the Ampeer

March 1995 Page 1

The Officers:

President:
Ken Myers
1911 Bradshaw Ct.
Walled Lake, MI 48390
phone: (810) 669-8124

Vice-President:
Richard Utkan
240 Cabinet
Milford, MI 48381
phone: 685-1705

Secretary/Treasurer:
Debbie McNeely
4720 Duck Lake Rd.
Milford, MI 48382
phone: 685-1105

Board of Directors:
Keith Clark
2140 E. Highland Rd.
Howell, MI 4848843
phone: (517) 546-2462

Board of Directors:
Jeff Hauser
18200 Rosetta
East Point, MI 48021
phone: 772-2499

Ampeer Editor:
Ken Myers
1911 Bradshaw Ct.
Walled Lake, MI 48390
phone: (810) 669-8124

Ampeer subscriptions are $10 a year U.S. & Canada and $17 a year world wide.

The Next Meeting: Thursday, Mar. 2, Dublin Community Center on Union Lake Road, just north or the village of Union Lake, 7:30 P.M.

The Quick Decal Caper

by Don Bartick

How neat it would be to decorate our latest creation with custom decals reflecting the bizarre imagination synonymous with free flighters. Not many of us have the skills to cut out tissue images that represent our original intent. Well, fans, life is good as long as there is a xerography copier available. Keep your eyes focused on this text because your author is going to guide you through a very simple process and once you experience it, you'll think I'm a genius and will be naming your kids (dogs, cats, squirrels) after me. Here goes...

1. Look up in your telephone directory yellow pages under the heading Artists' Materials and find the closest store. So far so good.

2. Give the store a call and ask them if they carry sheets of MACTAC or Chartpak applique film. Most likely they do or they'll tell you where to get it. GO GET IT! They come in 8.5 x 11 sheets.

3. Now create your designs on plain paper or adhere copies of artwork such as logos, typed copy or anything that will copy on a copy machine. Step 3 is complete and no brain buster, so far.

4. Now the hard part. Take your artwork and applique film to any copy place with a xerography copier (work place) and go at it. All quality copiers have single sheet feeds. So place your artwork original on the copier platen; close the cover and feed the applique film by hand. You may want to experiment with a sheet of copy paper to make sure which side copies before you waste any film ($1.00). Wow! look what I did.

5. The film is self adhesive, so to apply just cut around the image lightly with an Xacto knife. It is not necessary to cut through the backing paper. Now pick up an edge of the decal with your knife and peel it away from the backing sheet. Place the decal on the desired surface and burnish it in place. Very neat, huh?

WARNING!

Do not apply Butyrate dope to the surface or any other dope.

By the way, the film is 1.5 mils thick and flexible.

El Torbellino
George Peace; Editor
8414 Kappa Street
La Mesa, CA 91942

What's in this issue?

Notice:
Due to the current financial restraints, the light at the end of the tunnel will be turned off until further notice.

Reinforcing Wing Panels

The quickest way to reinforce wing panels is with thin Hot Stuff and model magic type filler. Very lightly spray some 3M-77 spray adhesive on your fiberglass cloth and position the cloth on the wing. The spray glue will make the glass cloth tacky and you can then get all the wrinkles out very easily. In a well ventilated area, put a plastic bag over your hand and dribble thin super glue on the glass cloth, pressing the glass down as you go. The glue goes off like gangbusters, so make sure you have good ventilation. Use a sanding block with some 80 grit paper to knock down the rough spots on the fiberglass. Do not sand through the glass, just get the bumps off. Now thin Model magic, Red Devil or 3M wall repair com-pound with a little water until it is a heavy cream-like consistency. Spread this on the glass over-lapping the edges by about three inches. Get it thick enough to cover the ridge at the glass edge. With a new piece of 100 grit, feather edge the filler down to the glass and balsa. Sand the whole wing with 150 then 225 grit paper and get all the sanding residue off with a tack cloth. Now you are ready for covering. The filler is very quick drying so you can get the whole job done in a couple of hours instead of overnight.
from The Tailspinner
Milt Peacock, Editor
Finksburg, MD

These Really Do Work!

When your CA applicator clogs all the time, do this: Tie a 12 inch string around the neck. Put a loop on the other end. When you're through glueing, twirl the bottle with your finger in the loop. Centrifugal force will push the glue out of the applicator tube and back into the bottle.

