

Radio Controlled Soaring Digest

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Front cover: Colin Taylor's 4.5 meter span Discus 2 (Top Models CZ) flies overhead during the Hawkes Bay Aerotow, New Zealand. Photo by Graeme Rose.



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iPhone 5, ISO 50, 1/7,750 sec., f2.4

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In the Air

Two new stories from GizMag.com will be of interest to readers of *RCSD*. The first explores the aerodynamics of the football used in the 2014 FIFA World Cup, the second announces a wood product said to be stronger than steel on a strength-to-weight basis.

First, the design of the newest FIFA soccer ball...

<<http://www.gizmag.com/brazuca-world-cup-football-aerodynamics-nasa-mit-jabulani/32582/>>

We found this interesting as it focuses on the aerodynamics of a round body, the basis for the development of airfoils via conformal mapping.

Governing body FIFA has strict regulations on the size and weight of balls, but none regarding their outside surface. So it's the outside surface which has been getting the attention of researchers. Every facet in the design of the little sphere has an effect on the way it behaves and moves through the air. Adidas talked to ball players and placed test balls in a NASA Ames wind tunnel and water tunnel in their search for the 2014 match ball, the Brazuca.

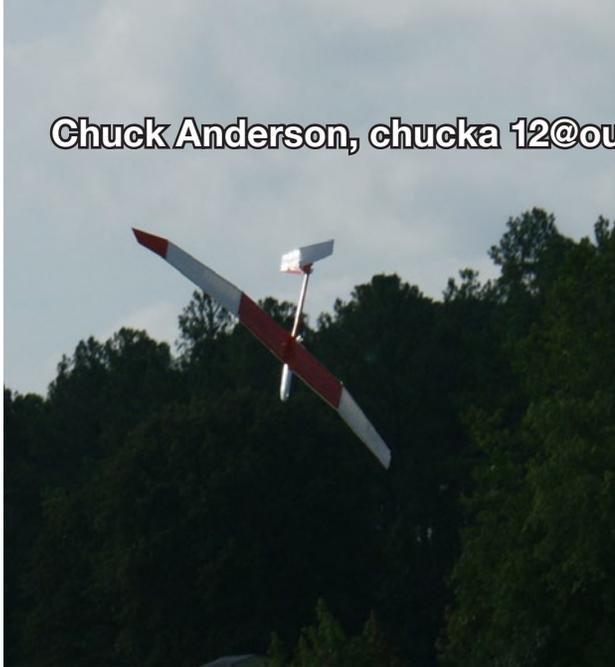
The Brazuca is the latest of a series of Adidas World Cup match balls, and comparisons with the 2010 <<http://www.gizmag.com/adidas-jabulani-soccer-ball-world-cup/15369/>> and 2006 balls <<http://www.gizmag.com/go/4927/>> are worth reading as well. The video of the 2014 ball in the wind tunnel is quite informative.

About that super strong wood... A team of researchers working at Stockholm's KTH Royal Institute of Technology

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AFTER THE



Chuck Anderson, chucka_12@outlook.com



CRASH



You have crashed your model. Now what?

I have seen many fliers head to the dumpster to dispose of the remains after removing the salvageable parts, but right after the crash is not the best time to decide what to do with the pieces.

I have been crashing models for over 60 years and observing others crash just as long. Several times, a crashed model could have been repaired except for missing parts.

If possible, I try to take notes about what happened while the memory is still fresh in my mind.

Several years ago, I had a major crash and documented the rebuild in an RCGroups build thread “LilAn Resurrection.” This is how I investigated that crash while repairing the model and what I learned in the process. Maybe it will inspire some fliers to think about what should be done after a crash.

On Saturday September 13, 2008 I was flying in a contest when my LilAn No. 3 had an unfortunate encounter with strong gusty winds from approaching Hurricane Ike. I don’t normally fly in these weather conditions but this was a contest I had flown every year since 1971.

As I started a zoom in the second round, the LilAn did an abrupt end over end tumble and two pieces flew off. When it stopped tumbling, the LilAn was in an inverted spin and the stabs were missing.



Photo 2: A bad time for decisions to be made.

I assumed that the stabs had fluttered off, but my timer said that he thought the stab had snagged the winch retrieval line. Someone yelled “Extend the flaps!” but RES models don’t have flaps.

The model stabilized in an inverted spin and I could do nothing but watch it slowly spin down. The rate of descent was slow enough that Rich Eichel was able to get pictures of the LilAn as it

neared the ground.

I have been crashing models for over 60 years but this was the first time anybody got pictures of the crash as it happened. The title page shows the end of my Number 3 LilAn’s 177th flight.

