

Accident Report N801G occurring 07/16/2016

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Summary:

A hard but recoverable landing bounce was the result of a suddenly veering crosswind which the pilot was unable to compensate for. A defective front landing gear bungee cord (the primary suspension component) failed at the first contact. There is a known history of bungee failures for this aircraft type. This failure resulted in a locked rudder condition. The nose then veered off course due to the cross wind and locked rudder. There was insufficient time to initiate a go around. On second contact in a direction not aligned with the runway, side loads, lowered nose geometry, and shock load from a the fully retracted strut, caused the front strut to fold back. After sliding a short distance, loss of elevator authority allowed the nose to dig into the turf, flipping the aircraft, substantially damaging it. Only minor scrapes were sustained by the passengers upon exiting the inverted aircraft.

Discussion / Chain of Events:

The subject aircraft is based at Wichita Gliderport (also known as McPherson field) a privately owned grass strip located approximately mid-way directly between Jabara (KAAO) and Stearman (1K1) airports. The aircraft is always hangered.

[REDACTED] and [REDACTED]

N801G is a STOL aircraft capable of operating using as little as 300 feet or less of ground roll in zero wind. It had less than 200 total hours on it and was maintained carefully by myself. However by ingrained habit I have always had my work checked by another A&P, and I often return the favor for their work.

Briefing the night before and a weather check that morning indicated CAVU conditions and 12 knot winds from the south to from the southeast. At approximately 11 AM on Saturday 07/16/2016, at my base of operations (Wichita Gliderport I topped off the tanks of N801G to about an inch below the neck of N801G, witnesses were present. Fuel indicated was ~22 gallons useable. The planned flight was for 1: 35 minutes, the 22 gallons representing 2.6 hours duration allowing for taxi-take off and climb, allowing for my planned personal minimums of 1 hour reserve - always. Data taken from the EFIS post accident showed 0:59 minutes of flight and 7.1 gallons of fuel used. The tanks areca top vented and one had a severed fuel line. With the wings inverted it was not possible to directly measure any remaining fuel. The estimated time en route back from 07S to the gliderport with the winds and at a loitering speed was 22 minutes. There was plenty of fuel and the engine produced desired power for the entire duration of the flight until stopped by the prop striking.

After safety briefing the one passenger (a co-worker, Mr. Gary Frost) and personally adjusting his harness and belt we departed the gliderport at approximately 11:30 AM CDT. After obtaining a clearance from ICT approach we made a slow circular flight over the greater Wichita city area at ~ 2400 MSL with a hold of a few minutes requested by Approach to clear traffic departing KAAO. Upon release we cleared the airspace, squawked VFR as directed and went direct to 07S departing the airspace about midway between KAAO and Beech Field. ATC was extremely busy so we elected to not ask for flight following. N801G is equipped with a portable ADS-B in which displays traffic alerts on the GPS. I purchased this upon moving the AC to Wichita the weekend after Easter 2016 due to the high density of traffic. Upon reaching 07S we overflew the field, observed the wind sock from $\frac{1}{2}$ to $\frac{3}{4}$ extended and pointing from the SE, announced our intentions and location on 122.9, and set up a downwind for Rwy 18.

The pattern was normal and due to the slight gusts I selected ½ flaps and approached at ~55KTAS. Clearing the road to the north and close to landing I slowed down to 46 knots at about 15 to 20 feet above the ground with a slight left crab to compensate for the wind. Full flap stall speed at that normal load is listed as 32 knots, no flaps stall speed is listed at 39 KTAS. I carried a bit of extra speed that close to the ground in case of a gust. As is my usual habit from my own instruction experience and from flying CAP cadets and Young Eagles I talk my way (out loud) to the ground to keep them calm and learning. At the point of just beginning the flare, I saw the wind sock stand straight out and shift to a direct cross wind. (It was at about a 45 degree angle to my left.) As I applied a correction I said out loud (and the PAX clearly remembers) “I am cranking in more crab.” The touch down was harder than my usual performance: left main then right main and nose almost simultaneously with a small drift to the right.

The AC bounced moderately, but to an extent that should have been recoverable, and the nose drifted to the right. I fully admit it was a crummy landing, not at all one of my best. Knowing that I was in a position that it was safest to touch down (I had 1400 or more feet of runway left and had only used 200 or so of it.) The left wing was down into the cross wind, and as I kicked in left rudder I got no response and had a good sink rate. My initial thoughts were that I had run out of rudder authority. That was not the case. In retrospect that is not likely as it has a huge full flying rudder and has been demonstrated at 22 knots of steady cross wind. At the time I realized that I did not have the time to apply power and go around or my reaction time may have simply been too slow.

