

**Hobby Lobby's
Co-Co Lama Indoor Helicopter RTF**

OR

IS IT REALLY POSSIBLE TO LEARN HELICOPTER FLYING ON YOUR OWN?

by Frank Granelli



Hobby Lobby's new Co-Co Lama helicopter is designed to eliminate many of the RC helicopter's basic difficulties that have restricted the growth of this aspect of the sport. Up to now, it has been difficult for an experienced fixed-wing pilot to transition to RC helicopter flying. There are many reasons for this.

The Problems

In the full-size helicopter world, there is one invariable rule: The smaller a helicopter is, the more difficult it is to fly. It is not hard to imagine then that shrinking a helicopter down to model size will make it extremely hard to fly. And yes, it does and they are. Even with modern gyroscopes that help reduce the pilot's workload, model helicopters require total concentration, much extra training and the help of an experienced model helicopter pilot. This last applies even to RC pilots who have 30 or more years of fixed-wing flying experience. While there are many reasons for needing extra help, here are a few of the more important ones.

First, a model helicopter needs to be perfectly trimmed before its first flight. Blade tracking, both blades spinning in the same horizontal plane, must be preset. So must be their balance. The gyroscope must be properly adjusted to insure the helicopter remains straight under power regardless of the amount of power being applied to the rotors. In short, only an experienced model helicopter pilot can properly set all the pre-flight parameters to insure a successful first flight.



Photo 1

Second, a model helicopter “presents” differently during flight. With the pilot standing behind the helicopter during hovering, the “rudder” control can *appear* to be reversed even though it is not. From behind, most new helicopter pilots focus only on the tail to keep the model pointed straight ahead. But focusing on the tail boom means that left “rudder” makes the tail move to the right since the “rudder’s” direction is set for moving the nose of the aircraft.

“Aileron” or bank control remains the same, reversing direction when the helicopter points toward the pilot. But those small spinning blades are very hard to see and the new helicopter pilot needs to learn an entirely different site picture to keep the helicopter safely away from the ground.

The “elevator” performs two functions and also presents differently from a fixed wing aircraft. Applying “up elevator” pulls the nose upwards but also puts the aircraft into reverse, flying backwards or functions as brakes, slowing forward motion. The helicopter can also gain altitude during this time. Pushing the “elevator” control “downwards” raises forward speed, increasing lift, so the aircraft climbs with the same power levels while gaining airspeed.

Finally, landing requires that the helicopter hover in one position while gently descending. Except for extreme 3-D flight, this never happens with a fixed wing aircraft. (The maneuver is called a Harrier Landing and it can be very rough on the airplane’s landing gear.) These, and other, differences make helicopter flying so different, not more difficult just different, that little fixed wing experience is directly transferable to RC helicopter piloting. That is why a trained helicopter instructor is always best when transitioning to model helicopter flying.

These differences have hindered the growth of model helicopters. In many RC Flying Clubs, there are no qualified helicopter pilots to teach others to enjoy this fascinating part of RC model aviation. Combine this with the extra costs involved as helicopters do tend to be more expensive and are easily damaged. A hard landing could force the rotor blades into the canopy and the tail boom, destroying all three. They are more easily repaired than fixed wing aircraft but those replacement parts are *not* free.



Photo 2

As already mentioned, Hobby Lobby’s new Co-Co Lama solves many of helicopter flying’s dilemmas. The kit box pictured in the photo was a pre-release version created when the helicopter was called the Lama 2. The name has been changed to reflect two of this aircraft’s unique advantages, The “Co-Co” stands for **Co**-axial and **Con**tra-rotating rotor blades (photo 3) while Lama translates as “helicopter”.



Photo 3

This indoor helicopter uses two main rotor blades that rotate in opposite directions. Just like the contra-rotating propellers on Lockheed's full-size P-38 Lightning, the two blades rotating in opposite directions balance out torque effects while helping to stabilize the aircraft. No pilot inputs are needed to keep the aircraft pointed in the proper direction. The Contra-rotating blades also mean there is no tail rotor to setup and trim out.