Every scrap that could be found was carried back to the shop for analysis.

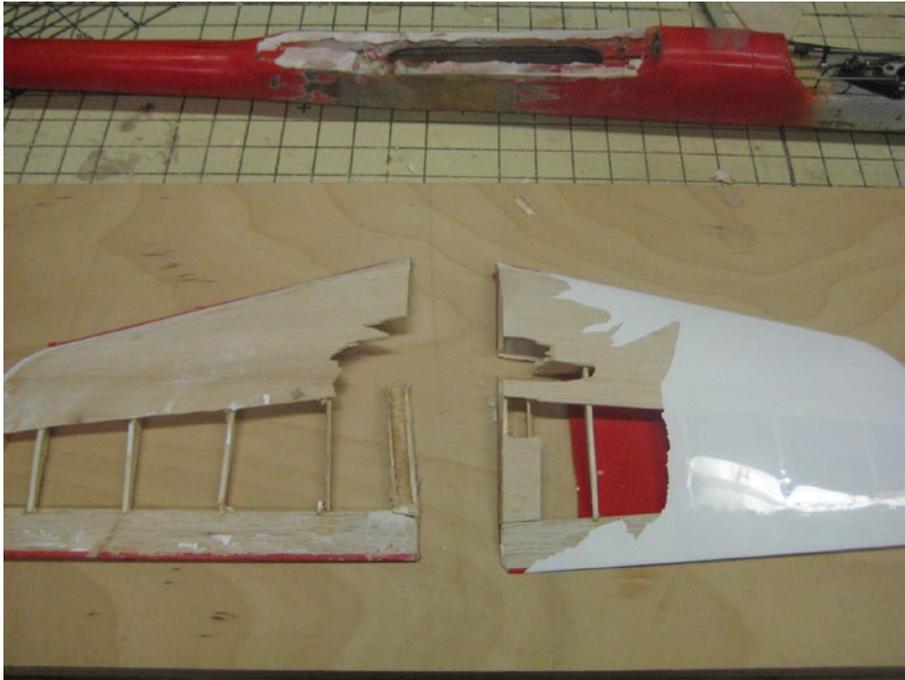


Photo 3: The damage to the fuselage and wing tips.

(See Photo 2)

The receiver, battery, servos, and wiring harness were removed from the model and checked for physical damage and operation. The ground impact was not much more severe than a spiked landing and everything worked after the crash.

I inspected everything for scratches and cuts as well as checking for cracked crystals on a vibration table before using it again. LilAn used an XPS 2.4 sailplane receiver and 2.4 receivers are much less vulnerable for crash damage than the old 72 receivers with all those crystals.

The right stab and the right wing tip panel were the pieces that flew off the model in the tumble. (See Photo 3) The left stab was still attached to the fin by the Monokote and the photos show it folded down in the spin.



Photo 4: Fuselage repair.

Examination of the broken parts revealed that only the center wing panel and the stabs were totally destroyed. The fuselage was broken between the wing bolts and held together by the pushrods and antenna tube with no other damage.

To prevent further damage, the fuselage was jugged up on the workbench to align the parts and glued together with thin CA and 5 minute epoxy. This made the fuselage strong enough to grind the paint off the break and reinforce it with inch wide glass tape.

After the epoxy had cured overnight, the area around the break was sanded to bare fiberglass and a 4 inch wide strip of 6 oz glass laminated over the damaged area. (See Photo 4)

Once the epoxy had cured, the fuselage was hung on the shop wall until the winter building season.



Photo 5: The new center panel and stabilizer halves.

Other parts suffered only minor damage and could be easily repaired so all parts were placed in storage for later rebuilding. After Christmas, a new center wing panel and stabs were built (See Photo 5), and the fuselage repair was completed.

The outer wing panels required only minor repairs and the model was flown again on March 21, 2009. (See Photo 6)

Post Crash Analysis

In my shop, I could examine the photographs and broken parts at my leisure in more comfortable conditions. The first thing I discovered was that the model did not hit the ground the way I remembered. The model contacted the ground on the nose and right wing tip in a shallow inverted dived.

The nose cone had light scratches and needed only a little epoxy in the splice seam and paint. (See Photo 7)



Photo 6: March 21, 2009.

The right tip panel broke off in the snap roll and the only damage to the right outboard wing panel was a grass stain where the tip contacted the ground and a compression fracture to the trailing edge at the root. (See Photo 8)

The left outboard wing was undamaged except for the tip panel. The tip panel bottom sheeting was destroyed and two ribs were broken in the ground loop following impact with the ground.

