

Pitts as a Trainer



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The best there is.

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RIGHT UP FRONT I WANT TO CLARIFY that this is an editorial essay more than it is an article, and I'm in no way taking a neutral position. What follows is my personal opinion, and that opinion is that Pitts Specials, especially the S-2A and -B, are hands down the very best basic trainers in aviation's broad inventory of trainers.

Reread that last paragraph. I didn't say aerobatic trainer. I said "basic trainer," as in the same basic training category as a C-152 or a Piper Cub. This is based on something over 7,000 hours of dual, given in a wide variety of trainers with more than 5,400 hours of that in a Pitts, in the pattern, at an average of seven to eight landings an hour spread across 42 years.

We should also probably clear up another point about the opinion I'm about to share. I teach aerobatics, as all Pitts instructors do, but the vast majority of my instructional time is teaching landings. And everything you know about flying is compressed into the short period between downwind and touchdown.



If your basic stick-and-rudder skills are weak, you'll find that getting the airplane into the "sweet spot" in ground effect just before touchdown is a helluva challenge. In fact, the widespread, and wildly erroneous, reputation of the Pitts is built upon what people think is squirrely ground handling, but isn't. The reputation should actually be built around the higher-than-normal demand placed upon the pilot's basic skills while flying the approach and getting the setup for the touchdown correct.

I'm not going to get into my feelings about how ground roll should be handled, nor am I going to get into how I personally teach approaches. Every Pitts pilot and every Pitts instructor has his own way of doing it, and everyone is convinced that they are the only ones who are right. It's a ridiculously contentious subject.

I am, however, going to make a flat statement that all Pitts pilots (and *any* taildragger pilot for that matter) will agree with: The character of the ground roll is a direct function of the quality of the touchdown. Probably 80 percent of taildragger ground-handling accidents can be traced back to a bad touchdown: it was either crooked, or drifting, or both. A bad touchdown sets up the dynamics that are then often made worse by poor, or misunderstood, rudder technique. But that's another subject for another day.

What I'm saying here is that the landing roll is a thousand times easier if the touchdown is straight with no drift. Very, very basic flying skills are required to make that kind of touchdown. And here's the statement that's going to piss off a lot of readers, and is the core of my argument: all the Pitts asks you to do is fly it, as if you're a 10-hour student getting ready to solo. That's when your basic stick-and-rudder skills are usually at their peak. But, in



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my experience, the basic skills of far too many pilots aren't at that level. And that is what my evaluation of a Pitts S-2A or -B as aviation's best trainer is based on.

When it comes to teaching and honing basic flying skills, the Pitts has no peer because everything about its aerodynamics is absolutely raw. There has been no attempt to engineer out those basic forces, which every airplane has, but aren't nearly as obvious in other planes.

I'm talking about stuff like gyroscopic precession (a tailwheel specialty), P-factor (a major element in Pitts control), adverse yaw (a big deal as AOA changes),

etc. These, and a lot more, are part of Ground School 101, but are barely noticeable in most late-generation airplanes because of careful engineering tweaks. This is especially true of trainers.

The result is that instructors can get by without harping on, or correcting for, these physical traits, because the nosedragger trainer really doesn't care how you put it on the ground. So, lots of instructors don't care either. The result is PPL pilots with weak basic skills that are generally carried throughout their entire careers. This isn't a hyper-serious problem, and is generally barely noticed. Until they strap on a Pitts, that is.

The Pitts absolutely won't let you get away with ignoring the basics. In fact, much of the airplane's reputation for difficult landings comes from pilots who are flying the airplanes more or less successfully but are having periodic problems strictly because their basic skills are so weak and the Pitts is punishing them for it. Incidentally, it's really easy to fly great aerobatics but have basic skills that are just rough enough around the edges to cause problems in non-aerobatic Pitts aviating.

So what are the specifics that make the Pitts such a great basic trainer? There are many, and it's



easiest to describe them one at a time.

The Aerodynamics Have Not Been “Improved”

Virtually every certified aircraft has to have its aerodynamics “dumbed down” a little to make it more saleable to a market that includes “ease of aviating” in its list of gotta-haves. The fin is often offset to take care of torque, and to a lesser extent, P-factor effects. Some will have the motor mount offset a little. All of those aircraft will have differential ailerons in an effort to minimize the need for rudder input by minimizing adverse yaw while rolling into a turn. Note I said minimize adverse yaw, not eliminate. It’ll always be there in every airplane, but it is so tamed that it’s difficult to tell it’s there except in extreme maneuvering. This is not so with a Pitts.

The Pitts was *not* designed to be flown by a little old lady from Keokuk with wrinkled socks, as most certified A-to-B aircraft are. It is aimed at a narrow niche, populated by performance-oriented pilots. They don’t want the airplane’s performance or handling compromised by making it “easier.”

The net result is that in a Pitts, every one of the basic laws of physics affecting an airplane is right there in your face. It’s like a mirror held up to the pilot, and he/she can clearly see where his/her basic skills are deficient without being told. In fact, it’s like the concave side of a shaving mirror that shows every zit and whisker on your skills, sometimes in embarrassing detail.

Keeping the Ball Centered Is Sacred

It sounds silly to say, “Keep the ball centered.” It’s so basic that most of us feel as if it doesn’t need discussing. But, it does when flying a Pitts, because there’s nothing about the

airplane that's going to make that an easy endeavor for a pilot. So much of modern aero engineering is aimed at lightening the ball-centered load for the pilot.

