

VALLEY RADIO CONTROL MODEL CLUB

JUNE 2010 NEWS LETTER

Grounds:

The recent rains have assisted us in keeping the runway grass relatively green. The club's Ride on Mower is now back up and running thanks to Colin Glazer who took on the job.

Barry's Mower license has now been endorsed "Strictly Push Mowers Only".



Photograph by Darren Glazer

After getting no offer of help from the local municipality on our **Water Lettuce** infestation a frustrated David Charls with the help of the internet located a web site "**River Health Program**". There were contact details on the site and David made contact and got very quick response from Sekwele Ramogale from the Department of Water Affairs. This response from Sekwale in turn led to Ryan Brudvig from the departments Bio Control and Aquatic weed Division who has agreed to assist with the clearing of the water lettuce using a biological method using insects that devour the lettuce.

Ryan says he knows the quarry as he has had involvement in the past with removal of Hyacinth, will arrange for the lettuce eating insects to be reared and then let loose on the lettuce. This method of control takes about 3 months before results are seen as the insects need to build up in number to really do damage.

The members of the club extend their appreciation and a big thank you to the both Ryan, Sekwale and the Department of Water Affairs.



Photograph by Darren Glazer

Hopefully the birdlife and small creatures that survive in, on and around the water in the quarry will make it through the period of the infestation.

We have not heard the fish eagles cry since the lettuce closed the water surface completely and they are sorely missed.

Fun Flying 16 June 2010:

An impromptu Fun Flying completion was held on Wednesday 16th June 2010. Doc Christo kindly compiled the competition routines and judged the event.

The day was great fun with club members for a change having to concentrate and fly competitively a sequence of routines and of course the committee made sure that the famous Quarry "Wors rolls" were available for sustenance.



"Ace Pilot" - 16th June 2010



Andre presented with the trophy by Judge Christo

Andre with his 40 size electric stick scored the highest points on the day. Andre has set the bar for the future club fun fly days by completing 22 "Touch and Goes" in three minutes for the touch and go routine. He was closely followed by the Quarry Ace Oom Rudie.

Thank you to Jo and Ian Gordge who kindly donated the trophy for the fun day.

Future Fun Flying events will be organized during the remainder of the year. For those of you who missed this fun fly day we hope to see you at the next one. Watch the press and the website for details.

Thank you, Christo for doing the preparation of Score sheets and arranging the event.

Weather

Although this is supposed to be the best flying weather time of the year, the weather forgot that and during June a number of flying days were lost due to the wind.

"The Good Guy's"

Dennis Joynt has kindly submitted this photo of the Monday Flyers. The "Good Guy's fly most Monday mornings and enjoy their traditional "Ouma Rusk's and coffee" .



Safety

Yet another accident free month. Thank you to all those who continue to abide by the safety rules, however we still have one or two individuals who like to bend the rules from time to time. On the occasions when we have a number of visitors present at the club, please assist by informing them about the Clubs Safety Rules, Pitt Area and No Flying areas. Rudie has kindly placed an informative sticker at the back of the peg board demarcating the different areas. Just remember that Enjoyable Flying is Safe Flying.

The Monthly Article

In order to help improve the knowledge base at VRCMC, the committee members have approached various people to do talks at the club and / or write articles for the VRCMC News Letter.

To date we have had a few very good speakers on different topics at the club and some very interesting articles in the monthly news letters.

In the interests of keeping the articles going David Charls our Chairman approached Jason Barker to share some of his hard won knowledge by writing a monthly article that would assist the VRCMC club members set their airplanes up correctly.

Jason has very kindly agreed to do a series of practical (read not overly technical and complicated) articles that the VRCMC members could read and put into immediate practice.

For the members that do not know Jason herewith a short introduction.

Jason has been flying RC model flying machines for over 20 years. He has flown large scale aerobatic at National level and this discipline is still his favorite. Jason has also done a host of other things in the RC field which includes, pylon racing, pattern, jets and helicopters.