Most of the wing damage occurred in the ground loop after touchdown. The center wing panel main spar broke at the left side of the bolt beam by axial loads in the ground loop and the left side Monokote had no tears except where the spar broke at the bolt beam. The left half of the center wing panel looked almost reusable except I don't splice wing spars.

All the right side ribs outboard of the bolt beam were shattered, but the spar had no damage. All glue joints between the broken



Photo 7: Nose cone damage.

ribs and the spar were intact. I had been concerned about the glue joint between the spar and the nose and tail ribs but the glue proved to be stronger than the balsa ribs. The remains of the center wing provided a lot of valuable information about wing construction using carbon fiber spars.

The tip panels were not designed for negative loads, so the right tip panel failed downward and sheared off in the tumble with minimum damage. The left tip panel remained attached to the outboard wing panel and suffered moderate damage when the model impacted the ground. Both were repaired and glued back to the outboard wing panels.

The tip panels were glued to the outboard panels without dihedral braces and reinforced only by a narrow strip of lightweight glass cloth on the bottom. (See Photo 9) After examining the damage, I decided that the joint was adequate



Photo 8: Right wing panel root repair.

for normal flying loads and no further reinforcement of the tip panel dihedral was needed since I did not plan to fly inverted or do outside loops. Six more LilAns have been built since the crash of LilAn 3 without wing structural modifications and all have performed satisfactorily.

The inboard two inches of both stabs were still attached to the fin by set screws to the forward joiner wire. The right stab had sheared off just outboard of the joiner wires and a brown mark on the leading edge of the right stab showed where the retriever line hit the stab. The left stab had failed downward just outboard of the joiner wires and remained attached to the stab root by the bottom Monokote. Right stab failure was caused by hitting the winch retrieve line and the left stab failure was caused by abnormal negative loads, so no structural modifications were necessary.



Photo 9: Left wing tip repair.

New stabs and a new center wing were built using joiner tubes, spoilers, spoiler string guide tubes, bolt beam, and plywood parts salvaged from the broken center wing panel. (See Photo 10) No structural changes were found necessary from the crash analysis; however changes were made in the build sequence to make the wing easier to build.

Not all crashes can be repaired, but some can if you don't leave the remains in a dumpster. Modern molded sailplanes are not as repairable as built up or bagged wing models, but many of the pieces can be salvaged. I have seen Bob Brown rebuild his broken Ava wing as well as several Ava wings belonging to other modelers.

You might be surprised how much more repairable a model becomes after it has been lying on a shelf for a few weeks. Even if a model can't be rebuilt, much can be learned by



Photo 10: Wing repaired complete, waiting for recovering.

analyzing the remains and searching for better construction methods. In this case, the crash verified the structural integrity of my simplified method of building a wing with a carbon fiber spar. The six LilAn wings built since the crash of LilAn 3 were easier and quicker to build.

LilAn 3 served as my backup RES contest sailplane for several years after the crash and still hangs in my shop needing only refurbishing to fly again. Unlikely since I have built three later versions, but LilAn 3 is still there if I need it again.

The entire sequence of the LilAn crash photographs can be seen in Rich's photographs of the September 13, 2008 Coffee Airfoilers contest on

<http://www.picasaweb.com/coffeeairfoilers1>.



TOM'S TIPS

Undressing a Blanik

Tom Broeski, T&G Innovations LLC, tom@adesigner.com

There were a lot of Blaniks at the Horizon Aerotow. After the demise of my Nemere, I decided to be like everyone else and get one.

Of course, I didn't want to look the same as all the rest and advertise Red Bull. A couple of the guys took off the decals and re-did their planes. Everyone seems to stick with blue on silver.

One pilot told me he had a lot of trouble getting some of the adhesive off and that Goo Gone™, and similar solvents didn't work. Sooooo... here's how I undressed her.

There are a couple different types of decals. →

Peel off what you can without heat. That leaves less adhesive. If fresh, it's easier than if they've been on awhile.

The blue and white vinyl peels the easiest. →





◀ I ended up using heat on the screen printed ones.



▶ For the small bits, I used the removed decal and just tapped and pulled the adhesive off. It's a very clean way to do it. ▶



◀ For the larger areas I used alcohol. The 91% isopropyl worked, but I found the solvent type worked fastest. Goo Off, Gone or whatever is in the paint thinner line did not work. I did wipe everything down with the isopropyl afterward.



◀ The alcohol doesn't dissolve the adhesive, but releases it from the surface. Keep the towel wet and it goes fast. ▶





Now for the tough one..... the Yellow.



This required heat...



and left most of the adhesive on the wing.

Turns out it wasn't as bad as I thought.