Try drilling a small hole in the blunt end of your X-acto knife. Insert a key ring in the hole. Now it will not roll off the bench and you have a nice hanger, as well!

Turn a beverage can over and it can be used to mix a small amount of epoxy. Some of us prefer to empty the can first.

The tabs used in Nabisco Saltine Crackers make great wire retainers. Glue them to the side of the fuselage, run the wires through them, then fold over.
from T.O.R.K.S. Newsletter
George Reverman, Editor
Columbus, OH

Cutting Fiberglass Cloth

From Charles E. Snyder of Brandywine, MA comes an idea that should be of great help to all model builders. To keep fiberglass cloth or tape from un-raveling and making all those nasty, loose threads, try spraying the part to be cut with spray hair set. It dries in seconds, does not get too stiff to work with and makes a nice clean edge. In addition, he has found it to be compatible with all adhesives and coatings.

Is Your Servo Going Bad?

by Stan Andrews

The other day I was asked if there is any way to tell when a servo is going bad. That's like asking your auto mechanic to tell you exactly when your car will stop running. But, just like your car, servos about to fail will give you some warning signs before deciding they've had enough. For example, you may notice slow movement, increased current drain, black residue inside the case under the motor, squealing, jittery move-ments or jumping during travel, or intermittent lack of response.

While none of these symptoms by themselves necessarily indicate a servo about to quit, they do war-rent a little extra attention to determine the exact nature of the problems and their repair.

The following are some things to check if any of the above symp-toms are occurring in your equipment:

Slowing movement or increased power drain
motor wearing out

Black residue inside of case
motor brushes worn

Squealing
worn bushings or gears

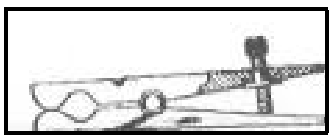
Jittering
pot worn at that point (could also be improper dead band built into servo electronics or a servo incom-patible with your transmitter)

Jumping during travel
bad pot or worn gears

Intermittent movement
broken wire, short or bad solder joint in wiring of components of amplifier. Bad connection in receiver block or in connectors.

Good maintenance of your servo, care in mounting and of exposed wiring and connectors will all help keep your servo from suddenly quitting in mid-air. If you see any of the above symptoms, pull your servo out of the plane and deter-mine the cause. Get it fixed! They won't repair themselves. As I have said before, the plane you save may be your own!
from Radio Control Sport Flyers
Bill Powell, Editor
Kansas City, MO

Extra Clamp Pressure



We've all used them at times and they work well, but if you require a little extra clamping pressure, modify the clothespin as shown. Add a blind nut secured with a little CA and a cap screw. Torquing down on the screw forces the jaws together more firmly.
from the Cascade Model Helicopter Club Newsletter

Dick McKenna, Editor
Everett, WA

Using Spreadsheets
from Dick Comber
99 Nutshalling Ave
Rownhams
Southampton S016 8AY
England
Tel : 0703 733583

Dear Ken,
I've been privileged to read quite a few extracts from your AMPEER thanks to Dave Durnford, and feel it is only fair to send you some-thing in return. Of our little group of electric flyers in Southampton very few use computers and of those who do, very few use spreadsheets and so far as I know I am the only one who uses spreadsheets in aeromodelling. You might be interested to see one or two of them.

1. Scaling

I use a "scaling" spreadsheet (sample enclosed) which produces amongst other things the same answers as your "Cubic Wing Loading" given in AMPEER for Oct 1994, although set out in a different way. [Incidentally, as printed in AMPEER your formulae have unbalanced parentheses.](oops km) The enclosed sample is based on an original German model of an "E-4250 Zeppelin Staaken" (1.89m span, 1.7kg, which is approx. 74 inch span and 60 oz.). This model appears under span 4 in the table. Dave is thinking of building an 80" span model (span 3 in the table) and I have started building a 65" span one (span 5). The drawing which we have had enlarged started at only 6.38" span (span 1) and the full size plane had a span of 31 meters (span 6).

Some of the figures, such as the target weight of Nicads for the full-size aircraft are of course non-sensical, and the flying weight for the full size plane is only a scaled-up figure, not the real one.