This setup eliminates a lot of weight and complexity. It also makes the helicopter much easier to fly. In fact, it might make transitioning to helicopters possible without an instructor's help. To see if this is possible, we tried "building" and flying the Co-Co Lama alone. This is the saga of that experience.



Photo 4

Hobby Lobby ships the Co-Co Lama Ready-To-Fly (RTF) and with four extra rotor blades, just "in case" they might be needed. Everything required is included and installed. The power for the twin electric motors is provided by a 2-cell, 7.4-volt lithium polymer (Li-Po) battery. A separate charger designed just for this battery is included.

The charger is powered by either a 120-volt plug-in wall charger or by a 12-volt battery connector. Both are included. Also included are a four-channel transmitter and mini-receiver. The transmitter is on one of the standard 72-mHz aircraft frequencies, not on the 27-mHz "CB" frequencies. The receiver is already mounted in the helicopter. This receiver is actually a four-in-one system that contains a pre-trimmed electronic gyro, the rotor blade control mixer, a speed controller for the twin motors and the radio receiver. A separate gyroscopic stabilizer is not required.

There is also an instruction booklet that applies to this helicopter and to Hobby Lobby's more traditional single bladed helicopters. This booklet covers charging the Li-Po battery and setting up and trimming a single blade helicopter. There is no section on trimming the Co-Co Lama because it doesn't need any trimming. Everything is preset at the factory.

Still, the directions should have included how to mechanically set reset the trim should that become necessary in the future. It may be that the production versions, ours was a very early test model, will have more complete directions.



(Click on diagram to enlarge)

Two micro servos are also mounted inside the fuselage to control the tilt angle of the 13.5 in. diameter bottom rotor and the topmost spinning fly bar's angle. Tilting the bottom rotor "banks" the aircraft. Changing the rotational plane of the fly bar acts as the "rudder" control to rotate the fuselage as would a conventional tail rotor. For a small aircraft (just 14.5 in. long and weighing under 8 ounces), the Co-Co Lama is very sophisticated. The diagram shows exactly how this aircraft is put together, simple but elegant. And should the worst happen, all of those parts are available separately to repair the helicopter.

The Big Test Flight



Photo 5 Photo 6

Just to be sure, I checked the blades for tracking. Both sets of the 13.5 in. diameter blades tracked perfectly as far as I could tell. Each set rotated in their respective planes. I have no equipment for balancing the blades so I have to trust Hobby Lobby on that score.

I have some flight simulators that contain helicopters. I have tried on many, many occasions to fly these whirling creatures that were created by angry demons solely to torment the RC pilot. Each time I try, I re-learn that I do not know how to fly a helicopter. My longest helicopter simulator flight to date is about 5 minutes and ended in the usual death spiral straight into modeling's Underworld. However, I took a few more tries on the simulator before flying the Co-Co Lama but nothing had changed and I gave it up as a bad idea.

So here we are. The helicopter is resting quietly on the floor of the gym in the school where my RC Club, the Roxbury Area Model Airplane Club (RAMAC) meets. There is only one experienced helicopter pilot in RAMAC but he never goes to the meetings. I am on my own for this flight.



Photo 7

Common sense tells me I should leave the aircraft safely on the gym floor and go to the club meeting. But I have never been accused of having too much common sense so why “ruin” that reputation now? It is time to plug in the battery and tempt fate. When you first plug the battery in, it takes 4-6 seconds to calibrate the gyro. During this time a red light will blink twice on the gyro board but the motors will not operate. Then a green light will blink twice and then remain lit. That means the helicopter is ready to go. Advance the throttle and it will start up.

I made everyone move as far as possible from the helicopter, including the photographer. I was sure this thing would jump into the air, spin around quickly a few times and come crashing sideways into the gym floor. As a result, I would probably owe the school some money to replace the cracked floor boards.



