

TORQUE BACK

Vol. 11 No. 11

August -September 2011

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"Incubus" pp 7-13

Hobart Model Aero Club inc.

PO Box 1117

Rosny Park 7018.

"Fly over pits to
ensure honourable
model will shortly
join its ancestors

The news letter of the Hobart Model Aero Club

Click on the article you are interested in to go straight to it

COCKPIT TORQUE—COMMITTEE NEWS

Both the clubroom roller door and sliding door have been keyed alike so only one key is needed.

The training aircraft chargers etc. have been upgraded and a cabinet has been purchased to lock the gear in at the club. Thanks to Tony Sheppard for the donation of the training aircraft.

A load of heavy soil is to be delivered when the ground dries out to fill the holes and ruts in the strip and the potholes in the road.

A second control-line circle has been mowed adjacent to the toilet.

Colleen and Jack Tonks are back from their holiday, when the weather is suitable they will have the usual Sunday BBQ.

At scheduled events eg. Tomboys Colleen and Elaine will help out foodwise.

An extension of the covered in seating area is currently underway by Jim Dicker a member of the club.



2011—2012 Committee

Top L to R : Tony Gray, William Deal, Tony Shepard, Bob McAllister, Martin Richardson. Bottom L to R : Peter Ederle, Mike Rutledge

COMMITTEE MEMBERS

President	Tony Gray	0409 681112
Vice President	Peter Ederle	
Treasurer	William Deal	6228 3538
Secretary	Tony Sheppard	6231 6700
Member	Bob McAllister	0419 360 698
Member	Martin Richardson	6249 7943
Member	Mike Rutledge	6249 2422

Next deadline

16th October 2011

*Submissions can be emailed
directly to the editor*

gels@netspace.net.au

NEW CREW TORQUE

Basil Bryan - New Club Member

The model is a E-Flite Andvanced 25 (electric)

Basil is not far from getting his bronze wings.



MEMBER TORQUE

Member Profile - Danny Coles

Your first aircraft encounter - Full Size or Model - can you recall?

When I was 8 years old my Dad bought me one of those little Cox engine control line planes. Many hours of fun was had with that plane.

How long have you been an aero modeller ?

I have been model flying for only a short time, however I was introduced to the hobby by a work colleague at Telecom, David Howell. He invited me to have a look at model flying at Kelly Field and that was 25 years ago.



Your first model aircraft -

My first model was a high wing trainer that surprisingly lasted quite some time. It was one of the best planes I had however I cannot recall the name. Like all good models it was lost to radio failure one Sunday afternoon

Your first full time Employment

Straight after leaving Rose Bay High School I worked for a panel beater, sweeping the floors and going for the "morno" for the boys

Your present Employment

Working for Telstra as a Linesman (30 years this October) as well as everything else they want me to do. Just for the record I know nothing about broadband, I know nothing about fixing telephone lines and if you have any problems with your landline or internet then please call operator- 49!

Name three model categories in which you are currently interested

Currently I fly a Mustang and a very lovely Chipmunk (just like a Sunday driver in a Volvo!)

Have you been involved in other Hobbies i.e. Boats, Trains etc

Other hobbies over the years included snooker, billiards and sailing. Started dinghy group sailing on a Saturday and progressed to sailing 42 footers on a Sunday.

MEMBER TORQUE

Do you have confidence aero modelling will survive the ipod age?

I hope so, I see many children in front of a computer on a sunny day. It is a shame that computers / ipods and all the other gadgets have made children and adults less talkative these days.

Do you have a current project on the building board

Current project is an 85 inch Yak from peakmodels.com. A bargain at only \$360 delivered to your door. (Note: Model now flying and performing really well – see top photo)

Favourite model aircraft

As all of you would know, my favourite was the 30cc P47 Thunderbolt. It was just a little bit noisy on the ear and unfortunately had a sudden ending due to an unknown factor that caused the nosedive into the ground. It's on the bench for repairs (maybe).....

Favourite model engine

My favourite would have to be the DLE 30cc petrol gas engine. For the price it is a great work horse Best memory of model building or flying - I haven't the time for scratch building so ARF models are for me. Best flying memory or should I say sad memory was when one of our past members, Anton was flying a very large scale Tiger Moth and unfortunately had a mid air crash with another aircraft. What a very sad day that was and it seems like only yesterday!

Favourite place in Tasmania (other than Kelly Field)

Bay of Fires at St Helens, this is an annual trip each Easter with family and friends. If you haven't been there I would recommend a weekend trip in the warmer months. Great beaches, camping area, toilets etc. Camping spots are called Cosy Corner 1 & 2 turn left before going to Binalong Bay (Don't tell the "mainlanders")

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Apart from our normal range of RC equipment we can get other brands as well if you require them.

We have control-line supplies , including control-lines 70 feet and 35feet long , fuel tanks ,bellcranks etc in stock..



EDITOR TORQUE

Hello everyone,

For those people whom I have not met yet let me introduce myself. I am Graeme Scobie. My involvement in the hobby of models goes back just before last Christmas, before the before last, before that, I think you get the idea.

One day I felt a most excruciating pain in my neck and it has nagged at me ever since. It got so bad that mum took me to the doctor in early November. As I walked into his room he took one look at me and said. I have some terrible bad news for you. I gasped and mum nearly fainted on the spot. I am sure I went blue in the face before he told me.

I found out years later that it was not uncommon condition amongst RC hobbyists. With baited breath I braced myself with one leg under the examination bed, the other jammed between the wall and the bed and finally with my fingernails clawing at the moulding around the door I expected the worst. As he drew his breath it felt like a cyclone had hit as he was a rather large man. Then as I heard his chair squeak due to his giant size (he was a big man when you are only 11 yo) he bellowed out as if to announce to the world his first child was born, "you have...", (lowering his voice to a level to almost a whisper, leant over and said, "I have come to the conclusion young boy that you have a condition seen more in people 3 time your age. Taking another cyclonic breath, and sighing he shook his head and said with great authority; Boy you have MNS. Looking rather puzzled and just as I was about to quiz him he again let out a sigh and said; that there is some good news and some bad news. Luckily for me Mum was with me as my attention was diverted he looked at mum and winked. With a hesitant and wobbling in my breath I squealed with tears flooding down my face "What the heck is MNS? He leant over and said the good news son is that it is not life threatening nor sadly will it ever improve. Now looking really worried I once again looked across at mum and she said quietly that already, don't worry darling I will do whatever it takes to make you better. I asked quietly; How did it happen? He said see that little mark on your leg. I looked down at my ankle there it was a little red mark, from memory about the size of a largish pin-head. As he said that is why you have the pain in your neck. I remember the day very vividly looking puzzled. I asked, What causes that doc? After another cyclonic episode (at this point I remember thinking; gee for a doctor he doesn't sound terrible well) I sighed once more and looked at mum and winked (so she told me years later) he said as you were asleep you got bitten by something in your bed. Looking me in the eye with a poker like face he it is a type of bug that will come back to bite you for the rest of your life.

Ok doc, what does that mean (with tears rolling down my face) he said that now that the bug has bitten you will always be infected with its poison (winking at mum). Mum asked what she had to do for my condition. The doctor wrote out a referral to a specialist. He picked up and called his receptionist and asked her to make an appointment to Mr Boyle. He handed her the note.

