

Flap & Aileron Gap Seals

by Jack Sobelman

The two upper outboard right-wing skins on my Twin Comanche had just been replaced. I looked down upon one of the ailerons. Through an opening in the aileron I saw something that really irritated me. It was my foot! The fact that I could see my foot while looking down thru the wing meant that air from the bottom of the wing could easily escape out of the top. This results in a loss of lift and increased drag, neither being desirable. A good look underneath where the flaps and ailerons meet the wing revealed some ugly things for air making its way across the bottom of the wing surface. It also allowed any higher-pressure air that entered the wing via the wheel wells to travel outward inside the wing and exit out the gaps between the wing and the flaps & ailerons.

In an article, Matt Kurke provided a way to plug some of the air leaks in the wheel wells. We followed his advice. I then began to research possible ways to minimize the flap & aileron gap problem.

Two vendors offer complete wing flap and aileron gap seals, and one offers just flap gap seals for both the single and twin Comanche. Both Webco and Knots 2U offer a complete underwing gap seal kit that traverses the entire underside of each wing with a Teflon sealant along the contact points with the ailerons and flaps.

The Webco and Knots 2U kits are similar in dimension, function, and installation requirements. Installation will take at or a little north of 40 man-hours. It's quite a task. Simply expressed, rivets are removed from the underside of the trailing edge of the wing. The flap seal strips are inserted between the bottom wing skin and the lower surface of the aft spar, then match drilled and riveted. Squeezing the rivets seems to provide a smoother result than bucking. The end result is attractive and functional.

LoPresti Aviation offers a different style which covers only the flap gap area. This product is heavier, thicker, and is different from Webco's and Knots 2U sets in that (a) it covers less area, and (b) extends farther aft onto the flap underside. Also, they are made of fiberglass instead of aluminum.

Which is best you ask? Well, let's analyze what they do, the time of installation, and what flight improvement is encountered.

The LoPresti flap seals cover only the flap area and are heavier than the other two products. I struggle to see an advantage with this product. I was told that they tested the effectiveness and found that the aileron portion was not effective, but this makes no sense to me. The Webco and Knots 2U seals span across the aileron as well as the flap which would provide a speed advantage as well as improvement in aileron effectiveness. The weight of the LoPresti seals, as thick as they are, and made of fiberglass (by appearance), is not an advantage. One suggestion was that the LoPresti flap seals, by extending farther aft, continue to provide gap seal advantage when the flaps are extended, but since the flaps are extended when in the landing phase, a small reduction in drag is not important.

I chose not to use the LoPresti product because I prefer aluminum over fiberglass for that application as well as the fact that the LoPresti kit did not address the ailerons. It was my opinion that their kit did not suit my needs.

As I see it, the Knots 2U and the Webco products are equal in quality and function. Both companies are reputable and provide high-quality technical support. The Knots 2U install instructions had better graphics. Phillip at Webco had personally installed in excess of 20 of these kits and is a living install support system. My experience with Knots 2U tech support has been very good as well.

I chose the Webco product, as they had fabricated two wing skins for my airplane, providing me with first-hand experience with respect to their metal fabrication skills. If you buy this kit from either Webco or Knots 2U and do a proper install, you will be pleased.

I performed much if not most of this install myself. I was fortunate to have "Adult Supervision" and assistance during the entire process, courtesy of Pat Barry and Gary Brenner, both highly qualified Mechanics, IAs and pilots as well. There is no way I would have undertaken such a project without them. I learned a ton! I will not miss the process of removing metal shavings from my hair as a result of lying on my back drilling out rivets!

After the replacement of both right outboard upper wing skins and the installation of the Flap & Aileron Gap Seal kit, I was wondering what my test flight would reveal. After an appropriate preflight, I put on my Maintenance Test Pilot hat, performed a high-speed taxi to check the flight controls and taxied back. After being cleared for takeoff, I pushed the throttles forward and took to the air. The liftoff, gear retraction, and initial climb were normal. I then adjusted the pitch trim for climb and took my hands off the controls. To my delight, the airplane stayed perfectly level with no other trim adjustments or control inputs required. (Counter Rotating Propellers—No rudder trim required for climb.) When it came time to cycle the flaps there was no roll in either direction during flap extension or retraction. Landing was normal, with a definite improvement in low-speed roll control.

I do not have exact test data on the aircraft's performance; however, I can state the following: (1) Roll control requires a minimal increase in force but is noticeably more crisp and effective. This is especially noticeable at low speeds, and (2) The airplane flew between 1 and 2 knots faster while having 250 lbs more weight aboard.

Was it worth it? Yes, without a doubt. If you can afford the time and resources necessary do this, and you value what it adds to your airplane, go for it. I am glad I did.