Photo 8

Many club members were safely hidden away behind doors, wood panels and benches. All who weren't were within inches of the exits, ready to run at the slightest hint of danger. The photographer, who in this case was my lovely wife Ann, was nervous but hung in there like a true professional photographer. I slowly advanced the throttle, concentrating on only the aircraft.

Instead of the demented monster I was expecting, the Co-Co Lama lifted smoothly from the floor and hovered there, about a foot or so high (photo 8). There were no tendencies to rotate, fall off to one side or to plow straight ahead. It just hovered in place as if I knew what I was doing.



Photo 9



Photo 10

After about a minute, I advanced the throttle a little more and the helicopter rose up to about 6 feet. It remained exactly where it was, just higher. The photographer became a little braver and moved in for a closer shot (photos 9 and 10). Since it was going so well, I slowly added just a little “down” on the right stick to make the Co-Co Lama move forward.



Photo 11

Slowly, the aircraft started out across the gym (photo 11). It did lose some altitude so I added a bit more throttle. It also tilted just a very small amount, about 5 degrees, to the left. But a little “right aileron” leveled the rotor and the left drift disappeared. Things must have looked under control at this point because Ryan O’Leary, one of our club’s best young pilots, came out from behind cover and went back to shooting hoops (background, photo 11).

After about 5 minutes in flight, I used the “rudder” to rotate the helicopter’s body and turned the helicopter back towards the launch point. With the helicopter now heading back towards me, I slowed everything down to allow myself the time to become accustomed to the changed sight picture and reversed controls. The Co-Co Lama slowed almost to a stop and made the return trip much easier than I ever would have suspected.



Photo 12

During the return trip, I did get the aileron input “wrong” and the helicopter banked over to the wrong side. But unlike a fixed wing airplane, I was able to just stop in place, sort of just hovering around, until I regained orientation. Once stable, I continued the return trip. This helicopter is very “comfortable” flying at airspeeds under about 5 mph. Control inputs became more complex when it was flown faster than that.



Photo 13



Photo 14

It was a slow, but easy, trip back to the original launch point. Once over the takeoff point, well nearly over it anyway, I turned the aircraft back to its original direction (photo 13). Slowly reducing the throttle lowered the helicopter safely back to the ground (photo 14). I couldn’t believe this. After countless frustrating flights on the simulator, and a few less than great real-world helicopter flights with an instructor, I had flown an RC helicopter on its very first flight, alone! Even better, the darned thing came back in one piece, ready to fly again.

In all, I made three flights in the gym that evening. The longest flight was about 12 minutes without recharging but there was still battery power remaining. During these flights I learned several important lessons about flying this very special aircraft that probably would apply to all RC helicopters. First, and above all, RC helicopter flying requires complete concentration. Every time my weak mind would drift away from a total focus on the aircraft, the helicopter drifted away with it. Staying focused was Lesson One.

Lesson Two was that all the controls, even the throttle, were extremely sensitive. The Co-Co Lama knew how to fly better than I did and the best flight sections occurred when I let the helicopter fly itself while I provided guidance. Left/right banking stick (“aileron”) movements never exceeded 1/16 inch. Even that small movement could be over-controlling if the helicopter was moving forward at the time. Forward and rearward pitch control (“elevator?”) required less than 1/4 inch of stick travel.

Lesson Three was that escaping in flight helicopter “problems” caused by bad piloting techniques means applying power and getting away from the ground as quickly as possible. A new pilot’s tendency, when in trouble near the ground, is to try to put the aircraft down.

This never works and almost guarantees that the helicopter will either fall over on its side or slam into the ground, breaking things. Instead, apply some extra throttle to stabilize the helicopter and to move away from the hard ground. The Co-Co Lama really responds well to throttle and locks itself into stable, upright flight under power. This is a great feature helping a new helicopter pilot to get out of trouble.

