

The Trailing Edge

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Bearhawk Ground Handling and Published Buffoonery

Moving airplanes around on the ground is something that many pilots don't give much thought. For tricycle gear airplanes, a popular but undesirable technique is just to grab the propeller and pull to move the airplane forward, or push to move the airplane backward. A better technique is to attach a tow bar to the nose wheel and pull on it to move the airplane forward. To move the airplane backward, you can push on the tow bar, or push on the prop near the hub with one hand and steer with the other hand on the tow bar.

For a tail dragger, everything is reversed. You attach the tow bar to the tail wheel, and pull on it to move the airplane backward. To move the airplane forward, you can try pushing on the tow bar, but the angle is generally not good, and there is no other part of the airplane structure within reach that can be pushed on. Add to that the directional instability inherent in a taildragger, and you're trying to push a grocery cart backwards with a stick. It can be done, but it takes an excessive amount of effort. I was gifted a tow bar by fellow Bearhawk builder Pat Fagan. Here you can see me trying to use it to move the Bearhawk out for its first flight.



Pushing the tailwheel with a tow bar

Backing up the Bearhawk is fairly straightforward with no extra devices. The leading edge tube of the horizontal stabilizer is sufficiently structural that you can push against it with no worries, especially near the root of the horizontal stabilizer. This technique is seriously frowned upon amongst Cessna and other owners, as their horizontal stabilizer leading edge is aluminum and not structurally strong enough to push on. Ground handling handles are provided on

the bottom longeron of the Bearhawk just in front of the horizontal stabilizer, but these are mostly useful for moving the tail side to side. Trying to use these handles to move the airplane forward puts your body in a very awkward position. I needed a better solution for moving forward that was more stable.

The Lead Rope

My solution was to fabricate a “lead rope” that would allow me to pull the fuselage forward. This would be connected to the tail wheel spring and equipped with a handle that I could pull while staying near enough to the tail to still be able to steer.



The Lead Rope

To create such a rope, I only needed about five feet of rope. I didn't have any suitable rope in my stash of materials. I could have gone to a store and tried to buy a short piece of rope. However, I had been a glider pilot and instructor at Mountain Valley Airport for many years, where they deal in large amounts of rope for glider tow ropes. Figuring that they probably had at least five feet of tow rope that was ready to be discarded, I asked if I could have any such rope. They responded by handing me a 200 foot piece of rope they no longer needed. It's good to know people.

To attach the rope to the tail wheel spring, I could just tie it on with a knot such as a bowline. However, based on experience with glider tow ropes, a better solution was to put a loop in one end of the rope, then wrap it around the tail wheel spring and pass the end of the rope through the loop. The tow rope is 3/8 inch polypropylene of tubular cross section. To form the loop, one end is taped tightly to form a point, then fed through the side of the rope and down inside the tube for several inches. Tension on the rope will compress the outer tube of the rope, securely gripping the rope inside, much like a Chinese finger trap.



The Lead Rope attached to the tail wheel spring

For the handle, I used a piece of $\frac{3}{4}$ inch dowel. I drilled a hole in the dowel big enough to pass the rope through, then fed the rope back into itself like at the loop end. The overall length of my lead rope is about 47 inches, but you can adjust that length to fit your requirements.



The Lead Rope as used for moving forward

I normally pull the rope on the right side of the fuselage, but that's just my habit. I hold the handle in my left hand. Pull on the rope to move the airplane forward. To turn left, move away from the fuselage and pull the tail to the right with the lead rope. To turn right, I push on the upper longeron with my right hand to push the tail to the left. I found it was necessary to push on the longeron with my hand and not to push the fuselage with my hip. I did that early on, and I have some moderate bends in my stringers as a result. Weld clusters are the best place to push.



Pulling technique, showing right hand on longeron for turning right

The lead rope can be used behind the tail to pull the airplane backwards, but I generally don't use it in this fashion since the horizontal tail leading edge is strong enough to push on.

Because of the combination of various dimensions, the lead rope, when installed, will conveniently rest on the horizontal stabilizer strut where it is easy to reach.



Lead Rope laying on horizontal stabilizer strut

The Hidden Threat of Buffoonery

The convenience of storing the lead rope on the horizontal stabilizer strut carries with it a significant hidden threat—forgetting to remove it before flight. This is very similar to the threat presented by a tow bar, particularly a tow bar on a nose wheel. There are many stories of pilots who dragged an airplane out with a tow bar on the nose wheel, then laid the tow bar on the ground, expecting to use it again to further reposition the airplane. The pilot gets distracted, forgets about the tow bar, then gets in the cockpit and starts the engine. The results are varied, but inevitable. Sometimes the tow bar gets sucked up into the propeller, making very expensive noises and mangling the tow bar. Other times the airplane taxis, pushing the tow bar along the ground, making very confusing noises. On rare occasions, the tow bar goes flying, hanging from the nose wheel, creating additional drag. In every case, it seems that by the time the mistake is realized the tow bar is no longer useful for anything other than mangled hangar wall art to remind the pilot of his inability to follow procedures.