I kept the surface wet with solvent alcohol and the adhesive just pulled right off in sheets.





◀ I was deciding whether to keep this "Bull" decal.

I opted for a complete undressing. The fuse and tail parts are all done the same way...

Now I'm ready for the hard part... deciding how to re-dress it.



In the Air, cont'd...

claim to have developed a way to make cellulose fibers stronger than steel on a strength-to-weight basis. ...this from a substance that requires only water, wood cellulose, and common table salt to create it.

To produce the new material, the team took individual cellulose fibers and broke them down into their component strands or "fibrils." They then separated and re-bonded these fibrils in a technique that results in filaments much stronger than the original fiber.

Use of this product as a basic building material and within composite structures should open new avenues in RC sailplane design.

Erratum In the June issue of *RCSD*, we completely misidentified the photo on page 62. The captioning should read:

"An ASW 28 between flights. Gotta love scale sailplanes with realistic pilots in place. Photo taken at the Hawkes Bay Aerotow, Hastings, New Zealand, in March of this year by Graeme Rose."

Our sincere apologies for the error(s). It should be noted that Graeme also provided the cover photo for this issue.

Time to build another sailplane!

RES at the MidSouth 2014



Ryan Woebkenberg, rdwoebke@hotmail.com

I have been working on LSF 5 for a few years now (the story of my 8 hour flight can be read in the September 2011 *RCSD*).

At the start of 2014 I made a deliberate effort to schedule for myself likely 20+ pilot contests for the purpose of making progress on the contest requirement

portion of level 5. I mapped out an informal list of about 10 contests, 5 or so of which I will be likely to actually make, that were either a day trip for me or could be piggybacked with a family vacation.

One of these that I had on my radar was the MidSouth RES event. I had been watching online registrations for about

a month prior to the event and could tell that it would be near 20 pilots in attendance.

It was due to that early season planning that on Friday May 23, 2014 I competed in the RES event at the MidSouth Soaring Championships in Louisville, Kentucky.



That day was 11 years to the day that I finished the build on my Paragon which I flew in the contest.

It has been a Friday tradition at the MidSouth to have some other non TD events. In years past it has been hand launch, XC, RES, and this year was RES in the morning and ALES in the afternoon.

I think that is a very nice format as it gives a chance to fly two events on one day.

I travelled to the event with a neighbor of mine who I have been flying RC with for about 10 years now, Ben Pitchkites. It was his first winch launched contest and the ALES event was both of our first time flying ALES (although both of us have

flown other electric soaring events in the past).

Ben and I left about 5 AM for the 140 minute drive and were back in the Indianapolis area a little before 8 PM. It was a very nice way to spend a Friday off work. I'd do it every year, but since the MidSouth migrates around the south I'll probably do it again in three years or



Jack Womack

so. Perhaps the Louisville club will hold a contest like this in future years with a similar Friday event.

At the pilots meeting it was announced that 22 pilots had signed in for RES. This was going to be a Level 5 qualifying contest and there were many in attendance hoping for that win. With five winches there was to be five flight groups and then seeded MOM scoring after the

first round. Tasks were announced at the pilots meeting as 10 minute precision duration and the landing task had already been announced on the RCGroups thread and on the contest registration site as a runway landing.

There were many good pilots flying great sailplanes at this event, but I knew that if I read the air well, worked the air well, and kept concentration up on the

landings I would be in the hunt for a good finish.

The RES event was three rounds and I did fairly well with that objective but not well enough. I placed 3rd out of the 22 pilots. I made all the flight times within 10 seconds but on two of the landings I wasn't concentrating well enough.

The first landing I was just off the landing tape. The 2nd landing I only did well



Two Paragons

enough for 25 landing points. The final landing I scored 93 landing points.

Analyzing the winner's score, we were similar on the task time (I averaged to within 6 seconds), but would have needed to average in mid the 80s on landings to outscore him.

I could have done this, I just didn't quite have my concentration up enough. At this contest just a handful of us made the 10 minute duration goal each of

the three flights and the landing score decided the "tie." I didn't do well enough in the landings to deserve the win. Skye Malcolm flew well making the times and the best landings and got a well-deserved L5 win, the first for his blue sheet.

LSF Level 5 requires six contests each of 20 or more contestants to be flown. It requires a total of 12,000 points to be accumulated and of the six contests

three of them must be wins. Winning a 20 pilot contest nets the pilot with 2,000 points exactly. So the objective is to average near 2,000 per contest. At this contest my score was about 1,850 so it was close enough to 2,000 that with a win in a low 20s pilot count contest this would average out to 2,000. So I chose to have the CD sign my LSF Level 5 sheet for this contest!



