RAA
RECREATIONAL AIRCRAFT ASSOCIATION
RÉSEAU AÉRONEFS AMATEUR CANADA

The Leading Edge

Monthly Newsletter of the Kitchener-Waterloo RAA

- January 2022 -

This is how my newly-completed floats (minus the rudders) looked in 2016. I am hoping to restore them to their former glory. Besides the shine in the floats, where did all the floor space go? Did my shop shrink over the years?

President's Message

Happy New Year everyone!

I hope everyone had a great Christmas in spite of the restrictions placed on us by the government in response to the pandemic.

2021 was a very busy year for me having completed my new aircraft, flying off the hours on it, and as you will see in this issue, rebuilding my Zenair floats that were damaged in my accident in 2019. In this issue, I have outlined a number of the steps it took to rebuild my floats, but it by no means shows the entire scope of what it took to do it.

Add to that a number of projects at home, including some major landscaping in the front yard, more renovations at the cottage (my son's home) on Deer Lake, and several smaller projects around the house. I fully expect things to slow down a bit in 2022 in spite of some other family commitments.

2022 is going to be a great year for KWRAA!

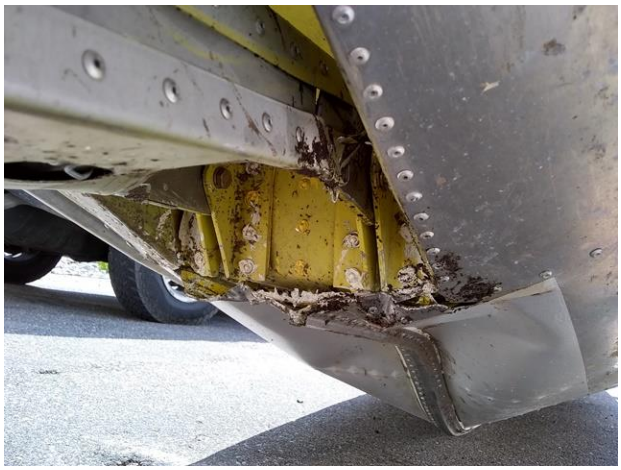
- Dan

Making a Splash… Hopefully.

There was little doubt in my mind that I had a big job ahead of me. During my take-off accident in July 2019, I not only totalled my plane, I damaged the floats pretty badly too. Although I had obtained quotes on having them repaired by someone else, I thought it was in my own interest to do it myself. After all, I built them in the first place, so who would know their construction better than I do.

The problem was that I had to store them while I built the new plane and then there was the issue of work space. Since building the original plane, the Garage Mahal shrunk… that is to say that a lot of tools and wood and other accumulated 'stuff' reduced my otherwise large space to half its normal size. Add to that the fact that the new plane came in a steel frame crate, which I left in the shop with 'Aerial One' tucked inside while I built 'Aerial 2'. So, when someone tells me they built their plane in a one-car garage, not only do I understand many of the challenges, I found myself unwittingly doing the same.

For the next two years, the floats were stored outside on the patio. No big deal, right? After all, Covid 19 meant that we weren't having guests over, so I didn't even have to drag out the patio furniture and set it up. All was well!



When Aerial 2 was flyable it all changed. I moved the plane to Ken Chute's airstrip where I could fly off the mandatory 25 hours on the conditional C of A. I moved the floats into the shop to start disassembling them and begin making new parts as part of the repair process.

There was considerable damage to both front fork and swivel assemblies as well as the front of the lower skins and several of the bulkheads in the front were buckled. Luckily, most of the extrusions (mountings) were undamaged, merely loosened from rivets popping loose.

The nose cones were destroyed, but the hydraulics seemed to still be fully operational and none of the hydraulic cylinder shafts bent. The front keel was badly bent on both floats. The side skins only had minor dings and the walkway was undamaged. As I said at the beginning, there was little doubt in my mind that I had a big job ahead of me.