After some time it all settled down and did not affect me for a year or so. Christmas of the same year we went to Sydney as we always did. We lived in Wollongong and used to take the trailer-sailer up and spend a few days at Balmoral beach just a few minute walk from my gran's place. Christmas eve was upon us and I went to bed on my bunk in the morning I woke to see a large box. My eye lit up like a Christmas tree. As I unwrapped it I eye bulged out of my head. It was a Tamiya radio controlled buggy (1981). After spending some time helping dad assemble it we charged up the battery and we took it ashore and in the big carpark at the end of the beach I drove it around.

Since that day I have been bitten by the bug the doctor was trying to tell me about. For the last 30 yrs I have been involved with radio controlled models from cars, boats planes, helicopters and hovercraft (designing my own). As you can see it is a serious affliction I have. That is one of the RC hobbies. So that is how I got into the world of hobbies. . Oh, forgot to tell you what was on the note :- "get him an RC model" Graeme (otherwise known as the editor)

RCMNS— is Radi-contus Moedel nekious syndrome. In other words RC Modeller Neck Syndrome

INSTRUCTOR TORQUE

New membership, essential for club growth, probably arrives via two main conduits - experienced modelers moving into the area and outright beginners who visit the field to see what's what. This latter is where our attitude to training should pay great recruitment dividends if we are properly organized to make newcomers welcome and give them a sympathetic introduction into model flying.

With this in mind it is gratifying to see how fast the new committee moved to allocate funds towards establishing decent training equipment and I and the other instructors thank them for this. We now have battery chargers, radio equipment, 2 aircraft and sundry other items, which when we get sorted should be immediately available to any instructor when occasion demands. It is kept in the new white cabinet in the work shed with the aircraft - a Boomerang 40 and 60 - in the racks. There is still some organisation to be done but we're getting there.

In step with getting the equipment organized, it's great to be able to announce the qualification of five new instructors. Martin Richardson, Joseph Ortuso, Terry Shearing, Greg Hall, and Michael Van Niekerk. Several of these members are relatively new to model aircraft but every one of them has taken their training seriously and worked very hard towards the instructors rating. They should be proud of this effort which apart from the personal satisfaction can only benefit the club by presenting a professional approach to training as well as taking the load off some of the clubs long enduring instructors like Geoff, Erwin and others who for far too long have carried the load. Our CFI Peter Ralph, on extended holiday for the moment has been instrumental in aiding this development and should soon feel safe and able to return.

In that the new instructors are a mixture of ages, both weekdays and weekends should see an instructor available on the field.

Once again - congratulations to the new instructors, look on your achievement with pride

Around the pits - the weather has been so appalling that very little of note has been happening recently. The fields Hare has been joined by a partner so we may have a breeding pair which is nice, a beautiful, very large Sea(?) eagle cruised by the other day but left us in peace and I have attached a pix from Peter Ralph detailing model flying in China. Flying over the pits is not to be considered by the look of it..

On another matter - Have a look at "uthere.com" find "ruby". I wonder where our activity will be in 20 years time? A cruise missile costs in the vicinity of \$50million and here we have a box about the size of a large postage stamp, costing about \$400 that can allow a model to perform all the requirements of said missile albeit at lower speed, although the turbine models are potentially high subsonic. It can even land the thing. Mind you I can see some benefits. Fire the model off from the road outside my place, drive to Kf and collect model which is now sitting at the pits. Could travel on the bike with no models to carry. Good stuff!

FROM THE EDITOR'S DESK

Any submissions for the Newsletter can be email directly to the editor (That's me) I am Graeme; gels@netspace.net.au. I can also be contacted on either; 6272 7472 or 0417 520 970. The content can be given to me in any electronic format and I will hopefully be able to open it. But to be on the safe side if you use the more common applications that will make it easier.

Funny Torque

A man walking along a road in the countryside comes across a farmer and a large flock of sheep. He said to the farmer, "I will bet you £100 against one of your sheep that I can tell you the exact number in this flock." The farmer thinks it over; it's a big flock so he takes the bet.

"973," says the man.

The farmer is astonished, because that is exactly right. Says "OK, I'm a man of my word, take an animal." The man picks one up and begins to walk away.

"Wait," cries the farmer, "Let me have a chance to get even. Double or nothing that I can guess your exact occupation."

The man says, "Alright".

"You are an Epidemiologist from Imperial College "advising" the Government," says the farmer.

"Amazing!" responds the man, "You are correct! But tell me, how did you deduce that? " Well," says the shepherd, "put down my dog and I will tell you."

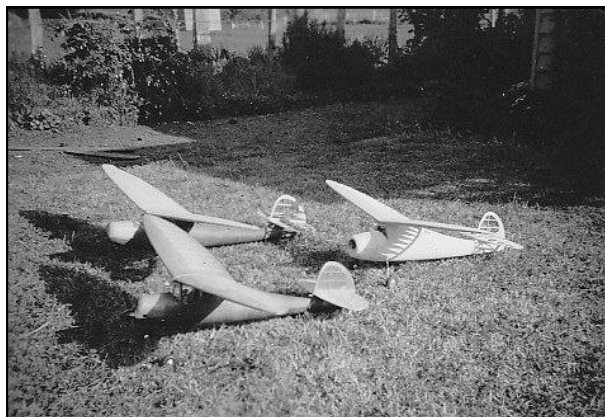
BENCH TORQUE***Ken de Bomford's "Incubus" flies again!***

By Chris Rowe

How it all began!

In mid 2009 Ken de Bomford, my old friend and mentor in the dark arts of aeromodelling, surprised me with an unexpected gift. It was the Incubus, a beautiful free flight model that was flown by Ken in the Power Scrambles at the 1957/58 and 1958/59 Australian National Championships.

The Incubus was the last of a series of three similar models that Ken designed and built in the mid 1950's, and all three reflected Ken's lifelong fascination with the sheer beauty, and aerodynamic efficiency of elliptical wings. Regardless of the efficiency of its wings however, the Incubus with a span of 40" and an all up weight of 16 onz would most certainly have tested the efficiency of its original Mills 0.75 engine! Perhaps this was the very reason that Ken chose to fly the model in the Power Scrambles, because the last thing that you needed in such events, was a model that insisted on flying too high, or too far away!



Ken explained that the model had only ever been flown on these two occasions and, following the 1958/59 event, he put the model away in his large model transit box where it had remained ever since! Although somewhat dusty, the model was complete with its original Mills 0.75 engine and custom twin exhaust manifold, and remained in remarkably good condition. I had no real idea what I might ultimately do with it, but a very careful clean up was obviously a good place to start, and the result was real surprise. Thus it was that, some months later the Incubus, together with an even older example of Ken's unique modelling skills, a 63 year old twin engine rubber powered flying boat, took pride of place at a local Model Engineering and Hobbies Exhibition.

The Incubus - 52 years after being stored away!

The original yellow doped Japanese silk that still covered the flying surfaces, was inevitably both dirty and discoloured, and had long since lost its original tensile strength. The underlying wing, tailplane and fin structures however, whilst somewhat dry and brittle, remained completely undamaged and as true and solid as the day they were originally constructed.

The fuselage, a masterpiece of true monocoque construction, with its 1/16" balsa planking meticulously shaped and glued over no less than 14 elliptical formers remained, with the exception of a couple of small cracks, remained completely undamaged and virtually in original condition. Also covered in yellow Japanese silk, albeit somewhat faded, the clear doped upper half of the fuselage clearly revealed the extraordinary craftsmanship evident in the underlying balsa structure. More surprisingly perhaps, when carefully cleaned of a generous coating of accumulated "gunk", the lower half of the fuselage was transformed, with the black and red cellulose automotive lacquer once again recovering its original glossy lustre.

