

Flight Control Problem – Sharing another Experience

By Hugo Ritzenthaler

Going through the maintenance records of my Pitts S1E, I came across an anomaly that occurred on my Pitts S1E in September of 2011 during a practice flight close to my home base, which is Romeo State Airport in Michigan. A few weeks before, I had returned from a competition in Kokomo, IN, where I competed in the Unlimited category.

While practicing my Unlimited Free sequence, somewhere in the midst of the sequence, I started a 360 roll and immediately encountered extremely heavy stick pressure, making it difficult rolling the Pitts around. Back at level flight, I was able to rock the wings. I looked out at my wings but could not see any damage whatsoever. Another try to roll the Pitts resulted in the same high stick input pressure. No doubt, something did go wrong during this practice flight, so it was time to get down onto solid ground. Flying the typical landing pattern, my aileron input pressure was pretty much normal. I landed safely and taxied back to my hangar. It was there after engine shut down, that I got a hint for having encountered the high stick pressure input. With the engine shut down, all four ailerons pointed downwards. While moving the stick side to side only the left top and bottom ailerons responded. Obviously, I had lost control of the top and bottom aileron on my right wing.



Position of ailerons upon engine shut down

It was time to carefully inspect the right aileron control mechanism. A simple check of the underside of the lower wing pointed to the slave rod assy, which was loosely hanging out of the wing. This bolt is normally attached to the bell crank and the slave rod of the lower wing. The slave rod connects to the slave strut that controls the upper wing aileron.



Slave rod assy loose and hanging down

Removing the bell cranks is not an easy job, as it requires cutting a hole into the fabric at the top side of the lower wing in order to remove the long bolt which connects to the slave rod at the outside of the bottom wing.



I suspect that one of the flanges had fractured some time before, so it was only a matter of time until the second flange tore off. As I remember, during flights before this day in September, the roll rate had slightly deteriorated. Reason for that was the bending of the second flange causing a reduction in aileron deflection.

Knowing well that the bell crank at the left wing could break anytime, too, both bell cranks were reinforced by welding a second flange to the top and bottom of the existing flanges.



Reinforced bell crank: addition of another flange at each side

After reinstalling both reinforced bell cranks and performing some test flights in the vicinity of my home airport, I restarted my practice flights and competed in another IAC competition in Bellefontaine, OH early October 2011. In 2013 the top and bottom wings were opened up as part of a general overhaul of this Pitts. This provided a perfect opportunity for inspecting the reinforced bell cranks close up. The bell cranks were found in excellent condition. As of this date, November 2020, the reinforced bell cranks have performed flawlessly.