Jason runs a very successful aerial photography business where he has used all his years of experience in RC and different RC platforms and combined it with using the real

thing for the taking of specialized aerial photographs and video. Have a look at his website www.skyimaging.co.za

Thank you Jason

PLANE ON RAILS – BETTER SETUPS – By Jason Barker

How to get a good basic servo/geometry setup

What's servo resolution?

Servos have a resolution of 1024 points per 60 degrees of rotation. That means although even when moving the stick slowly servos look fluid in motion they are actually only able to stop at one of these points. They look fluid because of the high resolution. This is the reason you don't want to run low percentage ATV or D/R settings. You would end up with a control surface that has very low resolution. This would make the control surface less fluid in motion (more jumpy) and also less accurate all round including centering.



Servo horn setup

First zero your sub trims, trims, any mixing or mixing offsets on the channel you working on before you screw the horn onto the servo. Unless you purposely trying to create differential on that control make sure the horn is square to the pushrod. Rotate the horn on the splines to see which one of the arms gets closest to being square, this will minimize the amount of sub trimming you need to square the horn from your TX afterwards.

When you fix the control horn to the control surface make sure the horn holes are square and in line with the hinge point.

For 3D setups, big control surfaces or servos that are marginal for the application

Here you want to dial up the ATV on your transmitters. Most radios can go to 150%. I take mine to 140% as this allows 10% for a small amount of sub trim and or flying trim. This is also the reason you want to zero your trims and sub trims on your TX before you set your servo horn. If you exceed that 10% when trimming you will have a dead spot at the end of your servo travel.

Trainer, sport and other general planes with smaller control surfaces & deflections

Here I use my ATV at 100%. The reason I do this with a smaller control surfaces with less deflection (lets say less than 25degrees) is that the suggested servo will have sufficient power and resolution for this type of setup but would be 40% slower if you set your ATV to 140% like a 3D setup.

With that said sometimes even small surfaces could do with increasing the ATV settings higher. An example of this would be an aileron that shows signs of wanting to flutter at high airspeeds or a flap / airbrake surface that is working hard. Increasing the ATV and then setting the throw back to normal deflection mechanically will make this surface more rigid and powerful.

Careful when using dual rates, if you using low percentage D/R (lower than say 70%) it a good time to consider increasing your ATV settings a bit to compensate for the low D/R. Remember that your D/R setting is a percentage of your ATV and low percentages means low resolution.

Setting up the throws mechanically

Using the above information, decide and set your TX ATV's to what you require. Now that is done lets mechanically set your pushrod to get the required throw. By doing it in this order you will get the best power/resolution from your servo for your control surface requirements. Once you have the servo and control surface horns fixed correctly, connect the pushrod to the very outside holes of the horns. If the surface movement is too much then move the pushrod on the servo horn inwards one hole and check again, repeat if it is still too much. If the surface doesn't move enough then leave the servo horn hole at the outside and move the control surface horn in one hole and again repeat if it is still too little. The reason for doing it this way is that you end up with the push rod as far out on the horns as possible which gives you the most rigid slop free linkage.

By doing it in the above order you will generally end up with the control surface horn being longer (measured from horn hole to hinge pin) than the servo arm which is a good setup. It is not always possible with a 3D setup but as a general rule you should try not go to a point where you have a longer servo arm than control surface horn.

Setting up the throttle for proportional power

With computer radios it has become very simple but for those who are using old or basic radios you can still set a throttle linkage mechanically so it gives you a smooth throttle response curve. Generally a throttle is very sensitive at the bottom half and from half throttle upwards almost does nothing. To correct this with computer radios adjust the throttle curve mid point to 30% and adjust the other points so it makes a smooth exponential curve. To do it mechanically, undo your throttle linkage at the servo. With the throttle stick at half move the servo arm on the spline so that it is around 30 degrees off square in the same direction as when closing the throttle. Adjust the pushrod length so the carb won't bind at either end when moving the throttle stick and then reconnect. You might have to adjust the length of the servo arm slightly to get the correct range of movement for the carb. When you finished you should have a carb that opens to about 1/3 when your throttle stick is at half.