Last but not least, the engine! As Ken had explained, the little Mills had been purchased specifically for the Incubus, and the model had only ever been flown in the two Nationals events. It was of course an original Mills 0.75, that had been barely run in 52 years ago and never started since! I just couldn't resist; the engine was carefully cleaned, mounted on a test bench and, with half a dozen flicks, away it went! It reminded me of that special moment almost 60 years ago, when I started my original Mills 0.75 for the very first time. It had been ordered from England to replace my ED Bee, which had unfortunately gone missing, some months previously, whilst mounted in yet another beautiful model built by Ken. That model, a converted sailplane, had eventually disappeared out of sight in the clouds whilst gliding upwards in endless circles, locked in a strong Scottsdale thermal. But that of course is another story!

BENCH TORQUE CONT..**It's a beautiful old model, but what should I do with it?**

Ken was clearly interested in the possibility of the Incubus being restored to flying condition and fitted with radio control, even suggesting that a change to electric power might be worth considering. For my part, whilst the possibility of seeing the Incubus fly again certainly intrigued me, I couldn't help feeling that such a model should perhaps be treasured in its original state rather than messed about with! After considerable discussion we eventually agreed however, that because of the obvious technical difficulties, returning the model to flying condition really did not appear to be a very practical proposition:

- At 16oz (725g) all up weight (AUW), the original model would most certainly have tested the capacity of the Mills 0.75 to lift it into the sky. The addition of radio gear would add at least another 4 oz (110g) and necessitate the fitting of a more powerful engine, fuel tank and exhaust assembly, all of which would add a further 3oz (75g) or so, resulting in a seriously overweight model with an impossible C/G problem as well!
- The tail end of the model presented its own unique difficulties. The original tailplane and upper fin, complete with trim tab were attached with rubber bands, not to the top of the rear fuselage but, to a mounting plate located a quarter of the way up the fin. The lower part of the fin, constructed of 1/4" balsa and strengthened with a King Billy pine spar that extended downwards to form an integral element of the fuselage structure. It was obviously going to be difficult, to say the least, to create a rudder large enough to control the model, if the removable elliptical tailplane and elliptical upper fin assembly were to be preserved in anything approaching their original form!
- A more serious complication was that the fully planked fuselage provided no points of internal access other than, the removable upper half of the cowl and a 30mm circular hole in the top of the fuselage under the wing. How could modified tail surfaces incorporating elevators and rudder be connected to servos inside the fuselage, without permanently fixing the tail surfaces in place and operating the control surfaces with ugly exposed push rods or cables?
- Finally, how could a receiver, battery and two servos be successfully installed inside a 55 year old fully planked fuselage, if internal access to the fuselage was to remain the single existing circular hole under the wing; a hole hardly big enough to allow you to get two fingers inside?



Somewhat reluctantly, I packed the model away in yet another box, and there it remained for the next 9 months whilst I thought about it!

In October 2010, some six months after Ken's death, I reopened the box; leaving such a lovely model hidden away unseen was most definitely NOT the right way to treat it. I knew that Ken would have loved to have seen the Incubus restored once more to flying condition and this, I now resolved, was what I was going to do.

If the Incubus was to be restored and modified for radio control, she was obviously going to need a rudder and elevators, and all of the flying surfaces would have to be re-covered. Clearly she was no longer going to look 52 years old but more like she might have done in 1959, if after the Nationals Ken himself had decided to modify the model for single channel equipment was

radio control. Suitable single channel equipment was certainly available at that time, and control of both rudder and elevators might also have been possible, had Ken decided to opt for a "Galloping Ghost" system! Finally I knew what I wanted to achieve, and somehow the problems no longer seemed insurmountable!

** A Galloping ghost was a step above the single channel radio from the mid 60's. for those that aren't in the know (Like me Ed.) if you look at this youtube link you will be just as much in the know as me. [Click here for more information at the Galloping Ghost](#)

BENCH TORQUE CONT..**I knew what I wanted to do, but how could it be done?**

The model had to have a bigger engine or it simply wouldn't fly, and deep in the dark recesses of my workshop was a Frog 1.49 *Vibramatic* diesel that I had purchased new in 1956. Coincidentally, like Ken's Mills 0.75, it had also remained unused for the last 50 years or so! If the Frog engine, tank and battery, could all be successfully installed within the original removable upper cowl, the significant increase in weight forward of the C/G, might perhaps be balanced by installing a micro receiver and servos inside the removable tailplane and fin structure. Such an arrangement would, in a single stroke, virtually eliminate the various problems arising from the limited access available to the fuselage, by reducing the internal R/C requirements to a single lead and switch that would connect the battery at one end, with the receiver and servos at the other!



With some trepidation I dug out my old Frog engine and compared it with the Mills; I could hardly believe the result! Not only was it exactly the same height as the Mills but, more significantly, the width of the lower crankcase was also identical. This meant of course, that the larger Frog engine could be mounted straight into the original engine bearers, with structural modification being limited to minor changes to the various openings in the upper cowl!

In a state of mounting enthusiasm, I noted that a new tank could certainly be fitted into the space available behind the engine; but where on earth could I put the battery? Once again a solution magically appeared! The bottom half of the radial cowl was formed from a solid block of balsa, and my battery pack just happened to be a sliding fit between the engine bearers; the battery could be neatly hidden away in a cavity that I could excavate underneath the engine and tank!

I now had a practical solution for the front end of the model, but could the servos and receiver be fitted inside the removable tailplane? Examination of the structure confirmed that it had a flat under surface, and a cambered upper surface approximately 3/8" deep at the centre line. If the structure could be thickened by about 3mm in the centre section area, it would clearly be possible for two Hitec HS-55 servos and a micro receiver to be mounted within it; but where would the Incubus balance after such modifications?

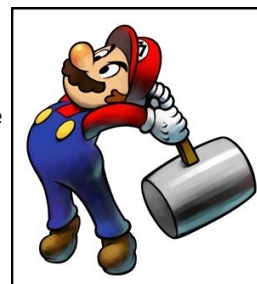
After measuring the critical nose and tail moments of the model, and weighing the original engine, the new engine, and the various components of the R/C system, a simple calculation confirmed that the Incubus should once again balance correctly; just as long as the tail surfaces could be modified and recovered without any significant increase in their weight. Difficult, but not impossible!



The only remaining problem was a niggling concern that the inevitable increase in AUW might seriously compromise the flight characteristics of the restored model. Whilst there appeared to be no obvious solution, it occurred to me that whilst the original wheels looked much the same as their modern equivalents, it was just possible that they were in fact somewhat heavier. A quick de-soldering job followed by another weighing confirmed, much to my surprise, that by replacing the originals with a pair of Du-Bro Super Lite wheels, the AUW would be reduced by almost 2onz!

What I actually did!***The front end of the fuselage***

First, an old fashioned free flight tank was made up to sit on the bearers behind the engine. Although tiny, the tank contains enough fuel for a two minute engine run; more than enough for a model that will be flown only on very special occasions. Next, the hole was excavated between the engine bearers to accommodate the receiver battery, and two indentations in the side of the lower cowl through which the original exhaust pipes had protruded, were filled with scrap balsa. Finally a battery lead was inserted through the firewall into the cabin area, where it was connected to a new R/C switch mounted high on the fuselage below the wing seat. The next step was to modify the removable upper cowl to fit the Frog engine. With the exception of the opening for the Mills cylinder head, which was simply enlarged to the required new diameter, the various holes in the cowl were simply filled with scrap balsa and carefully finished to blend with the original cowl surfaces, both inside and out.