The lead rope carries a similar threat, but at least it doesn't involve propeller or engine damage. I had identified this threat, but had not done anything about it. Then came AirVenture 2009.

On Sunday morning at the end of AirVenture, my copilot Stormy and I were preflighting, preparing to depart the airport. By this time, virtually all of the other aircraft around our parking spot had already left. The plan was to launch single ship from KOSH and fly to Rochester MN (KRST), where we would meet up with our wingman, the Fightin' Skywagon, which was parked 4000 feet away on the other side of a runway. This plan was much easier than trying to rejoin on the ground before departing. We finished the preflight and were ready to push out. Normally the

AirVenture protocol was to push the airplane out of the parking spot and toward the taxiway until beyond the display area. This protected the people in the area as well as the other airplanes. Since there were no other people or airplanes around us, we were told that we could just start and taxi from where we were. I didn't want to negotiate the turn out of the parking spot and avoid the light poles from the cockpit, so we attached the lead rope to pull the Bearhawk out of the parking spot and make the right turn.

Stormy and I pulled the Bearhawk out of the parking spot and made the right turn. From my position on the right side of the fuselage, I wasn't sure if we would clear a light pole with the left wing tip. I laid the lead rope on the strut and walked around the tail to the left wing tip. I convinced myself that we had plenty of clearance.

At this very moment, a member of the flight line crew came driving up directly at me. He told us that the airfield was about to close for 10 minutes or so to allow for the flyby for the memorial service over at the chapel, and that we should just stop right where we are. He promised to return to tell us when the airfield reopened. Thus, we stopped the departure procedure right there and relaxed while waiting for our release.

A review of various accident reports will show that the accident chain frequently starts when a procedure is interrupted or the pilot is distracted.

As promised, the flight line crew member returned and told us the airfield was open and we were cleared to start and depart. Stormy and I climbed into the cockpit and followed the checklist to start up and taxi out. We placed the "VFR" placard in the right side windshield to identify that we were departing VFR. We departed on Runway 18, turned right, and headed toward Rochester.

Two hours later, we landed at KRST. After parking the Bearhawk, I walked around to the right side of the airplane to check the chocks and tie down when I looked toward the tail and my heart sank. There, hanging on the strut, was the lead rope. I instantly knew what had happened—I never went back and removed it. Visions passed through my head of the handle flailing in the airstream, beating itself against the fabric, creating dents and tears. I walked to the back and inspected the area around the handle. Much to my surprise, the fabric was undamaged, looking just like it always had. I breathed a sigh of relief, and removed the lead rope, returning it to the cockpit. I needed a way to prevent this from happening again.



Photo taken on the ramp at KRST immediately after the buffoonery

Procedural Protection

My plan to mitigate the probability that I would fly with the lead rope again was to change two procedures. The first was what I call “the checklist step that shall not be broken”. When pulling the airplane out, once in position, the lead rope will be removed immediately. It will not be laid on the strut. No questions will be answered, and no distracting actions will be accomplished. Pull into position, drop the handle on the ground, remove the lead rope. No interruptions allowed.