Electric motors are the opposite and although I am not sure if newer ESC have corrected for this I have always had to adjust the throttle curve for about 70% at half throttle to give a proportional throttle response. Cheers Jason

Interesting articles:

Making Your Own Composite Landing Gear - by Windy Urtnowski

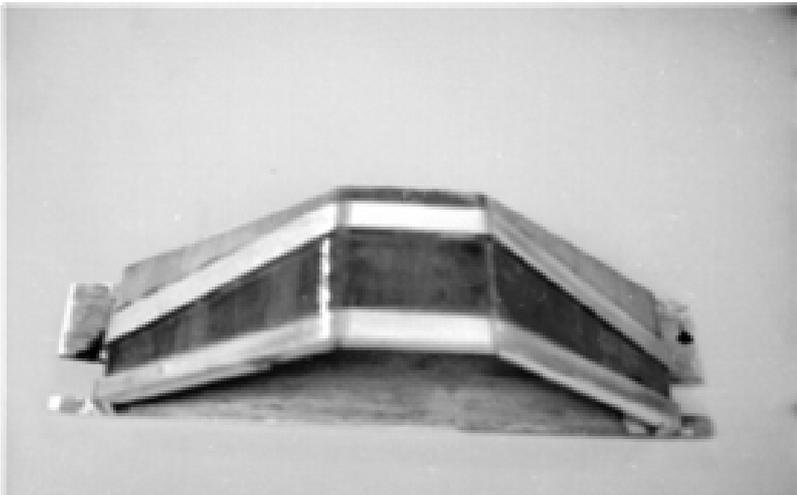
A recent building project required a fuselage-mounted landing gear with a specific combination of spread, height, and sweep angle, but nothing on the commercial market was exactly right, so I decided to mold my own.

I'd molded many model cowls, gear doors, canopies, and wheel pants using RTV molding rubber, so that method was an option, but I wanted to come up with an ultra simple and very inexpensive method that an average modeler could replicate easily the first time out.

The method described here is very similar to the method I used to mold carbon fiber props, but I think it's a lot less critical. It uses a male/female two-piece mold and is very easy to customize to your individual needs in any dimension.

This composite landing gear is a great project, even if you've never molded a part in your life. The mold can be made in just a few hours from balsa and C.A. glue.

All the materials are readily available from several sources. (I got mine from George Sparr at Aerospace Composites.) Not only can you learn a lot about molding and composites, but replacing that aluminum gear can save considerable weight and raise the vertical CG at the same time, and once you make the mold, you can make as many more gear pieces as you need in the future, quickly and easily.