BENCH TORQUE CONT..

New reinforced holes were then provided for the needle valve, tank filling tube and finger access to the rear induction air intake. This left only the vexed question of how on earth the exhaust gasses, emitted in all directions from the annular ports of the Frog engine, might be persuaded to exit the upper cowling in a more orderly fashion! In my free flight days, diesel engines were almost always left exposed to the elements in order to facilitate both starting and cooling. This model however had a smart radial cowl with the Mills being equipped with a custom manifold and twin exhaust pipes! If Ken had managed it in 1957 with the Mills, I felt obliged to do the same with the Frog engine, but its annular exhaust ports created a real problem, and a workable solution eluded me for weeks, if not months! Finally it dawned on me that an exhaust manifold, in the form of a flat rectangular tube, could be made up from two identical short lengths of aluminium angle. When assembled, it would attach to the engine, and convert the engine's annular outlets into a horizontally opposed twin exhaust system, rather like the standard Frog annular exhaust collector ring available in the 50's. Ultimately, it proved quite simple to make. The lower section was drilled for a tight fit on the engine's exhaust stack immediately above the crank case gasket; the upper section was similarly drilled, but with a smaller diameter hole to fit the threaded upper cylinder barrel before being retained by the cylinder head. After checking for size, shape and fit, the two sections were then placed on the engine with the mating edges smeared with epoxy, and locked into position by screwing down the cylinder head. Once the epoxy had cured, and before removal from the engine, the two parts of the manifold were finally joined mechanically by drilling small holes through each corner and driving in four slightly oversize steel pins.



After being removed, cleaned up and polished, I had a removable twin port exhaust manifold that looks, and even performs, just like an original part of the engine!



For the upper cowl to remain removable, it was of course necessary for the new manifold to fit completely inside the cowl. The next step therefore, was to make up two aluminium exhaust stubbs that would butt against the ends of the manifold and pass through the walls of the cowl on each side. The stubbs were made up somewhat over length and, in fixing them into the cowl walls, they obviously had to be carefully aligned with the central manifold. This somewhat challenging task, was eventually achieved by inserting lengths of soft balsa through the exhaust stubs to lodge in the manifold on each side of the engine. Then with the engine, upper cowl and exhaust components all temporarily locked in their correct positions, the stubs were finally epoxied into place.

The tail end of the fuselage

Ultimately, the whole success of the project now hinged on my being able to successfully insert a twin core battery lead, down through the ply tailplane mount and solid balsa sub-fin; up through the rear fuselage structure; and out into the cabin area. The visible formers in the cabin area all had large elliptical lightening holes cut in them, but there was no way of knowing if Ken had followed the same practice with all seven formers hidden deep inside the rear fuselage. In truth, the only way to find out was to drill the required hole in the tail end, and hope that he had!

Accordingly, a 1/8" hole was first drilled VERY CAREFULLY, at a 45 degree angle, down through the original ply tailplane support and the 1/4" balsa sub-fin structure which supported it, to exit in what I desperately hoped was an open fuselage structure forward of that point! There followed a lengthy and extremely frustrating process, at the end of which I had finally managed to insert a length of very thin piano wire down through the hole I had drilled - around the unavoidable bend into the fuselage - and up into the cabin area through the seven weight saving holes that Ken had indeed laboriously cut out some 55 years ago. With that task accomplished, a long battery lead was simply soldered to the tail end of the piano wire and pulled through into the cabin area, where it was connected to the switch to complete the wiring harness. Structural modifications to the rear fuselage were now completed with the removal of small sections of the tailplane mount and supporting sub-fin, to provide clearance for the new elevators and rudder, and relocation of the tailplane retaining dowel to a position forward of the elevator hinge line.

BENCH TORQUE CONT..***The flying surfaces***

The next step in the project was to remove the fin from its position on top of the tailplane, so that the original transfers on the model could be scanned for subsequent reproduction; there was simply no way in which the originals could have been saved for re-use. With the original silk removed from the wings, it was immediately obvious that no structural alterations or repairs would be necessary and, following a light sanding, they were stored away to await re-covering. The fin and tailplane were going to require significant modification however, and with this in mind accurate plans of the original structures were prepared as the essential basis for designing the necessary modifications

The decision as to where the tailplane and fin should be truncated to create the new hinge lines for the rudder and elevators was more difficult than expected. The original fin, in classic de Bomford fashion, was fitted with a neat little screw adjustable trim tab, and the obvious solution was to simply extend the original hinge line downwards to create a larger rudder. Unfortunately that would have resulted in a rudder too small to provide effective primary control of the model. Accordingly, a completely new hinge line had to be selected, and a new rear spar inserted into the old structure, suitably reinforced with gussets that matched the style of the original.

The original trim tab was made up from three laminations of 1/16" balsa, and my replacement rudder just had to be built the same way! I decided however, that with an engine double the capacity of the original Mills, it would be prudent to also increase the area of the fin; the original in my view, being already somewhat on the small size. Accordingly I decided to increase the fin area by about 15%, by simply extending the original elliptical outline, and structure, downwards to increase both the height and area of that part of the fin and rudder that were mounted above the tailplane.

Having already determined the position of the new elevator hinge line, the original tailplane structure was pinned down on my scratch plan, and the central and adjacent ribs removed together with the section of original trailing edge that was to be replaced by the elevators. The outboard ribs were shortened and a new rear spar inserted on the hinge line, together with strengthening gussets. The centre section was rebuilt with ribs of increased height to accommodate the two servos to be mounted flush with the lower tailplane surface. The original K/B spar was of course retained, but the height was increased by adding balsa packing to its top edge. The new centre section was then sheeted top and bottom with 1/16" balsa, and balsa packing strips were also glued to the tops of all outboard ribs and spar to systematically increase their height. When dry the balsa packing was carefully sanded back to result in a rebuilt tailplane some 3mm thicker at the centre section tapering uniformly to the original thickness around the elliptical leading and trailing edges. As in the case of the rudder, the new elevators were fabricated from three laminations of 1/16" balsa, and attached with standard micro hinges.

Underneath the tailplane, a compartment in front of the spar was created to accommodate the micro receiver, which is retained in place with a press fit balsa cover. Behind the spar, balsa mounting blocks glued between the top and bottom sheeting, provide for retention of the two servos. A simply push fit into place, the servos are retained in position in flight by the rubber bands that hold the fin and tailplane assembly in place on the original ply tailplane support. Two small dowels in the underside of the tailplane, lock into corresponding holes in the tailplane seat to ensure continued alignment of the fin and rudder.



BENCH TORQUE CONT..**Covering and finishing**

With the structural modifications completed, it remained to recover the flying surfaces and touch up the paintwork as necessary. Before re-covering however, I decided to wipe over the open balsa structures with a rag soaked in a Baltic Pine coloured water based wood stain. This resulted in both the old and new balsa elements immediately assuming a satisfyingly uniform pale golden colour with absolutely no increase in weight, whilst providing a perfect colour base for the yellow Lite Span that I had decided to use.

This was the first time that I had used Lite Span, and the end result was better than I could possibly have hoped for. Fortuitously, yellow Lite Span turned out to be virtually identical in colour, and texture, to an unused sheet of the original Japanese silk that Ken had also carefully put away and kept in his workshop for more than 50 years! Better still, the trick with the Baltic Pine wood stain has worked a treat, by rendering the various alterations that have been made to the fin and tailplane, largely indistinguishable from the adjacent original structure. The last step was of course to apply the new transfers, reproduced from my digital images of the originals by Signfast Pty Ltd in Hobart.