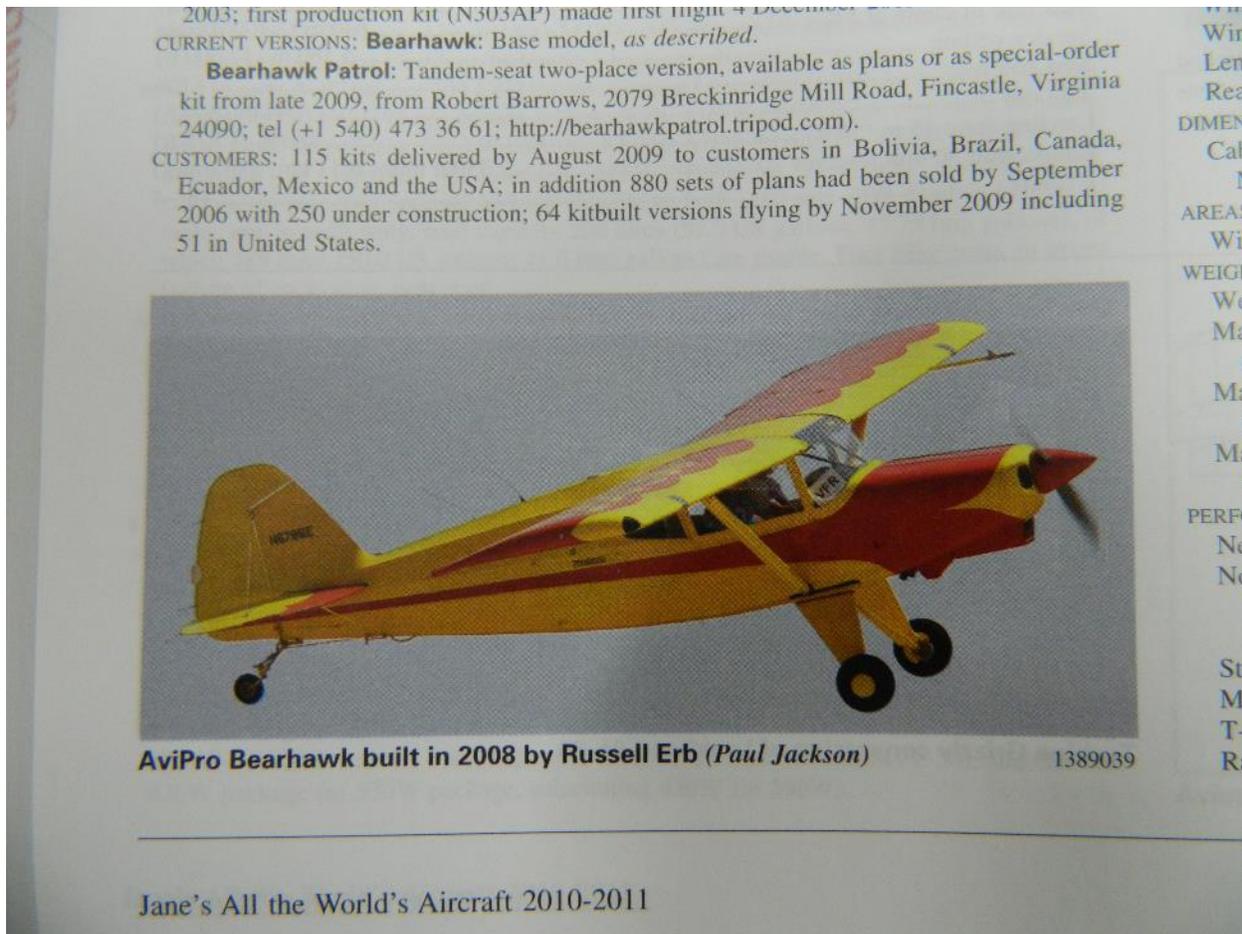
A second protection was a change to the Before Engine Start checklist. Step one of this checklist is “Lead Rope – LOCATED”. Even if I haven’t used the lead rope since the last flight, I will still reach into the pocket on the back of the copilot seat and put my fingers on the lead rope.

These changes have been successful, as shown by sixteen years of flying with no repeats of flying with the lead rope installed on the tailwheel.

But Wait! There’s More!

In a seemingly unrelated story, sometime between 2010 and 2013, somebody mentioned on the Bearhawk e-mail list that they had seen a picture of my Bearhawk in Jane’s All the World’s Aircraft under AviPro Bearhawk. Unfortunately, the supply of Jane’s All the World’s Aircraft books in the TPS library had stopped several years before 2010, so I couldn’t confirm this rumor.

On our trip to AirVenture 2013, my wife and I stopped in Arlington TX to stay with my Dad for a few days. While there, I remembered this mention of Jane’s, and I knew that my Dad frequently visited the library at the University of Texas at Arlington (UTA). I asked him to take me there so I could look through their copies of Jane’s. I found this picture under AviPro Bearhawk in Jane’s All the World’s Aircraft 2010-2011.



It seemed to me a little odd that my airplane should be listed as an “AviPro Bearhawk” when it was scratch built from plans. To be fair, there were a few parts from AviPro in the landing gear dampers, but that was as close to an AviPro kit as it gets. I looked at the next edition of Jane’s under AviPro Bearhawk and saw that the picture had changed to an actual AviPro kit-built Bearhawk, so my Bearhawk was only shown for one edition.

I started looking at the picture closer, and that’s when things got weird. I wondered where this picture came from and where it was taken. Looking at the windshield, I noticed the “VFR” placard. There was only one time in history prior to 2010 when that placard was in that position, and that was on departure from AirVenture 2009. Apparently, Paul Jackson was standing to the side of Runway 18 at KOSH taking pictures of departing aircraft. I suspect he looked up the N number in the FAA database and determined it was a Bearhawk. Somehow that picture made its way to Jane’s.

But wait! That takeoff was for the flight to Rochester MN. My brain went back a few pages to realize that was the flight when I forgot to remove the lead rope. I looked near the tail, and there it was in all its glory—the lead rope hanging off the stabilizer strut! Not only was my buffoonery caught in digital bits, but it was published in a major aerospace publication! No buffoonery goes unpunished!

- Russ Erb