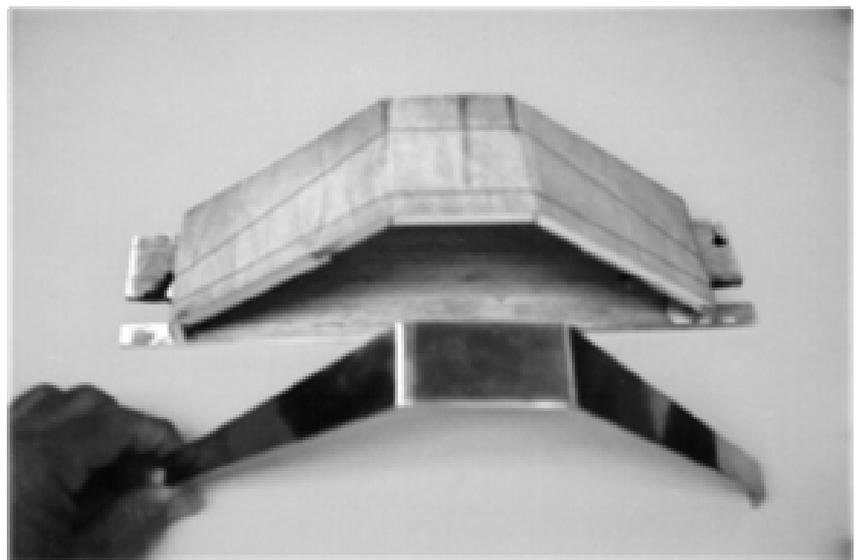


Step 1. Mold base from balsa and veneered 1/64" plywood. Aluminum gear (or dummy) pattern is traced on this lower mold half with a pen.

Begin by building a balsa male plug around the aluminum gear you want to replace. Any scrap balsa can be used—look at the photos to see how this part encapsulates the gear bottom, front, and back. If you're starting from scratch, you can bend a dummy gear from soft aluminum, or you can make one from plywood or even hard balsa.

The top half or female part is made right over the male part containing the cavity for the gear. Leave the ends open so that any extra resin can be squeezed out, as would be done with a prop mold.

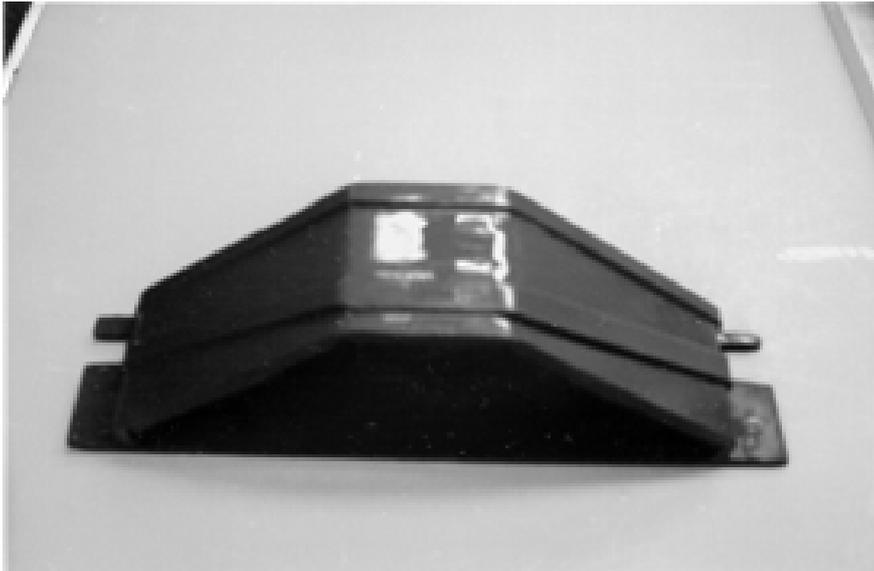
To give the molded parts a smooth finish, paint the entire mold with Brodak dope or auto primer and sand it perfectly smooth. Another method I've used is strips of Mylar on both sides of the mold where it actually contacts the resin. Either way, the outer surface will be as smooth as the mold cavity, so do a



Step 2. Make edges for the mold bottom from balsa or plywood to exact height of gear, with ends open so extra resin can be squeezed out.

good job. Finish this stage by polishing the mold cavity to a high luster with Gorham's Silver Polish if you painted it with dope, then wax it with Partal Paste Wax #2 (from Florida Glue Products), per the instructions on the can.

The mold should now be ready for the release agent. Paint polyvinyl alcohol (PVA) on all the surfaces that will contact the resin. I recommend painting the whole mold, four coats with a brush, trying to avoid runs and globs. Spraying the PVA is even better, since it will result in an almost glass-like finish in the final parts. Either way will work well, making Your Own Composite Landing Gear



When the release agent is drying, cut the reinforcing cloth to size. Fiberglass, Kevlar, or carbon fiber will all work, with fiberglass the least expensive, Kevlar stronger, and carbon fiber the strongest but most expensive all. Cut these blanks as accurately as possible, using new Excel knife blades and/or fiberglass wheel cutters.

