

USING THE RUDDER - By Ira Klien

Imagine you are driving down the road in your car.

Other than for directions....do I turn left or right?.....you never think about left and right when deciding on minor steering corrections to stay on course. It's automatic, because you, the driver, are oriented to the direction of vehicle motion. If your car drifts to one side you correct to the other. And you do it effortlessly and automatically.

Now imagine some other scenarios. Imagine your drivers seat in the vehicle is facing backwards. Or you are facing forward but your seat is hanging from the cars ceiling. Or you are facing backwards with the seat hanging from the ceiling.

Or all of the above where every few seconds the position of your seat, and your orientation to direction of travel would be constantly changing.

It would become a real challenge to keep your car on course under those circumstances. Do you steer Left? Right? Right? Left? Which way am I going?

But that is pretty much the situation you are in when flying your plane. While you are staying put on the flightline, the plane is constantly changing its orientation to you, so trying to keep the plane on course (steering) by using rudder can get pretty confusing. Dependent upon whether the plane is flying toward you, away from you, or toward you inverted or away from you inverted.

We are not, for the moment, talking about "roll" orientation, or "pitch" orientation. I am sure we have all learned the sad lesson of pulling up when the plane is inverted. Bad, bad bad.

The problem with rudder for most people, is learning "which" rudder direction to use for correction, since it is entirely dependent on the orientation of the plane to your view of the plane. And the problem for most people when learning rudder is that they think in terms of "left or right", which requires a multiple step process in which first you determine if your plane is going left or right (and remember, if your plane is inverted and going toward your right it is actually going toward the planes left....no wait....the plane was coming toward me so it was going toward its right no wait????? Mass confusion. Wrong rudder input. Damn!

What I have worked out over time is a few simple rules for using the rudder, both for course corrections and for aerobatic maneuvers, that allows you to automatically use the correct rudder input without ever thinking about "Right or Left".

So lets begin.

There are 4 possible "horizontal" orientations (we'll talk about vertical orientation later) of the plane to you as you stand on the flight line;

- 1- The plane is upright and flying away from you
- 2- The plane is upright and flying toward you
- 3- The plane is inverted and flying toward you
- 4- The plane is inverted and flying away from you.

Ok. Lets begin. Now remember that in all the following discussion, you are always facing your plane. So if the plane is at the left end of the runway, your body is “half twisted” to your left, and so is your TX. If the plane is at the right end of the runway, you are “half twisted” to the right. If the plane is across the runway, you are facing forward (if you are facing backward, ignore all of the following...you are totally screwed up).

Orientation 1 Upright and flying away is the easiest situation because this is like driving your car (or taxiing). You are simply steering the plane in the direction you want to go. You are steering the nose of the plane. No problemo!

Orientation 2 Upright and flying toward you. This one is important, because it happens every time you land, whether from the left or right. You need to use the rudder to maintain a proper track on the runway so that you do not drift either into the pits or into the weeds.

The simple way to think about this is that you should point the rudder stick, as you are facing the plane, **toward the side you DON'T want to go to.**

If the plane is drifting toward the pits, push the rudder stick toward the pits. So if you are landing from the left and drifting toward the pits, you would wind up pushing the rudder stick toward the left. If you are landing from the right, you would push it toward the right. **BUT YOU ARE NEVER THINKING/CALCULATING LEFT OR RIGHT.** You are thinking “Away from the pits”.

If the plane is drifting toward the weeds you would be pushing the rudder stick toward the weeds.

In effect, you are steering the tail of the plane.

Here's a hint for landings. Instead of making the turn from downwind to final with just aileron, use rudder to make the turn and much less aileron. This will keep the turn flatter which will mean much less last second correction by aileron as your speed is slowing down and you are getting closer to the ground, where a tip stall could be fatal. Once lined up, keep the wings flat and steer only with the rudder.

Which rudder direction to use for turn to final.? The stick direction toward the flight line as you come around to final (or you can think of it as steering from behind on the downwind leg as in Orientation 1....same difference. Don't think Left or Right”).

Orientation 3 Inverted and flying toward you. What you see coming toward you is the nose of the plane as you are facing it. Just push the rudder stick in the direction that you want the nose to go. Forget about “left or right”. Just push that nose around with the stick.

Orientation 4 Inverted and flying away from you. What you see is the tail of the plane. Just push the rudder stick in the direction you want that tail to go. You are actually pushing that tail to the “outside” of a turn.

OK. You get the idea. Here are 4 more orientations.

The plane is vertical going up as in a hammerhead, torque roll etc. and either the top is facing you or the bottom.

Or the plane is vertical going down with either the top or the bottom facing you.

If you stop and think about it, these are just the same as the original 4 orientations with the forward line changed from horizontal to vertical by pulling up or pushing down

Going up top facing you. Steer the nose with the rudder stick (same as orientation 1)

Going down top facing you. Steer away from direction you don't want (steer the tail)
(same as orientation 2).

Going down bottom facing you. “Push” the nose. (same as orientation 3)

Going up bottom facing you. “Push” the tail with the rudder stick. (same as orientation 4)

OK. Here are a few hints for aerobatic maneuvers that require rudder correction. These would include Point Rolls, Slow Rolls, Knife Edge etc. Remember, the idea here is to not have to think about whether to use “Left or Right”.

If you are flying upright and roll the plane to knife edge (or the first point in a 4 point roll), the rudder stick input is always in the opposite direction as the roll direction. And in a 4 point roll, the last rudder stick input (point 3) is always in the same direction as the aileron stick. You don't have to think “left or right”. Roll the plane either left or right and input rudder in the opposite stick direction.

So the sequence for a 4 point roll would be

Roll (left or right)
Rudder Input (opposite rudder stick)
Roll again
(Rudder released, down if necessary)
Roll Again
Rudder Input (same side rudder stick)
Roll Again
(Rudder released, up if necessary)

Rolling right

AR, LR,AR,DE, AR, RR, AR,UE

OR

Rolling left

AL, RR, AL, DE, AL, LR, AL UE

The sequence for a slow roll is the same but the timing of the inputs is slightly different as the aileron is not released once the roll begins and the rudder and elevator inputs are slowly mixed into the roll.

Now, if you are starting any of the above maneuvers from inverted flight, you just have to remember that the first rudder stick movement is in the same direction as your aileron stick movement (and in point rolls etc, the last rudder input would be an opposite stick movement).

The point of this last discussion is that you do not have to think “left or right” but simply remember a few simple rules (opposite rudder stick starting from upright; same side rudder stick from inverted).

The point of the whole discussion is that I think it is easier to learn how to use the rudder if you stop thinking about “left and right” and just think about the orientation of the plane. If you are not comfortable using the rudder, you should practice some easy ovals and straight flight over the runway using the rudder to steer the plane until you get used to the feel and it becomes internalized. Then practice the same thing inverted until you get used to that feeling.

I hope this discussion helps some of you, and please feel free to laugh at me the next time I screw up a landing approach, or very obviously screw up a maneuver by using the “Other Rudder”.

We all make mistakes, after all.

Ira