Finishing the fuselage was not a big task! The black engine bay and surrounding cowl were re-finished with enamel that closely matched the adjacent original black lacquer on the fuselage; and a couple of tiny cracks in the red area were touched up, using a \$2 bottle of perfectly matching nail varnish that I just happened to notice at my local chemist shop one day. Finally the Incubus was ready to fly again!

The Incubus flies again!

Flying any model for the first time is a somewhat nerve racking business, but the prospect of flying this particular model for the first time simply terrified me! Of course I could have been sensible, and asked someone with more flying experience to handle the test flight, but somehow I felt that I owed it to Ken to do the whole thing myself. So it was that in perfect weather conditions, on 7 April 2011, I finally plucked up the courage to fly the Incubus for the first time.

The first flight was almost, but not quite, as difficult as I had imagined it might have been! After the hand launch, the Incubus soared away but immediately demonstrated a barely controllable tendency to turn sharply to the left and drop her wing as an obvious consequence of the increased power and torque of the Frog engine. Unfortunately, with no engine control, I had no choice but to spend most of the flight desperately trying to avert disaster, whilst fervently hoping that the engine would stop immediately, if not sooner! Finally she transitioned into a nice flat glide and, with a sense of considerable relief I was able to land her safely back in the centre of the grass strip!



Back on the workbench I was fortunate in being able to increase the engine side thrust without any need for structural alteration, and the model was next flown on 27 May 2011 with Peter Ralph in attendance with his camera to do justice to the occasion. This time the model behaved impeccably, as may clearly be seen in Peter's superb shots of the model in flight.

Conclusion

This project proved both uniquely challenging and immensely satisfying in that I finally achieved exactly what I had hoped for. The Incubus now appears just as she might have done in 1959, had Ken himself modified her for radio control. Most importantly however, whenever and wherever she

may be flown in the future, she will I am sure continue to provide an appropriate reminder of the truly unique contribution that Ken de Bomford made to aeromodelling in Australia.

FANTASTIC JOB !! She flies nicely too.. Chris. (Ed)



BENCH TORQUE CONT..**DRILL SHARPENER**

By Bob Morrison

Ever been annoyed by having to buy new small drills when broken or blunt? Some of the smaller sizes can be expensive and are difficult to sharpen accurately. This little tool is based on a design featured a while ago in a model engineering magazine, which was in turn based on a tool called the "Wishbone". *Please note that the tool is for finishing: initial sharpening or shaping should be done on a grinder.*

This version is altered a little by reducing size to about 2/3, and including a 10 degree twist in the arms to automatically give lip clearance, so it's no longer necessary to "roll" the unit during sharpening strokes. This is not quite correct, but with small drills it doesn't seem to matter. The original single washer roller is replaced with ball races so that the sharpener is stable on the slip stone. Clamping is by a cross-drilled clamp screw from a jenny caliper holding the drill in a milled "V". Will hold from #60 up to 1/8". It's surprising it takes so few strokes to sharpen even a 1/8 drill. I was sceptical of the hone direction being parallel with the lip, but results are quite satisfactory provided the surface of the stone is in good condition. By the way the stone should be very fine grit; a fine "Arkansas" stone is ideal.

**Main details are:-**

Length	70 mm
Depth	20 mm
Roller dia.	10 mm
Included angle	120 deg.

WEB TORQUE AND BIG TORQUE

You might like to have a look at some of these website.

The Large Model Association

<http://www.largemodelassociation.com/>

LARGE SCALE MODEL AIRCRAFT BOWYLIE

http://planeimages.smugmug.com/Other/LARGE-SCALE-MODEL-AIRCRAFT/7809812_YUn5g#505663762_bUJ6S
(What a nose dive Ed)

A beautiful large scale model aircraft, the Fairey Fantome

<http://www.rc-airplanes-simplified.com/large-scale-model-aircraft.html>

Geoff Reichel Models and Replica Aircraft

<http://www.airwaveyachts.com.au/Aircraft/Index.html>

Cleveland Model Helicopters

<http://www.clevelandheli.co.uk/Scale.htm>

COSFORD 2007 LARGE MODEL SHOW

<http://www.youtube.com/watch?v=J2nDu66Qe6g>



TECH TORQUE

How to Prolong Lithium-based Batteries

What Causes Lithium-ion to Age?

Batteryworld.com - Isidor Buchmann

The lithium-ion battery works on ion movement between the positive and negative electrodes. In theory, such a mechanism should work forever, but shelf life, cycling and temperature affect the performance. Because batteries are used under many demanding environmental conditions, manufacturers take a conservative approach and specify a battery life between 300 and 500 discharge/charge cycles. Life cycle testing is easy to measure and is well understood by the user. Some organizations also add a date stamp of three to five years; however, this method is less reliable because it does not include the type of use.

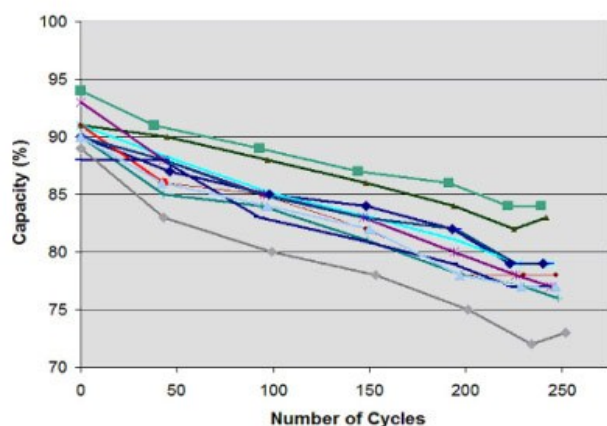


Figure 1 illustrates the capacity drop of 11 Li-polymer batteries that have been cycled at a Cadex laboratory. The 1500mAh pouch cells were first charged to 4.20V/cell at 1C rate (1500mA) and allowed to saturate to 0.05C (75mA) as part of full charge procedure. The batteries were then discharged at 1500mA to 3.0V/cell, and the cycle was repeated.

Figure 1: Capacity drop as part of cycling. A pool of new 1500mA Li-ion batteries for smart phone is tested on a Cadex C7400 battery analyzer. All 11 pouch packs show a starting capacity of 88–94 percent and decrease in capacity to 73–84 percent after 250 full discharge cycles (2010).

Courtesy of Cadex

Designed for a smart phone, the packs were already a few months old at time of testing and none of the batteries made it to 100 percent. It is common to see lower than specified capacities and shelf life may have contributed to this. Manufacturers tend to overrate their batteries; they know that very few customers would complain. In our test, the expected capacity loss was uniform over the 250 cycles. All sample batteries performed as expected.

Similar to a mechanical device that wears out faster with heavy use, so also does the depth of discharge (DoD) determine the cycle count. The smaller the depth of discharge, the longer the battery will last. If at all possible, avoid frequent full discharges and charge more often between uses. If full discharges cannot be avoided, try utilizing a larger battery. Partial discharge on Li-ion is fine; there is no memory and the battery does not need periodic full discharge cycles other than to calibrate the fuel gauge on a smart battery.