Important: Vacuum up immediately after cutting these materials, wearing a good dust mask, *always*.

Step 3. Prime all surfaces, sand, paint (optional), and polish to a smooth surface. Any defects left in the surface will be picked up in molded part.

Carbon fiber and fiberglass can be "sandwiched" in layers, if you want, but always use the carbon on the outer skin, since it is the stronger material. Any good epoxy resin will make a satisfactory gear, and if you want the ultimate strength, you can get exotic aerospace resins...but be aware that these usually are very toxic and need to be post-cured in an oven at very specific temperatures.

Polyester resin is a lot heavier and weaker, so it's not a good choice for this type of structural component. To begin the actual lay-up, paint the mold cavity with resin, using a flux brush, then lay in the reinforcing cloth until it's just a bit above the cavity created in the male mold. Put resin on each layer as the part is built up; making sure that resin saturates every piece of cloth.

As you reach the top of the mold, a rubber squeegee can be used to squeeze out excessive resin—too much resin doesn't add strength, it just adds weight.

Next, put the female "cap" half on and use clamps to squeeze out all the excess resin. I glue 1/8" plywood pads to the mold where each clamp applies pressure.

After a full cure—typically 24 hours—separate the mold halves and pop out the molded gear. If they stick, you can use a wedge to separate them. If you didn't use enough release agent, you may do some damage to the mold, but that's easily repaired with Bond-O. Clean the release agent off the gear with warm water, being careful to avoid getting a splinter from the flashing, and trim any rough edges. Examine the part critically for solidity and straightness.

If it's twisted, you can heat it with a heat gun and twist it back into alignment. (Use an oven mitt—when a composite piece is hot enough to be twisted, it's too hot for the bare hand!)

Wet-sanding the new part (use 400-grit wet-or-dry paper and do it under a running faucet) will give it a surface that's ready for paint. A coat of Brodak primer followed by a coat or two of Brodak color

dope will give you a very durable finish. Some prefer the unique look of a "polished" carbon composite piece, and Gorham's Silver Polish does an excellent job.

Molding composite parts isn't a "black art," and the average modeler can learn to do it fairly quickly. It's a skill that **Note plywood reinforcement pads on mold top so halves can be clamped, squeezing out extra resin. For lightest and strongest part, use 52% carbon or fiberglass, 48% resin (by weight).** Complements traditional modeling skills, with the added bonus that molded parts are stronger, lighter, and tougher than if they were made from wood...and duplicates can be made in a very short time.

Good luck with this and all your modeling projects.

David Charls has approached **AMT Composites** based at Unit 16, The Power Centre. 21 Lanner Rd, New Germany and confirmed that all the above mention products are available. Look at their website, www.amtcomposites.co.za which has a comprehensive list of what they stock.

We are currently exploring the possibilities of using this as our topic for our next "Informative Workshop", and **AMT Composites have** intimated that they would be prepared to assist so if you are interested in attending a composites workshop with professional input from **AMT Composites**, please email webmaster@vrcmc.co.za so that we can get some indication of numbers as we will need to make a firm booking.

To end this months News letter herewith some **Acronyms and Jargon explained:**



Step 4. Four coats of mold release wax are applied and polished, one hour between coats, then four coats of PVA are brushed or sprayed on to ensure clean release.

Some of the terms are pretty confusing, and a lot of acronyms and other RC only rating systems are used. This downloaded short reference may help some who wondered what all acronyms actually stood for.