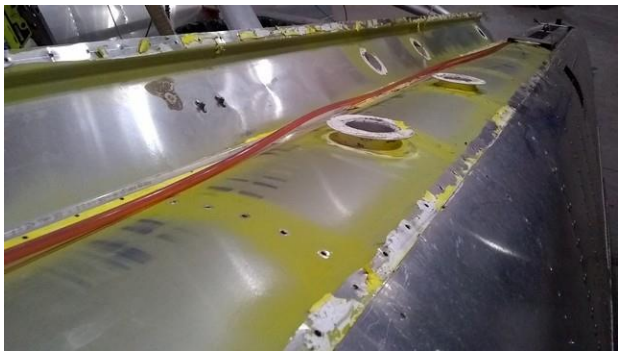
I started by removing anything that was bolted on and safely stored the parts in large bins.

I then removed the front bottom skins as far back as the damage appeared to go. I cut the squeezed rivets off with a hammer and chisel after trying to drill them off to no avail. Shearing them off with a sharp chisel was not only faster, but did a much cleaner job of it. I had to hold the chisel just right so as not to cut into the aluminum skins as I carefully drove the chisel home with a hammer.

Once the lower skins were removed, the damage to the bulkheads was more apparent, but still what I expected to see.

Drilling out the pulled rivets was the method of choice to gain access to the sealant that still held everything together. I made a small ruler-like tool with a sharpened end that I used to cut the sealant along the rivet lines after removing the rivets. It was painstakingly slow work, but it did work!

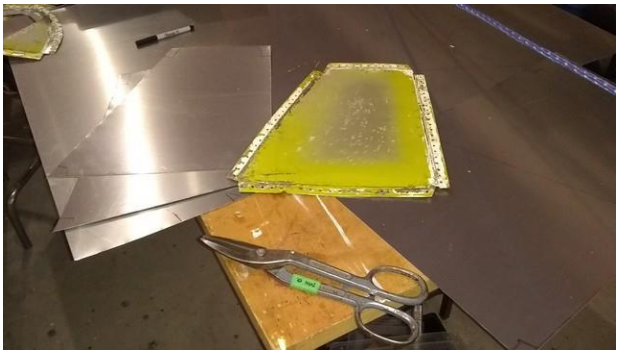
I removed the upper walkway the same way. It had to be removed in order to gain access to the top rivets in each bulkhead to be replaced.



After removing the front wheel bulkhead assembly, I began drilling out all of the rivets holding all of the mounting brackets and reinforcing extrusions.

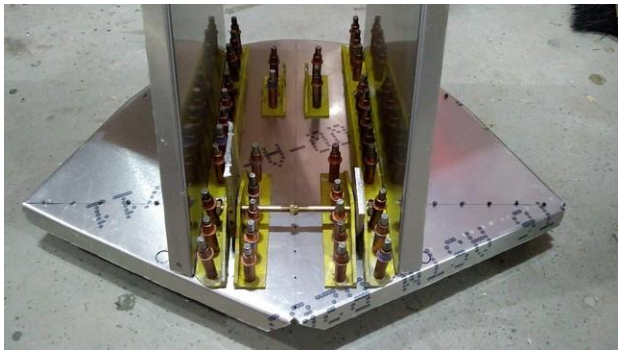
Many of the rivets inside are structural stainless steel rivets and presented quite the challenge to remove. I found that the bits of mandrel left inside some of them meant that I was replacing drill bits quite often and sometimes could not get the drill bit to align with the centre of the rivet.

I found that driving the mandrel bit out with a small centre punch worked well and made the drilling job easier. Applying a drop of cutting oil to the tip of the drill bit made the job easier and faster as well as reducing my dulled-out drill bit to rivet ratio substantially.



By hammering some of the aluminum bulkheads and skins out flat, I was able to trace them and lay out some of the critical hole positions in the new parts I was making.

Although I could have purchased the replacement bulkheads from Zenair in Midland, I wanted to learn some of the basics of aluminum aircraft construction and decided to make my own bulkheads. Besides, if I wasn't happy with them, I would just order some from Zenair. So, I watched a few videos, made a wooden form and proceeded to pound out a few bulkheads.



Satisfied with the result, I began assembling the parts I had made and added the extrusions back into the assemblies. Everything was done with clecoes first, of course, since final assembly would require the addition of adhesive sealant for waterproofing.

Alignment of front and rear extrusions was critical, so the use of a guide was required.