Depth of discharge	Discharge cycles
100% DoD	500
50% DoD	1500
25% DoD	2500
10% DoD	4700

Table 2 compares the number of discharge/charge cycles a battery can deliver at various DoD levels before lithium-ion is worn out. We assume end of life when the battery capacity drops to 70 percent. This is an arbitrary threshold that is application based.

Depth of discharge Discharge cycles Table 2: Cycle life and depth of discharge A partial discharge reduces stress and prolongs battery life. Elevated temperature and high currents also affect cycle life 4700 **Table 2: Cycle life and depth of discharge** A partial discharge reduces stress and prolongs battery life. Elevated temperature and high currents also affect cycle life.

TECH TORQUE CONT.

Specifying battery life by the number of discharge cycles is not complete by itself; equally if not more important are temperature conditions and charging voltages. Lithium-ion suffers stress when exposed to heat and kept at a high charge voltage.

Elevated temperature is anything that dwells above 30°C (86°F), and a high voltage is higher than 4.10V/cell. When estimating longevity, these conditions are difficult to assess because the battery state is in constant flux, and so is the temperature in which it operates. Exposing the battery to high temperature and being at full state-of-charge for an extended time can be more damaging than cycling. Manufacturers do not like to talk about these environmental conditions and release information only in confidence when so requested.

In this essay we do not depend on the manufacturer's specifications alone but also listen to the comments of users. BatteryUniversity.com is an excellent sounding board to connect with the public and learn about reality. This approach might be unscientific, but it is genuine. When the critical mass speaks, the manufacturers listen. The voice of the multitude is in some ways stronger than laboratory tests performed in sheltered environments.

Let's look at real-life situations and examine what stress a lithium-ion battery encounters. Most packs last three to five years, less if exposed to high heat and if kept at a full charge. Table 3 illustrates capacity loss as a function of temperature and state-of-charge. One can clearly see a performance drop of recoverable capacity caused by environmental conditions and not cycling. The worst condition is keeping a fully charged battery at elevated temperatures, which is the case when running a laptop on the power grid. Under these circumstances the battery will typically last for about two years, whether cycled or not. The pack does not die suddenly but will produce decreasing runtimes as part of aging.

Table 3: Permanent capacity loss of lithium-ion as a function of temperature and charge level. High charge

Battery Temperature	Permanent capacity loss when stored at 40% state-of-charge	Permanent capacity loss when stored at 100% state-of-charge
0°C	2% loss in 1 year; 98% remaining	6% loss in 1 year; 94% remaining
25°C	4% loss in 1 year; 96% remaining	20% loss in 1 year; 80% remain-
40°C	15% loss in 1 year; 85% remaining	35% loss in 1 year; 65% remain-
60°C	25% loss in 1 year 75%; remaining	40% loss in 3 months

levels and elevated temperatures hasten permanent capacity loss. Newer designs may show improved results.

Batteries are also exposed to elevated temperature when charging with wireless chargers. The energy transfer from a charging mat to the portable device is 70 to 80

percent and the remaining 20 to 30 percent is lost mostly in heat. Placing a cellular phone on the heat generating charging mat stresses the battery more than if charged on a designated charger. We keep in mind that the mat will cool down once the battery is fully charged. Read more: [Charging without wires](#).

Equally stressful is leaving a battery in a hot car, especially if exposed to the sun. When not in use, store the battery in a cool place. For long-term storage, manufacturers recommend a 40 percent charge. This allows for some self-discharge while still retaining sufficient charge to keep the protection circuit active. Finding the ideal state-of-charge is not easy; this would require a discharge unit with an appropriate cut-off. Users should not worry too much about the state-of-charge; a cool and dry place is more important.

The voltage level to which the cells are charged also plays a role in extending longevity. For safety reasons, most lithium-ion cannot exceed 4.20V/cell. While a higher voltage would boost capacity, over-voltage shortens service life. Figure 4 demonstrates the increased capacity but shorter cycle life if Li-ion were allowed to exceed the 4.20V/cell limit. At 4.35V, the capacity would increase by 10 to 15 percent, but the cycle count would be cut in half. More critical than the extra capacity is reduced safety, which would be the results of a higher charge voltage.

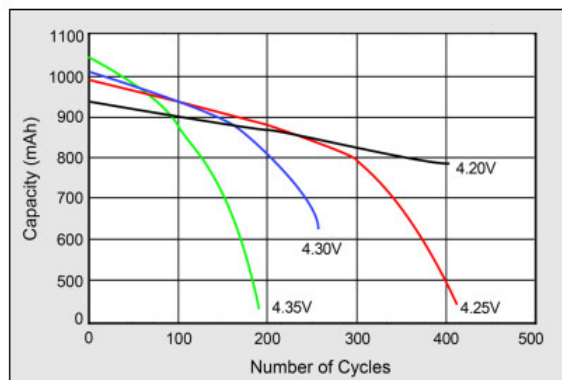
TECH TORQUE . CONT..

Figure 4: Effects on cycle life at elevated charge voltages Higher charge voltages boost capacity but lower cycle life and compromise safety. Source: Choi et al. (2002)

Chargers for cellular phones, laptops and digital cameras bring the Li-ion battery to 4.20V/cell. This allows maximum runtime, and the consumer wants nothing less than optimal use of the battery capacity. The industry, on the other hand, is more concerned with longevity and prefers lower voltage thresholds. Satellites and electric vehicles are examples where longevity is important.

We have limited information by how much lower charge voltages prolong battery life; this depends on many conditions, as we have learned. What we do know, however, is the capacities. At a charge to 4.10V/cell, the battery holds a capacity that is about 10 percent less than going all the way to 4.20V/cell. In terms of optimal longevity, a charge voltage limit of 3.92V/cell works best but the capacity would be low. Besides selecting the best-suited voltage thresholds, it is also important that the battery does not stay in the high-voltage stage for a long time and is allowed to drop after full charge has been reached.

The voltage threshold of commercial chargers cannot be changed, and making it adjustable would have advantages, especially for laptops as a means of prolonging battery life. When running on extended AC mode, the user would select the "long life" mode and the battery would charge to only, say, 4.05V/cell. This would get a capacity of about 80 percent. Before traveling the user would apply the "full charge mode" to bring the charge to 4.20V/cell. This saturation charge would take about an hour and would fill the battery to 100 percent capacity.

Realizing the stress on the battery, some laptop and cellular phone manufacturers choose an end-of-charge voltage that is less than 4.20V/cell. A slightly larger pack compensates for the reduced runtime. Another option to extend battery life is removing the pack from the laptop when running on the power grid. The *Consumer Product Safety Commission* advises the public to do this out of concern for overheating and causing a fire. Removing the battery has the disadvantage of losing unsaved work on power failure.

Heat buildup is always a concern and running a laptop in bed or on a pillow may contribute to this by restricting air-flow. Not only will heat stress electronic components, elevated temperature causes the electrodes in the battery to react with the electrolyte and this will permanently lower the capacity. Placing a ruler or other object under the laptop to increase floor clearance improves air circulation around the enclosure and keeps the unit cooler.

The question is often asked: Should I disconnect my laptop from the power grid when not in use? Under normal circumstances this should not be necessary because once the lithium-ion battery is full, a correctly functioning charger will discontinue the charge and will only engage when the battery voltage drops to a low level. Most users do not remove the AC power, and I like to believe that this practice is safe.

Everyone wants to keep the battery as long as possible and use it in a way that is least stressful. This is not always feasible. Sometimes we need to run the battery in environments that are not conducive to optimal service life. As a doctor cannot predict how long a person will live based on diet and activity alone, so also does the life of a battery vary, and it can always be cut short by an unexpected failure. Batteries and humans share the same volatility.