Not having to worry about keeping the ball centered makes flying so much "easier." But in the Pitts, we're not looking for "easy." For that reason, you absolutely have to worry about the ball because our efficiency and our flight paths are dependent on it. In a climb, for instance, if the ball is allowed to slide out until it doesn't quite touch the lubber line, it can cost as much as 300 fpm in climb. Ditto on the glide.

A Pitts is fairly fast for a dirty old, wire-and-strut braced biplane, because everything is carefully shaped and lined up to slice through the wind. But, let the ball get off-center and its drag coefficient goes from that of a pool cue to that of a tumbleweed in only a few degrees. And keeping the ball centered means the pilot is *always* paying attention to his butt ("Step on the ball, step on your butt").

P-factor Is a Factor

Every airplane with a propeller has P-factor, and it's eye-opening to see the difference between a Spamcan and something like the Pitts. First, nothing is compensated for in the airframe, so the pilot is expected to do the compensating. That's what our feet are for. It always amazes even Pitts pilots, who don't know they are automatically compensating for P-factor, when you ask them to take their feet completely off the rudders in a full power climb: the airplane wastes no time in twisting into a hard left turn with the ball against the right end of the tube. And it amuses them, when you ask them to keep their feet off the rudders in that same situation, as they cut the power and set up a glide: as the speed falls, the nose swings right and the ball crosses center, headed for the other end of the tube. Every time the power is changed the nose/ball is going to go somewhere it's not supposed to be unless the pilot stays right on top of it.

Do the same thing in a 172 and it's hardly noticeable. To most pilots, P-factor is a theoretical entity to which little attention is paid. Not so in the Pitts. It becomes an integral part of your thought pattern, and you become a better pilot because of it.

There's Adverse Yaw and There's Adverse Yaw

As with everything else in the Pitts, when it comes to adverse yaw, it carries the laws of physics to extremes, asking the pilot to do that "pilot stuff" to compensate for them. In normal cruise flight, the airplane has only a little adverse yaw. Still, if you do Dutch rolls (roll from a 30-degree right bank to a 30-degree left bank in coordinated flight), you hardly know you're using the rudder



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to keep the nose straight ahead. If you take your feet off the rudder and keep rolling from bank to bank, the nose will wander maybe 10-15 degrees left and right. However, slow the airplane down and increase the angle of attack and the story starts to change.

Slow it to 90 mph, for example, a common Pitts approach speed, and roll into banks left and right with zero rudder and you'll see the adverse yaw has increased probably 30 to 40 percent. So, more rudder is needed at that speed to keep the nose in front of the pilot.

Now comes the eye-opener: slow the airplane to 70-75 mph, the speed you'll be traveling as you're in the act of flaring and holding it off for landing. Do the same bank-to-bank changes: the adverse yaw is now so high that you actually see reverse command for a few seconds on each bank, e.g. the stick goes to the right,

but the nose goes to the left. And that's where a lot of crooked touchdowns come from: messing with the ailerons in flare without coordinating and/or keeping the nose straight ahead.

No Dead Spot

Most pilots are constantly moving their hands in tiny little patterns without realizing it. This is a muscle memory thing that comes from flying Spans, where they are continually moving the controls in the dead spot that encircles neutral. This is no problem in something like a 172, but the Pitts has no dead spot. None. Zero. Nada. Pressure the stick a fat 1/16-inch to the side, and the ball will slide off center, the wings will move.

The rudders take only the slightest, immeasurable pressure to produce the same results. And this is where the image of the Pitts

being squirrely in the air comes from. And this is the way you want a machine of any kind to be. You want it to do exactly what you ask of it with no approximation.

With no dead spot to absorb their uncommanded hand movements, new Pitts pilots find themselves fighting the airplane. And they say it's squirrely. However, it's not. What it is, is reactive. It's doing what the pilot asks of it, but too often the pilot doesn't know what he's asking for. What we're doing is taking people out of Winnebagos and putting them into 911 Turbo Carerras, and it takes a little while to realize the airplane is exactly mimicking your every motion. If you don't want the airplane to move, don't ask it to move. This is the moral behind flying any airplane, but the Pitts drives it home with no doubt showing.

Precision Is Everything

The Pitts is the sharpest tool in the tool box and, if you expect to do good work of any kind you need a sharp tool. The drawback to a sharp tool is that if you make a mistake it'll be a big one, so you do your best to be as exact as possible with it. And this is one of the major factors that make the Pitts such a great trainer. It simply won't tolerate lackadaisical anything. We've all heard that the landing is made in the approach, and nowhere is that truer than with the Pitts.

The placement of downwind, the height and distance out, are all critical. As is the need to control the nose attitude exactly so the speed can be as stable as possible. Not a small task. And the track across the ground, which will usually be at an angle to centerline, should always be pointed at the point on the runway where you want to land. The runway doesn't exist. Only the desired touchdown point counts. If any of these fac-

tors are approximated, the landing itself becomes approximate, and sometimes downright ugly.

All of this is abundantly clear to students/pilots. They learn quickly that the better they control all of the factors while inbound to the runway, the better the landing itself will be.

Pressure, Not Increment

Everything about the controls begs the pilot to use pressure, rather than actual movement of the controls, to make it do his bidding. All airplanes love being pressured, not rammed, into position. Everything is a squeeze. A caress. And the result is a smoother, more sensual flight and no airplane does sensual as well as a Pitts.

If there is one drawback to the Pitts as a basic trainer it is that it ruins you for every other airplane you'll ever fly. Unless you're climbing the aerobatic ladder, every other airplane is likely to be a let-down, by comparison. **IAC**

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