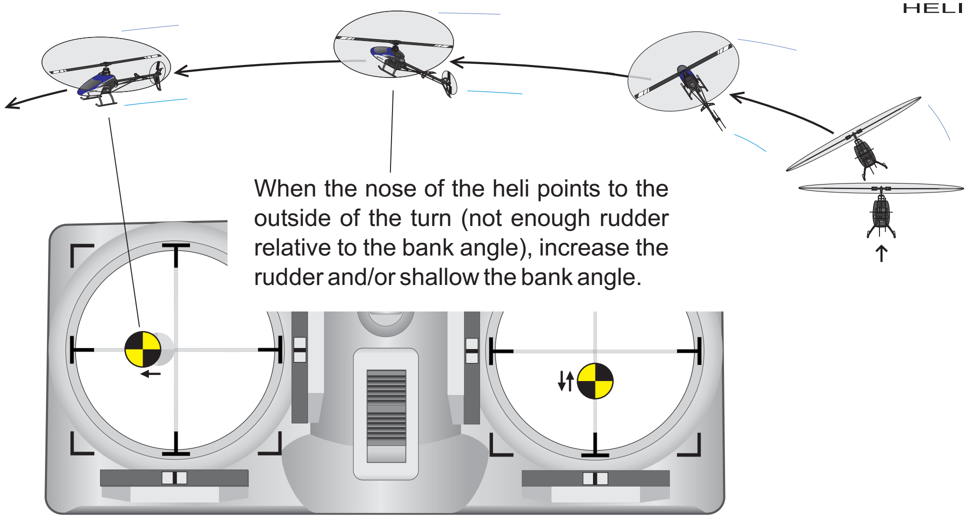
Fine Tuning Procedure Turns

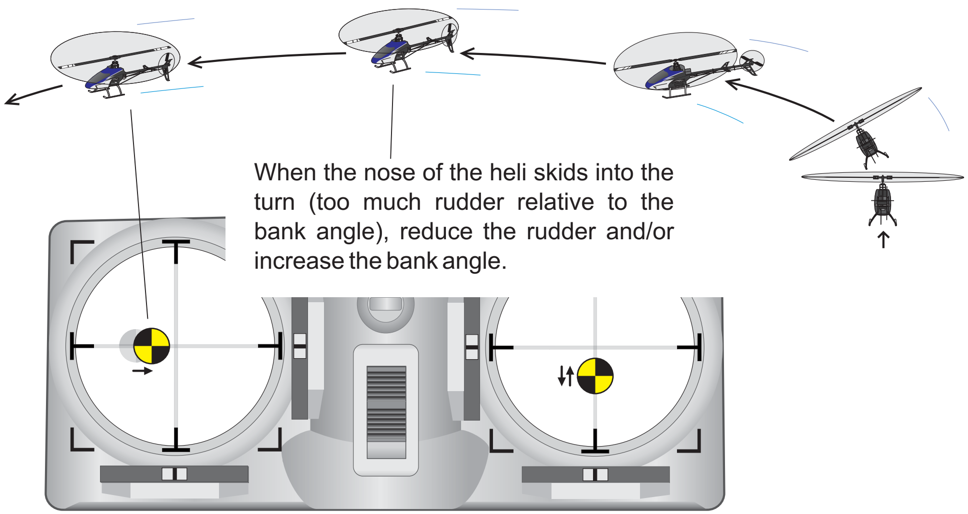
In order to cleanly carve around the turn without skidding, pilots must learn to fine tune the amount of rudder they're holding and/or fine tune the bank angle. For example, when the nose of the heli points to the outside of the turn (not enough rudder relative to the bank angle), the solution is to add more rudder and/or shallow the bank angle. Or, when the heli skids into the turn (too much rudder relative to the bank angle), the solution is to lessen the rudder and/or steepen the bank. There's no magic solution for quickly learning to coordinate these inputs. Depending on the setup and other factors, it takes practice to develop this skill. Although, a good understanding going into your sim practice will start you out well ahead of the curve.

The amount of forward speed also has an influence on the size of the turn and the adjustments required, e.g., a faster turn uses more space whereas a low speed turn is more compact. Forward speed is controlled by the length of time between initiating the movement and applying the opposite counter elevator bump that stabilizes the movement. I.e., forward speed will remain low when the counter bump is applied immediately after initiating the movement, whereas a higher forward speed is achieved by waiting a bit longer after initiating the movement to allow the speed to build before applying the counter bump (along with increasing throttle).

While all procedure turns require some elevator, without a lot of momentum, slower speed turns rely more on power adjustments to maintain level flight, whereas higher speed turns rely primarily on using the elevator to correct altitude changes. Bottom line, correct altitude changes during a turn with elevator, but if attempts to arrest a descent with the elevator don't produce immediate results, add more power.

Note: If you pull too much elevator during a turn and cause the heli to lose forward momentum, you'll have to push forward elevator to lower the nose and reestablish forward movement while adding power to prevent a loss of altitude.