Power / Voltage Regulation

- **ESC** (Electronic Speed Controller)
 - Uses a PWM signal to control the speed of a motor
 - ESC's are made for either brushless or brushed motors (See motors)
 - ESC's are rated in Amps (A) for how large of a load/motor they can control
- **BEC** (Battery Eliminator Circuit)
Steps a higher voltage down to a lower voltage, a kind of voltage regulator
- **UBEC** (Ultimate BEC)
Same as a standard BEC, but made for higher voltages
- **BESC** (Battery eliminator speed controller)
An ESC with BEC
- **LVC** (Low Voltage Cut-off)
Keeps LIPO batteries from becoming too drained, which can be dangerous, usually a feature of a controller
- **DVM** (Digital Voltmeter)

Controller Acronyms

- **RX** – receiver
 - Receives a control signal from the transmitter, output's a PWM signal for servos or speed controllers
- **TX** – transmitter
 - (The remote you hold in your hand)

Battery Terms

- **LiPo, LI-PO, Li-Poly**
Short for lithium ion polymer battery, the standard type of R/C battery
- **LiFe - LiFePO4**
Lithium Iron Phosphate battery, generally safer than LIPO batteries, better shelf life, faster charging
- **NiMh**
Cheaper, but generally not as good as LiPo or LiFe
- **S Rating** (Like: 1S, 2S, 4S, 6S, etc)
Number of cells in a battery pack
A single **LiPo** cell is 3.7v
A single **LiFe** cell is 3.3v
A single **NiMh** cell is 1.2v
- **P Rating** (Like: 2P, 4P, etc)
Number of parallel lines in the battery, each parallel doubles the mAh the battery can deliver

A **2S2P** battery has 4 cells in 2 parallel lines

- **C Rating** (Like: 1C, 10C, 20C, etc)
Amount of current battery can discharge in an hour 1C = Batteries entire capacity

A **10C, 500mAh** battery can discharge at 5,000mA (5A) max, and have about a 6 minute life at max discharge

A **20C, 500mAh** battery can discharge at 10,000mA (10A) max, and have about a 3 minute life at max discharge

- **Charging Bag, Charge Pack**
A fireproof safety bag for storing batteries
- **LIPO Monitor**
An alarm that goes off if the battery voltage drops too low. Batteries that drop too low can be damaged, or possibly explode.

Motor Terms

- **Brushless Motor**
A motor that runs off of A/C power, and has no "brushes" that transfer current into the rotating spindle. Brushless motors are similar to stepper motors, but only have two coils.
- **Brushed, Canned, Standard Motor**
A traditional DC driven motor
- **Coreless motor**
A motor without the iron core in its windings
- **Out runner motor**
Brushless motors where the casing spins and the centre stays still
 - Motor is mounted by the back of the shaft
 - Low RPM's, high torque
 - Silent
- **In runner motor**
Brushless motors where the centre core spins, and the casing is fixed
 - Motor is mounted by motor casing
 - High RPM's, low torque
 - More efficient than out runners
- **GB**
Gear box, usually for planes
- **KVM, kv-RPM, KV**
A motors' RPM in thousands per volt supplied

Servo Terms

- **KG Rating** (Like: 10kg, 20kg, etc...)
Amount of force the servo can exert in kg/cm
Can also be rated in oz-in (Imperial)

- **G Rating** (Like: 30g, 50g, etc...)
How heavy the servo is
Can also be rated in oz (Imperial)
- **Sec Rating** (Like: 0.20sec, 0.50sec)
How fast the servo can rotate in seconds (usually for 60 degrees)
- **Digital Servo**
Pretty much like a non-digital servo, but uses a microcontroller brain

Thanks for reading!

We hope you enjoyed this months news letter and if you know someone who could like to be included in the monthly news letter mail, feel free to forward it to them! Or go to the clubs web page (vrcmc.co.za) and add their name and email address on the contact list.

With regular contributions and report backs our club news letter can only go from strength to strength. If you have any interesting articles, hints or airplane stuff that relates to our RC hobby that you would like to share with fellow modelers by publication in our monthly News Letter, please forward them to Andre our webmaster at e-mail address webmaster@vrcmc.co.za.
