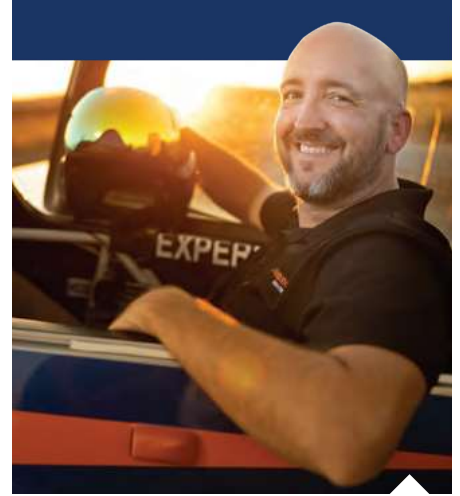


Roll Drills

BY JIM BOURKE, IAC 434151



THIS MONTH, FOR A change of pace, I'll give our newcomers some advice on how to improve their competition rolls.

A correct competition roll will be flown on a straight line and a constant heading, without apparent climb or descent. A well-flown competition roll will feel as if you are gently rolling about your belly button. If you are experiencing any kind of sliding, or any sudden change of *g* in any direction during your roll practice, I can promise you it isn't looking quite correct from the outside.

A competition roll is primarily accomplished with the aileron, but the elevator is also extremely important. The rudder does its job as well, though most people overemphasize the importance of rudder. If you have the rudder in the correct position during the roll, you will be applying pressure more than moving it.

Since it's hard to explain exactly how to fly a great competition roll, I will be sharing some drills I've put together that have helped others. I created these drills for the Decathlon, but they work well for any airplane with an inverted system.

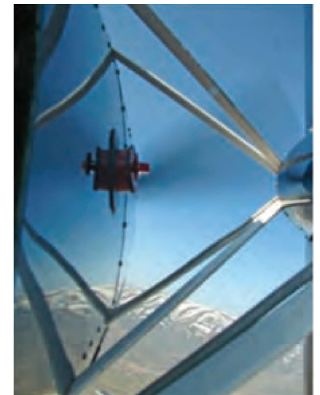
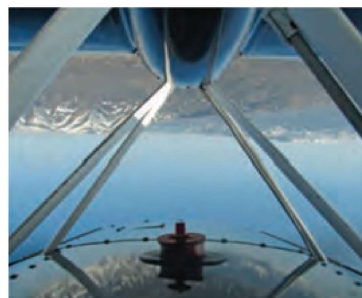
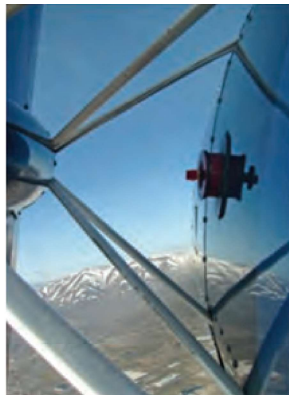
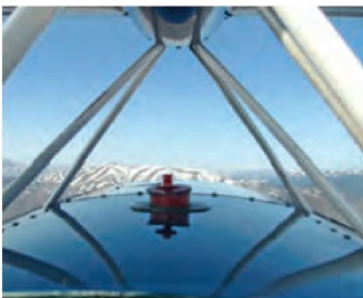
Be careful! Get good aerobic training before you fly rolls, fly them very high until you are confident you can do them safely, and give yourself lots of space for these drills. Ideally, you should find a place where you can fly a few miles over a road or railroad track for reference.

When you do these drills, always do them in both roll directions. A lot of people find rolling to the left easier than rolling to the right, but you'll learn faster if you work in both directions. And intersperse some attempts at regular competition rolls in between the drills so you can measure your progress.

Drill No. 1: Six Half-Rolls

After you've learned how to fly a basic roll, the next step is to learn how to fly it without climbing or descending. I like using half-rolls for this. Fly a straight line and use whatever roll rate you like. Roll to inverted and hold inverted flight for at least three seconds before rolling upright. This maneuver is called a two-point roll. Pause a bit, then repeat until you've done three of these two-point rolls in succession. That's the drill.

This drill shows you exactly where the nose needs to be at the midpoint of the roll.





Bruce Mamont inverted during a roll in his American Champion Decathlon.

Repeat the drill until you can do this without changing heading or altitude and until you are able to accomplish this with smooth elevator input that blends in and out as needed. It's okay to adjust the roll rate to a comfortable level and increase it as you progress.

Drill No. 2: Three Linked Rolls

When you can fly half-rolls without climbing and diving like a love-struck porpoise, you are ready to try linked rolls. In this drill, you will fly three rolls in succession without stopping or changing the roll rate. It's okay to pick a roll rate that suits you, but once you begin you must maintain that roll rate through the drill. (Of course, you should stop rolling if you are losing altitude or getting dizzy.)