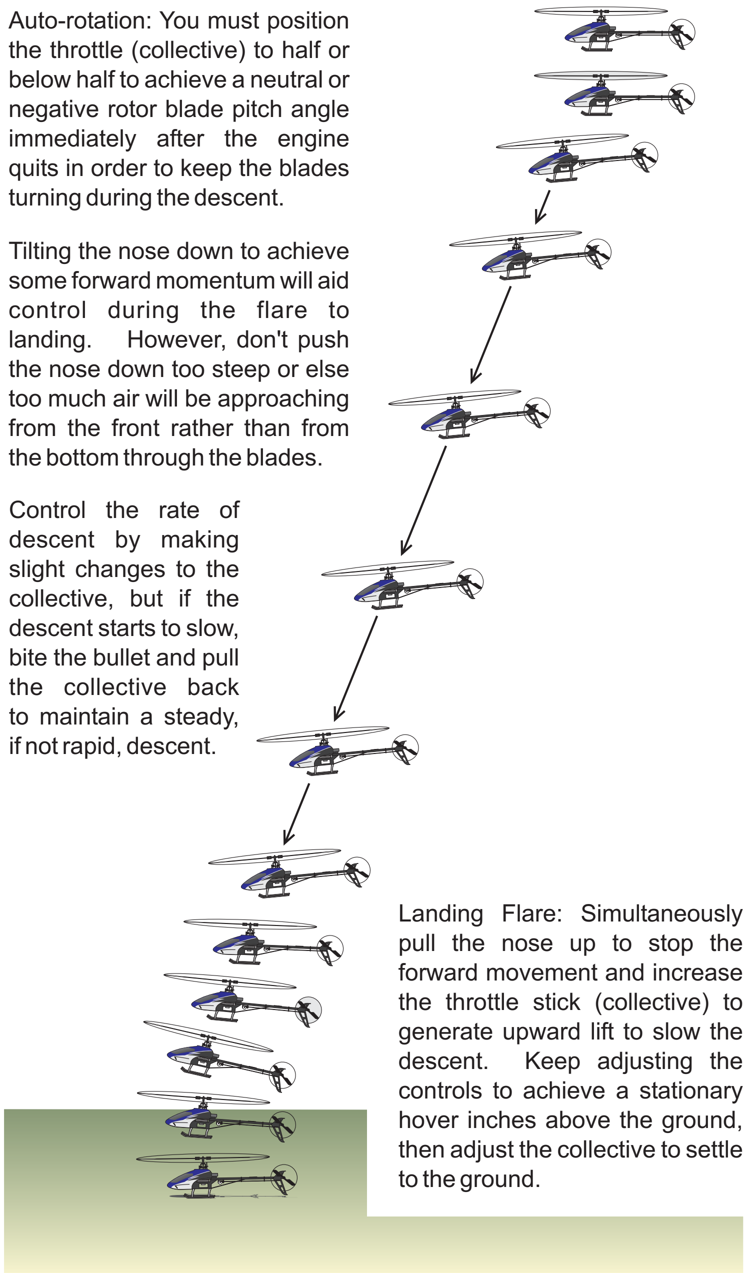
KPTR: When the heli skids away from the turn, increase rudder, and when it skids into the turn, decrease rudder.

Auto-Rotation and Recovery

When a motor fails or is shut off, auto-rotation is the procedure that pilots use to cause a rapid sink rate and thus keep enough air rushing through the rotor blades to keep them turning. The energy stored in the blades is then briefly translated into upward lift as the heli approaches the ground to execute a controlled touchdown. Since electric helis will continue providing some power when flown beyond the batteries optimum flight time, auto-rotation is rarely necessary with electrics. If it’s a small electric heli, there simply isn’t enough mass in the blades to keep them turning anyhow, so auto-rotation isn’t really an option unless the heli is very high and the pilot is very skilled with a lot of guts. It’s mostly larger engine driven helis that could experience an engine failure and require auto-rotaion skills. Frankly, odds are that until you become very experienced you won’t react in time to execute the auto-ration procedure successfully unless you practice it a hundred times in a simulator first.

Recovery comments: One of the main objectives learning to fly helicopters has to be to limit the severity of one’s mistakes to what a novice is capable of handling, and ultimately to replace mistakes with the proper execution. The reality is that the skills required to recover an out of control helicopter would challenge even more experienced pilots, so novice pilots must concentrate on keeping all their control inputs tiny and brief in order to stay out of trouble in the first place, not look to get better at recovering. Of course, the cost saving answer is to develop proficiency on a simulator beforehand, and the time saving answer is to follow a concise training program versus the traditional trial-and-error approach.

The best advice that can be given regarding recovering a collective pitch heli is 1. act fast and keep doing the best you can to recover. Helis usually don’t afford enough time to analyze what corrections to make, you’ll simply have to react. 2. Recovering helicopters is not like airplanes where reducing power affords more time to determine the best course of action. Since a heli will usually tip over and proceed to beat itself up (a.k.a., do the funky chicken) if it doesn’t touch down level, sometimes applying more power as a last resort before hitting the ground is the only way to buy more altitude and time to recover, albeit at the risk of increasing crash damage if unsuccessful.



KPTR: Recovery skills develop down the road, in the mean time, avoid trouble by keeping your inputs brief.