To get a better understanding of what causes irreversible capacity loss in Li-ion batteries, several research laboratories* are performing forensic tests. Scientist dissected failed batteries to find suspected problem areas on the electrodes. Examining an unrolled 1.5-meter-long strip (5 feet) of metal tape coated with oxide reveals that the finely structured nanomaterials have coarsened. Further studies revealed that the lithium ions responsible to shuttle electric charge between the electrodes had diminished on the cathode and had permanently settled on the anode. This results in the cathode having a lower lithium concentration than a new example, a phenomenon that is irreversible. Knowing the reason for such capacity loss might enable battery manufacturers to produce future batteries with longer life spans.

[CONTINUES P.18...](#)

[RETURN TO INDEX](#)

FIELD TORQUE . LETTERS TO THE EDITOR**From :- Nils Acting Chef Flying Instructor.**

In the ongoing effort to ease students entry into the model flying world, I've started a glossary of expressions and phrases normally only understood by the cognoscenti of modelling.

Student - That class of Homus Erectus inhabiting model aircraft sites, whose synapses and optic nerves are so misalligned that coordinated activity is well nigh impossible. Can be masked to some extent by prolonged exposure to RF under the guise of training.

CFI -The title given to the poor sacrificial sod delegated to put name and reputation on line by signing the paperwork allowing a student to fly alone once instructors suffer burn out and refuse further training.

Instructor - Poor heathens who have so transgressed club rules they have been relegated to stand beside a student in the fervent hope that both may learn something from the experience.

Buddy box - A cable joining two transmitters. Enables the student to be given control when the instructor becomes disoriented and suffers a bout of confusion. Has saved many models.

Bronze wings - Evidence of an exhausted state of being when in desperation instructors fall back on faith that a students flying is unlikely to result in death or serious injury to persons outside a 5Km radius of the field.

Gee, Nils you instil me with great fears and a deal of trepidation. I feel so much more comforted now having read your words of wonderful wisdom. I can ensure you that my boots will still be shaking and wet from sweat as it no doubt will stress me out at my first and subsequent flights. Nether the less I have a feeling of great comfort with having the real pilot at my side. (Ed)

**Wings and Wheels
UK 2011**

The large model shown is about 3/4 full size Pitts special , powered by a 250 cc Hirth two stroke



(No prizes for knowing what it is, but Tony G would like to know Ed)

TECH TORQUE .CONT..**Power loss through Protection Circuit**

Besides common aging, a Li-ion battery can also fail because of undercharge. This occurs if a Li-ion pack is stored in a discharged condition. Self-discharge gradually lowers the voltage of the already discharged battery and the protection circuit cuts off between 2.20 and 2.90V/cell. Some chargers and battery analyzers (including those from Cadex) provide a wake-up feature, or "boost," to re-energize and recharge these seemingly dead Li-ion batteries.

* Research is performed by the Center for Automotive Research at the Ohio State University in collaboration with Oak Ridge National Laboratory and the National Institute of Standards Technology.

FUNNY TORQUE**MYSTERY OBJECT****What the heck !!**

Is it an awkward-stra? As it is big and cumbersome? Well, it BIG and it on wheels... (Ed).

(See websites below for credits)

Yesterday we asked you what these mysterious instruments were for and we've been impressed by the response

Lyndon got pretty close with this comment "They're there for tracking the noise the bombers made as they flew over head so that the anti-aircraft batteries in the background there could zero in on them better and were still in use in WW2 ."



Eizu commented along similar lines: "It looks like a WWII aircraft locating/tracking device to me. Judging by the uniforms, German maybe. This website has a good overview of American versions: <http://www.skylighters.org/howalightworks/>"

Eric says "It looks like a either a very big mechanical brass band or a very strange elephant gun :-)"

But Anonymous hits the nail on the head saying "These are Japanese acoustic locators from around the 1930's. These were used to detect aircraft and the photograph shows anti-aircraft guns to the right." Which is pretty much spot on. The photographs actually shows Emperor Hirohito inspecting the machines. You can read more on these devices and other acoustic locators

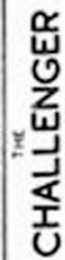
See links :-

<http://www.dsself.dsl.pipex.com/MUSEUM/COMMS/ear/ear.htm>

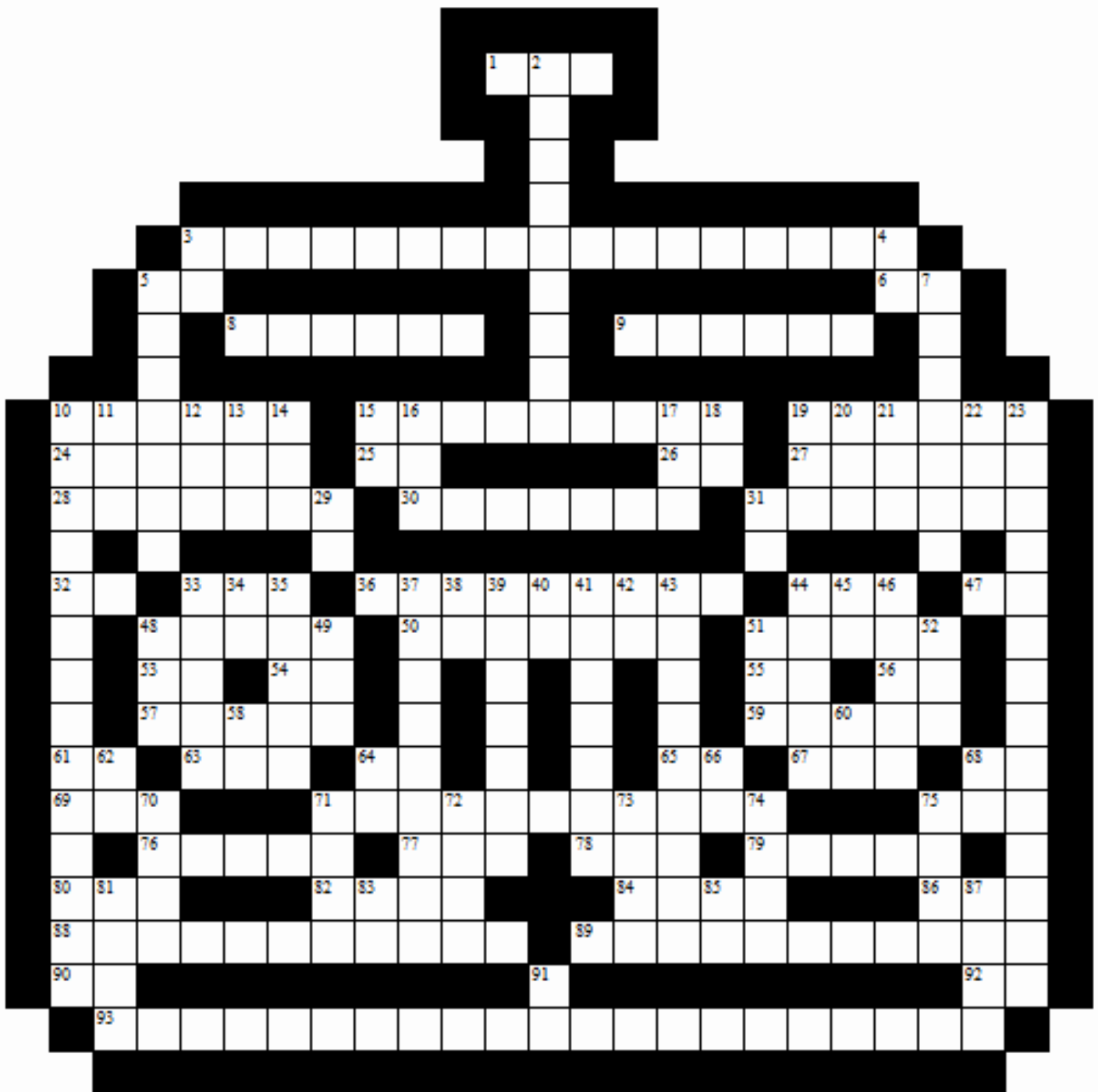
http://en.wikipedia.org/wiki/Acoustic_location