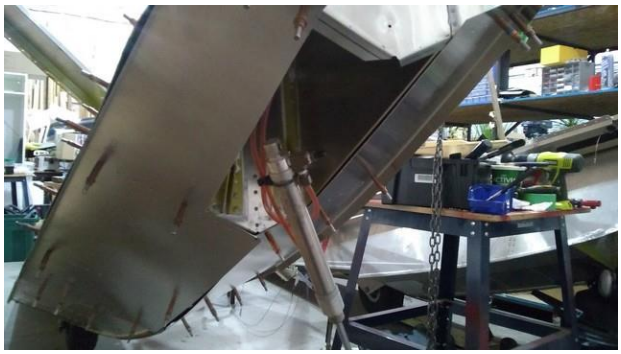
The flattened bulkhead served nicely to align all of the critical holes and then many of the final holes could be back-drilled through the extrusion to ensure perfect alignment on the new bulkheads.

Removal of the sealant on exposed surfaces was hastened by the use of a small drill-mounted Scotchbrite pad. I just had to hold on tight and develop a knack for keeping the pad from running away down the surface beyond where I wanted it to go.

Once everything was cleaned up and the new aluminum roughed up a bit, I added the sealant to each joint and began final assembly.

The new and original skins are shown here for comparison. I only replaced the bent section, but did a triple row of rivets and overlapped the bottom skins at a bulkhead to ensure a very tight and secure seal.

I trial fit the wheel bulkhead assemblies into the floats,



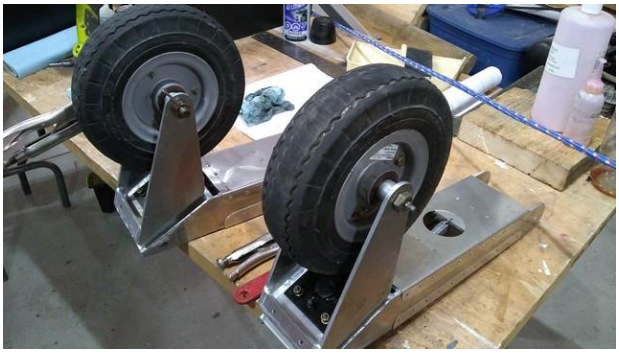
then trial fit the new bottom skins.

I then test fit new pieces of keel extrusion and drilled half a bazillion holes to mount them temporarily with clecoes. Next, I drilled another half a bazillion holes out the bottom skins to match the holes that take 3/32” squeezed rivets that join the bottom skins to the side skins. I then disassembled everything and deburred all one bazillion holes.

Once I was satisfied with the fit, I cleaned and roughed up the surfaces and began sealing

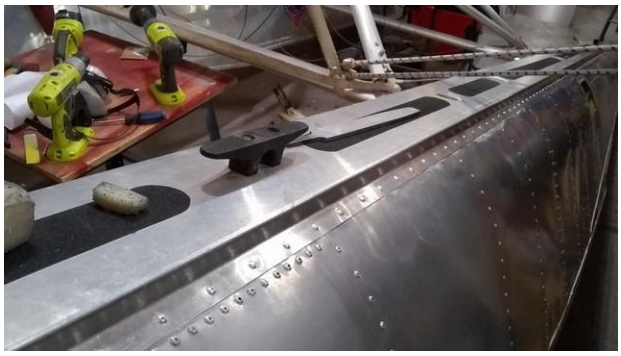
things up with Sekoflex sealant as I riveted things in place.

Over the next several days when I had a few spare moments, I would rub each of the rivet heads with a piece of crepe block to rub away the excess sealant. It's slow work and cramps the hand up, so I did it piecemeal rather than attempt it all at once.



Rebuilding the front fork, swivel and wheel mount assemblies took a little time to put together, but it was pretty straight forward.

Once together, I retested the hydraulics, bled out a little air and refilled the reservoir. I tidied up the hose lays under the walkways and remounted the walkways with rivets and sealant. It is worth noting that I dipped every pulled rivet in sealant before inserting it into the holes to ensure a nice tight seal as well as a secure fitment when squeezed. This meant a little extra cleanup of excess sealant was required, but I don't want to spend a lot of time chasing leaks in the floats.