What is great about this drill is that any error in the roll technique

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PHOTO BY ALAN CASSIDY

gets magnified. For example, if you tend to change heading 10 degrees during a roll, that might not be very noticeable. You might even be able to cover it up by mashing in a bunch of rudder. But if you link three rolls together, you won't be able to get away with it. I've seen pilots do a rolling turn the first time they try this exercise!

This is a good time to mention that if you are doing any of these drills and are experiencing something you don't like, stay curious about it. Covering up your defects will only hurt you in the long run. Whatever problem you have with your flying has a solution — I promise. Don't let yourself get in a rut; use experimentation to find out what needs to change to make things better.

Drill No. 3: The Super Slow Roll

A super slow roll is one that takes at least 10 seconds to perform, but for this drill I like 16 seconds. The reason I like 16 seconds is because it divides easily so that we can count four seconds per quarter rotation.

I'm aware that 16 seconds seems impossibly long to new aerobatic pilots, especially in a plane like a Decathlon, but I assure you it can be done.

Maintain a constant roll rate and count to yourself. Most people rush





Cockpit view of Jeff Granger in his Extra 300 practicing his slow roll.

the second half of the roll, so don't be surprised if you must work a bit to find the right control pressure needed to keep the roll rate constant.

As always, make sure your heading and altitude do not change. If you have trouble keeping the nose where it needs to be during knife-edge flight, that means you did not use the elevator properly when you were leaving upright or level flight.

This drill can be challenging, but stick with it, because if you want to fly great rolls you must learn to do them slowly before you can do them quickly.

Drill No. 4: The Rudderless Slow Roll

The idea of this drill is to fly the best competition roll you can using only aileron and elevator. Obviously, you will have to find a compromise here, but that's the point: to find the best compromise possible. Do what you must with the controls and the flight path as long as you end the roll with the same heading and altitude you had at the beginning.

This drill seems *impossible* to many people when they first try it. I've heard a lot of people say "It can't be done," but it can, and with practice you will be able to show how!

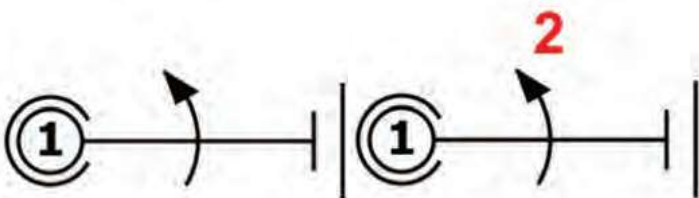
For this exercise, you want the roll to last at least four seconds. Slower is even better.

Some of you will recognize that the solution to this drill is a barrel roll, but keep in mind that the idea is to make it look as close to a standard competition roll as possible.

Let me know how it goes!

Please reach out and let me know if these drills were helpful to you. I can be contacted at president@iac.org.

IACI



Left is a slow roll; right is a two-point roll symbolized in the Aresti notation.



FACTS, FIXES & TIPS

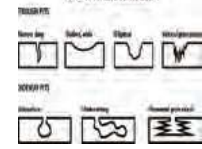
FROM THE PROS

FIFTY SHADES OF CORROSION



The appearance of corrosion varies with the metal. On an aircraft, the most common type of corrosion is on its surface when paint becomes oxidized, banged-up, or worn away. Here, it often appears as a grey or white powdery haze. With removal, if you're lucky, the surface may appear etched and pitted alerting you to the potential for crack development and greater structural damage.

TYPES OF PITTING CORROSION



Some types of corrosion burrow between the inside of the surface paint and the bare metal, following grain boundaries or spreading at random. Aluminum is particularly susceptible to this type of corrosive attack and may exist without visible surface evidence for quite some time before component failure.

Prevention is always better than the cure.

Ensuring suitable corrosion protection prior to and during assembly of individual aircraft parts like stress relief heat treatments or corrosion inhibitors can help prevent or significantly delay the onset of corrosion. Unfortunately, it's not always the case. Routine inspections for any signs of corrosion and regular preventative maintenance are critical. Protective coating applications that deposit an added barrier against paint deterioration and inhibit further oxidation, soiling and stains are essential in the fight against corrosion. Products that protect like NUVITE'S NuPol®, NuPower II®, NuGlaze® & CitriCut® Xtra guard against UV and other atmospheric degradation.



HOW DOES DRAG EFFECT MY FUEL EFFICIENCY?

Drag relies on the chaotic property changes in airflow caused by physical disturbances along what should be a flat, waxed, solid surface. Increased irregularities in smoothness causes more fuel to be burned from increased drag.



ABOUT THAT ANGLE

For painted metal, laying the buffer flat against the surface is better. Not so on bare metal. It's critical to hold the buffer at a 10-15° angle, so only one side of the pad is working polish into the surface. This avoids unwanted swirl marks, cuts, and overheating. Always focus on no more than a 24" square, moving up/down, left to right, fully polishing the target area.



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