The second touch down was at about a 20 to 30 degree angle to the direction of travel at stall speed in a 3 point to possibly nose first contact. The nose went down much lower than usual on contact, followed by prop strike, almost immediately nose gear collapse. I held back full stick and kept the upwind wing down as we slid. After a short slide, the elevator lost authority, and from the marks in the sod (soft but acceptable) the nose began to slice into the turf and gradually over a distance of possibly 25 to 30 feet in dug in and the plane flipped over onto its back with substantial damage as it slid for a short distance until the rudder dug into the ground, bent and stopped it. This would have happened at about 12:30 PM CDT.

After securing the fuel and power. I ensured that the PAX got was OK and egressing, I removed my belt and exited the AC. I received two shallow but bloody cuts across my right shin, from the edge of the door frame or a piece of broken Plexiglas (not sure which) while exiting. The PAX received a slight shallow cut on the edge of his palm and a shallow cut on his right knee during exit. After exit, it pulled out my survival vest, examined the PAX. I used alcohol wipes to clean the cuts and applied 2 band aids. I then cleaned my own 2 cuts and applied 3 band aids. Since there was no one closer to us than the Beaumont Hotel, and we could get no cell coverage, after determined we were OK we walked about ½ mile down the runway and upon the street to the hotel.

On arrival, I contacted the FSS to report the airport closed and was forwarded on to the FSDO to report the accident. The hotel staff loaned me some first aid gear and we cleaned my cut and reapplied band aids as the sweat and walking had made them come loose and bleed some more. A person arrived at the hotel to report the plane on the field inverted. We explained the situation, whereupon he left and apparently immediately contacted the news media, who neither saw nor talked to either of us. The electronic article that went out on the internet was erroneous and accurate only in that there was an airplane, where it was, that it was upside down, and that we were not with it when he saw it. Upon seeing the article, the sheriff's office called the media and contacted the hotel. From the hotel they obtained our contact info and called me. I had several conversations with the FSDO (Mr. Kenneth Simonian). And were told that there would be a follow up call from an investigator, Mr. Terrell.

While we waited for a ride back to Wichita, we ate lunch and spoke to the hotel (and airfield owner). After getting an OK from NTSB via FSDO to move the plane to the side of the field, we used the hotel owner's backhoe and 2 men, attached a nylon sling to an already damaged portion of the left wing. Before touching the AC I took extensive picture of the damage and of the PAX and there was one of myself. We lifted it slightly and gently slid it to the east side of the field. In this way we did not disturb or damage the aircraft further. I paid the owner \$100 for the use of the backhoe to retrieve and roll over the ruts after we replaced the damaged sod. They insist that no further compensation is required

but have my contact information should they change their mind. We then returned to Wichita with our ride, and I escorted my PAX to his car, ensured that he was OK and sent him home.

On arrival at Wichita I received a call from the KS state troopers asking that I return to Beaumont and meet with them and the FAA inspector as soon as practical. The PAX declined to return and gave his statement to the police over the phone. I met with the PAX the next day and at that time he did not have any bandage on the superficial cuts. I see this person every day and he reports no after affects. I have only one remaining band aid on my shin and no adverse effects other than a slight bruise on my chest from the shoulder harness buckle. I returned to Beaumont, gave my report to Mr. Terrell of the FAA and 2 KS state troopers and texted photos of documents and a statement to Mr. Simonian.

After receiving a message from Mr Terrell to the effect that the AC was released for recovery, I then returned to the aircraft and took photos. Then I captured the hobbs and tach data off of the EFIS. I removed my personal gear, aircraft documents, and the easily removable avionics from the plane for safekeeping. The avionics were delivered to the PW Aviation offices in Wichita along with the logbooks and other aircraft documentation (since new) on Tuesday 7/19. I was curious as to the reason for the dropped nose and for the nature of the failure of the FLG. I removed and placed aside a small piece of the lower cowl exit baffle (it is still attached) to see into the strut area. **I noticed that the bungee which provides suspension for the front strut was broken. Even at full compression this bungee is designed not to break.** The travel stop is a small 1/8" wire ring welded around the strut tube which if the bungee fails, contacts the lower strut bearing. **From the Zenith Builder's site there are several reports of failed FLG bungees for this AC model.** Some fail after extended service, some in only months, but the problem is pronounced enough that an aftermarket kit has been for sale for several years to replace the bungee with a steel spring. **The important point is that if this bungee fails and the strut compresses and hang, the rudder can lock up.** There have been 2 incidents of this that I know of in the 2 years since I bought my CH801. Both occurred on pavement or hard packed gravel, failed on first contact with no bounce, so the nose did not dig in and collapse, but one recently resulted in loss of control and resulting wing and prop damage.