<http://www.skylighters.org/howalightworks/>

TORQUE PLANS



CROSSWORD TORQUE



Goto:- <http://www.airplanesandrocks.com/magazines/model-aviation-crossword-puzzle-1.htm> for the answer

ACROSS

- 1 Don't ___ a little wind keep you from flying.
- 3 Model Aviation column by Paul Kopp - 2000
- 5 State in AMA District IV
- 6 Cyanoacrylate
- 8 Applies liquid finish to model
- 9 Required
- 10 Survives inspection for Quickie 500 qualification
- 15 Typically
- 19 Cut grooves on a pushrod
- 24 Alloy of copper and zinc
- 25 State in AMA District V
- 26 Chemical symbol for arsenic
- 27 Path the pylon racers follow
- 28 Your are currently doing this to Model Aviation
- 30 LCD on your computer transmitter
- 31 Officiate at an FAI record attempt
- 32 Us
- 33 F-14 ___ cat
- 36 Powerplant that runs on fuel
- 44 Biblical fruit
- 47 State in AMA District VIII
- 48 Upbeat
- 50 Will _____ please get that spectator out of the pit area?
- 51 Supreme being in the Middle East
- 53 Geographical location of AMA District V
- 54 I couldn't get the engine to run, ___ I went home.
- 55 The ratio between circumference and diameter
- 56 State in AMA District IV
- 57 Tubing and sheet metal manufacturer
- 59 Attempted to set a record
- 61 State in AMA District XI
- 63 You, ___, can learn to fly.
- 64 State in AMA District V
- 65 State in AMA District VIII
- 67 Sesame plant
- 68 State in AMA District XI
- 69 Model airplanes are ___ toys!
- 71 Grouping of cells
- 75 Path that a propeller tip takes
- 76 Shout of exultation
- 77 What an airplane flies through
- 78 Greek goddess of the dawn
- 79 Brand of fuel by Morgan Fuels, of Enterprise, AL
- 80 Commercial airline
- 82 Servo-to-control surface interface
- 84 Lamé movement
- 86 Rural Electrification Act acronym
- 88 Caused by standing upright
- 89 North American bog shrub
- 90 Not applicable
- 92 State in AMA District I
- 93 Model Aviation "AMA This Month" area - 2000

DOWN

- 2 Vintage German WWI monoplane
- 3 Shortcut for radio controlled
- 4 State in AMA District V
- 5 General title for reporter for Model Aviation 7 Stuck to with Zap
- 10 Leading Edge Model Aircraft's city in NY
- 11 There ___ some great thermals out here today!
- 12 The preferred type of grass field to fly from
- 13 Biblical high priest
- 14 Our nearest star
- 15 State in AMA District V
- 16 Antiquity
- 17 Direction of grain in silk cloth covering
- 18 Model engine manufacturer in Gardnerville, NV
- 19 C/L products distributor, in Two Harbors, MN
- 20 Describes a really fast airplane
- 21 Operate an engine
- 22 Donkey
- 23 Propeller manufacturer in Tucson, AZ
- 29 Starter's command at beginning of a Quickie race
- 31 State in AMA District XI
- 33 Pay for another's entry into a contest
- 34 Model engine manufacturer
- 35 Botch
- 37 Flightline helper
- 38 Model engine manufacturer's name - backwards
- 39 Cover with foliage
- 40 State in AMA District IX
- 41 Farewell
- 42 State in AMA District VI
- 43 Formation of neoplasms
- 44 ___ with disaster when performing low-level aerobatics
- 45 Muncie's state
- 46 Chairman's hammer
- 48 ___ him if he's finished with the frequency pin.
- 49 Distress signal
- 51 Very capable
- 52 I ___ a great day at the flying field!
- 58 Electrical switch type
- 60 AMA District that includes NJ and NY
- 62 Perform
- 64 State in AMA District I
- 66 Type of electrical current
- 68 Otherwise
- 70 Now ___'s a nice-looking airplane!
- 71 Threaded fastener
- 72 Polynesian carved image
- 73 Long, cylindrical piece of wood
- 74 19th letter of the Hebrew alphabet
- 75 River in central Switzerland
- 81 Enclose a receiver in foam
- 83 State in AMA District VII
- 85 State in AMA District XI
- 87 Overhanging lower edge of a roof
- 91 Direction a helicopter goes with positive cyclic

FOR SALE & WANTED**FOR SALE**

1/8th Scale Tiger moth. Well perhaps I got the scale wrong just a little but its still for sale anyway there may have to be a small cash adjustment on sale price of \$5000 due to my error is scale.



Phone Harry 0417 546 789

GIVE AWAY**to a good hanger**

This model has never been flown. Here is my model that I am giving away. As you can see my model is somewhat different to ordinary models. It comes complete with not one, but two cockpits and the worlds largest

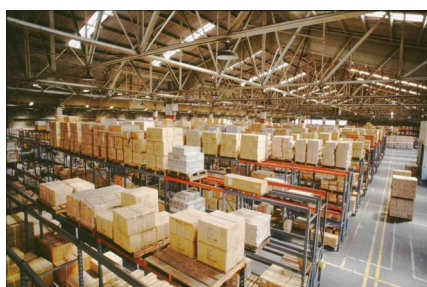


hairdryer (and may include Kevin Rudd. If you lucky). It also comes complete with 2.4Ghz transmitter may require a more experienced pilot. Not suitable for aerobatics either.

Phone John 0412 758 595

FOR SALE

I have an extensive range of models I sell from home in the garage under my house. As I don't need to have an expensive shop front, my prices are competitive with the shops and in most cases cheaper. Ok my garage is a little bigger then the 5m x 4 m garden shed.



Fred's Small time hobby shop Phone 5555 568 585 868

WANTED

I am looking for a Hitec Flash 5x transmitter in good condition as I want to make up a buddy controller. Please call Graeme, 0417 520 970 or email me at gels@netspace.net.au. (Ed)

**EVENTS FOR 2011**

EVENT CALENDAR - 2011/12		
Date	HMAC	LMAC
Sat 10/09/2011	Control Line	
Sat 17/09/2011		Thermal/LEG Gliders
Sat 8/10/2011	Tomboys	
Sat 15/10/2011		Pattern
Sun 6/11/2011	S/Off Scale	
Sat 19/11/2011		Tomboys/Control Line
Sun 4/12/2011	Xmas + Tomboys+ Swap Meet	
Sat 17/12/2011		FunFly/Xmas BBQ
Sat 14/01/2012		S/Off Scale Day
Sat 4/02/2012	Low key Aerobatics	
Sat 18/02/2011		Thermal/LEG Gliders

(No cheating with the crossword !!. Hey! I saw you on Google.-(Google does not count as a reliable source of correct answers