I then made new trim strips and clamped them in place with vice grips, spring clamps and sealant. Sikoflex cures in about 4 to 6 hours allowing me to move on to the next piece.

As I finished the final assembly, I noticed that the EDO-style pump-out cups were very rough with crud that had built up on them and the rubber plugs were also rough with crud. The original plans on the Zenair floats only had flimsy plastic caps that fit into holes to be drilled in the side of the floats near the walkways. When I built them in 2015/2016, I ordered and installed the EDO-style pump-outs to make the floats look a little more refined and make the pumping-out process easier. There's nothing wrong with the standard Zenair method, I just like the EDO-style cups and plugs better.

I mounted a Scotchbrite pad on a drill mandrel and used that to clean and polish the inside of the cups and then used a flat piece of Scotchbrite and some cleaner/de-greaser to clean the rubber plugs. I was very pleased with the resulting smooth and clean surfaces, which should restore the seals to like-new condition.

I still need to rebuild the fiberglass cones that go on the front of the floats, so a bit of composite work awaits me over the winter months. If I don't get to it though, they are available already made from Zenair, but I enjoy a challenge, so I will attempt restoration first.

There are a number of smaller maintenance items I need to complete to have them ready to fly in 2022, but those items will be done as I prepare them for mounting on the new Highlander, Aerial 2.

With winter closing in fast and 2021 coming to an end, I wanted to get Aerial 2 inside for the winter. As you likely know, I do not have a hangar at an airport currently, and as such the floats have been moved back onto the patio that has served as their home for the last two years. I see this as a temporary home and expect to mount the plane on them as soon as possible, likely sometime in May.

I hope to find a nice home (hangar) for both the plane and floats in the spring, but not too far from my home either. I got spoiled quite a bit by flying from Ken Chute's strip. Even though there's no dock space or hangar space available, it's really nice to only be a 5 minute drive from the plane. If I have to, I'll consider just leaving it outside at Ken's this year, but some rental space at Guelph or other close by location would be nice.

In any event, it's great to have the repairs completed and I am really looking forward to float flying in 2022. So much adventure awaits!

- Dan

Upcoming Events in 2022: (Highlighted lines are KWRAA Events*)

Meetings are now held on the second Thursday night each month due to Monday night scheduling conflicts at the Cadet Youth Development Centre!
Meeting dates and protocols have changed as the pandemic progresses.
On-line meetings will resume due to the new Omicron variant of the Covid-19 virus.
Updates will be sent out to members via e-mail, along with a link to the meeting.

January 13	-	January Meeting at 7:30 will be on-line. Check your email for details.
February 10	-	February Meeting at 7:30 Details to follow as the situation changes.
March 10	-	March Meeting at 7:30 in the Cadet building at CYKF (tentative)
April 14	-	April Meeting at 7:30 in the Cadet building at CYKF (tentative)
May 12	-	May Meeting at 7:30 in the Cadet building at CYKF (tentative)

Look for summer fly-in details later in the New Year.

September 8	-	September Meeting at 7:30 in the Cadet building at CYKF
October 13	-	October Meeting at 7:30 in the Cadet building at CYKF
November 10	-	November Meeting at 7:30 in the Cadet building at CYKF
November 25 ?	-	KWRAA Christmas Party – Details to follow later in 2022

* KWRAA events are fly-in and/or drive-in.

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FOR SALE:

I have a large quantity of Sika spruce available. Many pieces are cut to a taper from end to end for the spars of a Tern sailplane project; all are either rough sawn to 1" or a little more or planed to 7/8".

It was sold to me as spar grade.

I looked at all the pieces a few weeks ago to verify grain direction and ring count. I did a few density and moisture content measurements and all were well within MIL-S-6073.

I also have 22 full 4' x 4' sheets of 1/16" fir plywood plus some odds and ends.

Present retail price is about $40 per board ft. for 7/8 sitka and $60 per sheet for plywood. I am open for offers, but I would especially like someone to buy the whole lot! The sitka is presently in a shipping crate about 28' long by 10" square section and could be moved onto a trailer in this box fairly easily.

A complete listing of material is available. Contact Bruce Clift (519)395-3144 or blairskids@hotmail.com.