I believe that the bungee failed on the initial bounce, and that a rudder lock up is what prevented rudder action, directly contributing to the nose over. A hard landing in the gusting cross wind was the contributing factor. I believe that what I perceived to be lack of rudder authority was in fact a locked control. The post crash examination of the rudder, which was locked into its last position when the AC flipped indicated that it had been deflected only 10 degrees or so to the left. This is not consistent with an attempted full left application of rudder.

Upon closer examination of the failed bungee it was observed that the broken rubber strands for about 1/2 to 2/3 of the diameter on one side have oil on them. (see photo) The bungee is located in the cooling exhaust air stream so they collect oil on exposed surfaces. As the Zenith Builders Web thread indicates temperature is a contributing factor to deterioration. This AC is equipped with a cargo pod which causes the engine to operate about 50°F hotter than usual resulting in hotter exhausted cooling air. This may have been a contributing factor to deterioration of the bungee.

The remaining strands were clean. **This indicates that the bungee was already partially failed when I first landed.** There is no mandatory replacement time in service for this part. Reports of from 10 years to as little as a few weeks in service before failure have been reported on the builder's web site. The general consensus is that it should be looked at frequently and replaced after about 2 years in service. For this AC that would have occurred during the upcoming Oct 2016 condition inspection (moved forward from December to synchronize with my BFR and Medical). In my written AC project plan I had intended to replace this with the steel spring bungee upgrade. It is nearly impossible to do a full inspection with the AC cowed. It is my practice to visually inspect it and the strut height (an indicator of aging) whenever the cowl is off for oil change or other service. This visual check was last done on 05/15/2016 when the cowl was removed to take out the oil cooler winterization plate (see logbook) and I observed no abnormalities. But the AC has made on the order of 50 landings since them, about 1/3 on sod strips.

End of report. Appendix follows:

I certify that the statements made in this report are true, accurate, and complete to the best of my knowledge and ability.

Sam S McNair, Jr.

PS if there is any way to pass it on. I was very impressed with the promptness, courtesy, and professionalism exhibited by all of the FAA and NTSB personnel.