The final lesson was that a new helicopter pilot’s left (rudder stick) hand should be able to move automatically. This means that the pilot must not consciously think about applying “rudder” while flying a helicopter. Instead, these inputs should just happen as they are needed without any extra thought by the pilot.

All conscious thought should be occupied planning out flight direction a few seconds further into the flight and on the banking/pitch/throttle inputs needed to get there. Because of this requirement, I would suggest that new Helicopter pilots flying this, or any training helicopter, have completed solo training and have already been flying their second aircraft.



Photo 15



Photo 16

This helicopter was so easy to fly, that I couldn’t wait for the second flight. There was plenty of battery power remaining, so I lifted off again and sent the Co-Co Lama on its way into the middle of the gym (photo 15) while Ryan kept a close eye on its progress. After turning sideways for a quick photo-op (photo 16), it was time to go for altitude.



Photo 17



Photo 18

Adding throttle made the aircraft rise straight up to near the ceiling beams (photo 17). The helicopter remained stable and showed no signs of any problems. This really is an easy helicopter to fly. The climb was brisk while requiring a minimum of extra throttle. There were a few stray, insane thoughts in my head about landing on top of on of the steel cross beams. Fortunately those thoughts quickly passed away after some quick psychiatric therapy was applied. But having such thoughts illustrated just how comfortable I was getting flying the Co-Co Lama. Instead, I reduced throttle and began hovering in the middle of the gym, just a few feet high (photo 18).



Photo 19



Photo 20

Keeping the low altitude, the helicopter slowly flew back towards the launch point (photo 19). Photo 20 was taken just before the next landing. Either I had been reborn as an accomplished helicopter pilot, not likely, or this aircraft was proving a very easy helicopter to fly.



Photo 21

So fly it I did. I tried several more takeoff/hover/land cycles and then flew out into the gym again (photo 21). The Co-Co Lama felt comfortable and controllable. I even tried some banking turns but kept the speed slow, under about 5 mph. I found that flying faster than that made me fall behind the flight and made control difficult. But hovering was a dream and slow flight almost made me think I really knew what I was doing. Actually the helicopter knew what it was doing; it is well designed for its instructor role.

However, the final flight was an example of Helicopter Lessons One and Three mentioned above. After a pleasant 3-4 minutes into flight number three, I allowed myself to get distracted by people talking to me and by thinking about the next photo shots. The helicopter started to drift towards the photographer who was dutifully taking photos and not moving away. I inputted the wrong bank control and matters got worse. Since I was just about a foot high, I landed the helicopter while it was sliding sideways.

It tipped over on its side, hard; breaking the tail boom's rear wing and the central shaft's coupling that held the fly bar in place. This was the second time that I had turned the Co-Co Lama on its side. The first time was a very gentle event and the fly bar just popped off its holder and was easily snapped back in place. This time, the mount actually broke. The replacement parts arrived in just a few days from Hobby Lobby and the Co-Co Lama was airborne once more. But this incident gave me an idea.



Photo 22

Many larger model helicopters use a training gear designed to prevent the helicopter from tipping over during bad landings. This can work on the Co-Co Lama as well. Attach two plastic straws to the landing gear with small twist ties as shown in photo 22. The straws should extend an equal distance away from the landing skids on both sides while crossing in the center, directly under the helicopter. The straws and twist ties add almost no weight but are strong enough to protect the helicopter during bad landings. Landings where the helicopter falls onto its side are almost completely eliminated using this training gear. I suggest that anyone flying this, or any small helicopter, for the first time install this system before the first flight.



Photo 23



Photo 24

It was two weeks until the Co-Co Lama flew again. This time, I felt confident enough to fly it in the cafeteria with its low ceilings and lots of tables to get in the way. So again, we took off (photo 23) and went for altitude. Flying this aircraft is a lot of fun, even for a new helicopter pilot like me. Even flights near the ceiling (photo 24) were no problem.