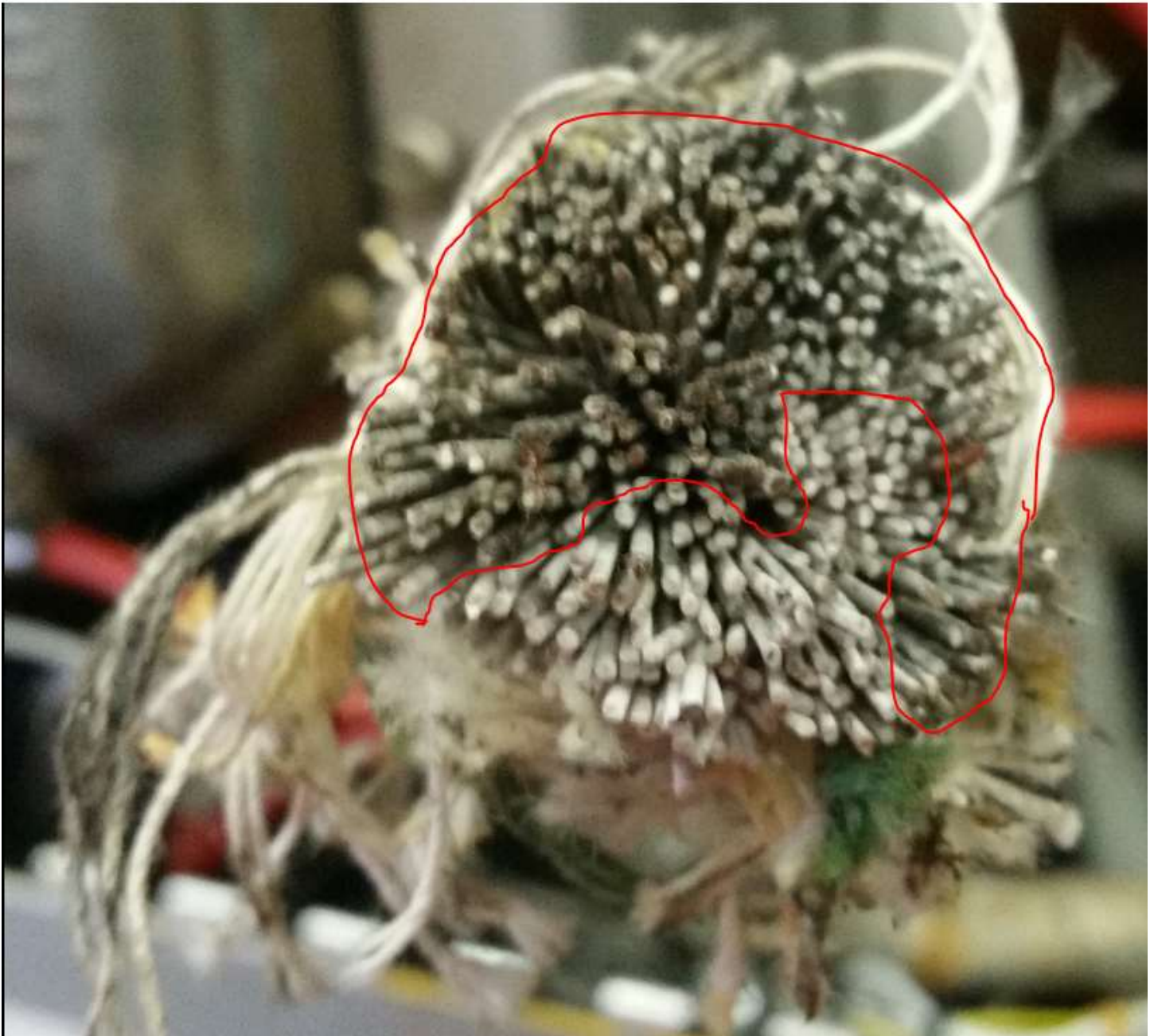
Photo of aircraft in situ



Photo of failed bungee in situ at scene of the accident. Notice oil residue discoloration on front strands.



Photo of Bungee after AC recovered and bungee removed. Note area outlined in RED having fibers with oil / exhaust stains



Excerpts from Zenith Builder's site discussion string concerning failed bungees from Zenith web site. 2 known failures in the last year or less.

- Posted by [MAURICIO NASSER EHLKE](#) on February 4, 2016 at 6:13am in [STOL CH 801](#)

Hello 801 builders. I Had a problem with the bungee cord. I became scared when i lost the rudder control. My 801 has only 100 hours. How could the cord kaput? How many hours for replacing it? Does anyone have a manual for the regular and systematic inspections.

Replies to This Discussion



[Permalink](#) Reply by [Ben Haas](#) on February 4, 2016 at 8:10am

My first bungee lasted 10 years and over 1000 landings.... Something must be chafing yours to kill it in just 100 hours??



[Permalink](#) Reply by [MAURICIO NASSER EHLKE](#) on February 4, 2016 at 10:47am

Did you see the photo i linked? It,s amazing how happened. When i fixed up, could not identify any reason for it.



[Permalink](#) Reply by [Joe Harrington](#) on February 5, 2016 at 12:53pm

It seems to be heat that is the biggest factor with the bungee cords. Ben, your auto engine conversion probably does not generate as much heat near the bungee as some engines. Some engines like the Rotax 912ULS on the 750s and 601s are having bungee life spans less than 50 hours! If you can reduce the radiant heat in the bungee area, it might last a whole lot longer. Might consider some type of heat shield, a blast tube to provide a steady stream of cool air, or both.

Good luck,

Joe



[Permalink](#) Reply by [Bill Wilcox](#) on February 7, 2016 at 9:56am

I changed my bungee cord with a new (check the stripe color) cold weather (I live in Alaska) one right before I installed it. The ones from the factory were 4 years old. I changed the next one at 5 years. The one I have now has 7 years on it. I will take a really hard look this year at condition inspection time..

Here is a good PDF on bungee cords.

<http://eaavintage.org/wp-content/uploads/2013/01/2006-Vol.-34-No.-0...>

Bill Wilcox

N801BW



[Permalink](#) Reply by [Patrick Hoyt](#) on Friday

Would the "Steel Bungie" work for you guys...?

Here's what I'm talking about (what I put on my plane): <http://www.zenith.aero/photo/20160423-151210>

More info about that can be found by searching this site.

- Pat