Photo 25



Photo 26

I felt comfortable flying the Co-Co Lama around the room. This was a whole new continent in the world of model aviation for me. And I was really enjoying it. I tried landings, banked flight and did lots of hovering (photo 25). There was plenty of power remaining, even after 10 minutes in the air, so I went back for altitude (photo 26).



Photo 27



Photo 28

Reducing altitude, I set the Co-Co Lama into a pre-landing hover (photo 27). But I was having too much fun to stop now, so I applied power, gained a few feet of altitude and buzzed Sport Aviator's staff photographer, Frank Costello (photo 28). It was not that 5 flights had transformed me into an

RC helicopter pilot. It was that this aircraft practically flew itself that made me so comfortable with it.



Photo 29



Photo 30

After a battery recharge, which took about 20 minutes using the 120-volt AC charger (note – recharging a fully depleted battery requires 60 minutes but I don't like to run Li-Po batteries too close to depletion), the helicopter was ready to defy logic and gravity once again. So we launched for another flight around the room (photo 29). Suddenly I heard the siren call of the tables spaced around the cafeteria. The beckoning song of the flat table tops was irresistible. Photo 30 proves that I didn't even try to resist. On the first attempt, I was able to land the Co-Co Lama on one of those inviting flat tops.

The Solution

The Co-Co Lama proved so stable, predictable and easy to fly that an RC fixed-wing pilot with at least 2-3 airplanes experience can safely fly it indoors. The counter-rotating rotor blades make this possible. The aircraft's stability and the factory pre-set trim allow the first flights to be trouble-free. However, it would be a good idea to have an experienced helicopter pilot present to make that first flight if one is available.

Having a helicopter-qualified instructor to assist you would speed the learning process and help avoid the problem that I experienced on the third flight. If one is available, flying the Co-Co Lama under the instructor's direction is about the best way to learn RC helicopter flying that I can think of.

As you can probably tell from reading this product review, I am excited about the new world of RC flying that the Co-Co Lama has opened for me. But there are some caveats that must be mentioned.

This helicopter and other similar twin rotor designs are strictly for *indoor* flight. Top controllable flight speeds are around 5-6 mph. Even a slight wind, 2-3 mph, can make control difficult. A 6 mph wind, or wind gust, would exceed the aircraft's control ability. Crosswinds would make any landing attempt nearly fatal.

Fortunately, this helicopter requires very little room for safe flying and can be flown almost anywhere indoors; after the pilot has some practice in a gym or very large room like the cafeteria in the latter photos.

Central, twin rotor helicopters like the Co-Co Lama are not meant for speed or prolonged forward flight. They are meant to teach new helicopter pilots how to takeoff, hover and land. Their design allows a new pilot to master the sensitivities and intricacies of banking, pitch, airspeed control, variable lift vectors and flight/hover transitions without being overly demanding of piloting skill. In this respect, they perform a truly outstanding job.

But the higher airspeeds that result from prolonged forward flight and any aerobatics are far outside their performance envelope. In fact, very high airspeeds can cause twin central-rotor

helicopters like the Co-Co Lama to lose directional control. But the pilot must really work hard to get the aircraft into these problem realms.

There is one more thing about the Co-Co Lama that should be mentioned. Remember that one of the problems mentioned above that was limiting the growth of RC helicopter flying was the cost? This aircraft solves even that problem. *For less than \$180.00*, Hobby Lobby offers this complete RTF Hobby Lobby helicopter package including a 4-channel transmitter, receiver, gyroscope, electronic speed control with Battery Eliminator Circuit (BEC), two micro-servos, Li-Po battery, two separate charging systems and the helicopter itself. All you add are the eight "AA" transmitter batteries.

For that very modest cost, there is a whole new world of indoor model flying just waiting for every fixed-wing pilot with a little experience. If you want to know more about entering this new world, then please go to <http://www.hobby-lobby.com/cocolama.htm>