The "% difference from Span 1" is the terminology used in our photocopy shops. The linear dimensions are merely scaled down from the wing span in line 12 in proportion to the spans entered in line 20. The areas are scaled down:

$$\text{new area} = \text{original area} \text{ times } \frac{\text{new span}}{\text{original span}} \text{ times } \frac{\text{new span}}{\text{original span}}$$

and weights and watts and thrust are calculated by multi-plying by new span / original span three times instead of twice. Wing loadings are calculated in the usual way. Watts and thrust are figures derived from other people's figures, and are only a guide. "Scale with reference to Span 6" is for the benefit of those of our modellers who think in terms of scales such as 1:20 or 1:15 etc., and of course is only applicable if the span of the original plane is known.

You will see we have to have a "metric" section here, being close to continental Europe. If original figures are metric, I sometimes input a figure in inches, and try different ones until the metric figure is correct, if you see what I mean. This is a "lazy" way of doing it but quite quick if the program is already loaded.

2. Abbot's Formula

This spreadsheet gives a table using Abbot's formula for (output?) watts required to turn propellers of various dimensions over a range of r.p.m. (sample enclosed). There are enough formulae in the table to make the computer take quite a few seconds to recalculate! At the top, three figures have to be inserted. Bob Boucher's most common formula factor (relating to the type of propeller) is 1.31. The only measurement I have made suggested a higher factor would be required. The "rpm factor" of 1.15 is the (arbitrary) factor by which successive rpm figures in the 6th row are increased, and can be changed as required. 1.15 is the factor which gives a figure of 34000 rpm in the final column, having started with an arbitrary 1000 rpm in the first column. 34000 is the highest number of propeller rpm in our practical experience so far. The number of values of rpm (columns) is the most I can get on a page with this particular spreadsheet, printer and paper size. For propeller blades, inserting a number other than 2 merely increases the wattage in proportion to the number of blades. It is quite probable that increasing the number of propeller blades beyond 2 would lead to further inefficiencies which are not taken into account.

3. Design

I also use an unoriginal "designing" spreadsheet made up from information scrounged from all available sources, rather like others mentioned some time ago by yourself and based on Keith Shaw's and others' ideas. It is not so advanced as some, but is still useful to me.

4. Bruno Schmalzgruber's Graupner Speed 400 information

This is a table of information on Graupner Speed 400 motors with different ratio gearboxes, different size propellers, amps, volts and thrust. I add other calculations on to his figures as required, such as thrust / watts etc. Only of interest to people using Speed 400's or other small ferrite motors.

5. Resistive Trickle Charging

Most of our group of electric flyers now take a collection of charged flight packs to the field rather than recharging on the field. This is because they have acquired enough packs for a session's flying, they are not flying competitively, and they live fairly close to the flying site. Most of these packs are trickle charged by simple resistive trickle charging, using old car battery chargers and suchlike as the source of power. The resistive trickle chargers consist of connectors, resistors and LEDs which indicate when current is flowing, and could hardly be simpler or cheaper. One of our helpful senior members has
made up many these chargers for members over the years.

So when people come along and say, for example - "I've got this transformer in a box, can I use it to charge my batteries?" I have a spreadsheet which calcu-lates the values of resistors required to do the job. It is in the form of a large table, and gives figures for the calculated ohms and wattage

of the main resistor and the ohms and wattage for the second resistor which limits the current through the LED. You input supply voltage, required charging rate (normally C/10), wattage safety margin (not less than 1), minimum charging volts per cell (normally 1.45), dis-charged cell voltage (worst case, say 1 volt per cell), cell capacity in mAh (normally ranging from 11 to 2200), the number of cells in the pack (normally 1-15 in the table), and LED current and voltage requirements.

Two recent examples were (1) when the require-ment was to trickle charge 7 cell 1700 mAh packs from a 22 volt source, and (2) when the requirement was to charge 250 mAh 4 cell receiver packs.

An earlier version of this spread-sheet gave the calculated wattage values regardless of how low they were. But when the helpful senior member referred to above saw these low values he said you can't buy such low wattage resistors, so I put in complicated conditional formulae to make it print 0.25 whenever the calculated value was less hardly a necessary thing to do! Even now I'm not sure these are 100% error - free.

I realise that for people who always fast - charge their nicads this spreadsheet would be of no interest at all.

6. Other Uses

Spreadsheets are also very useful for making up tables for people who don't use spreadsheets themselves. I recently made some up for Dave Durnford, and will enclose one on theoretical motor run times (or battery life) to show what I mean.

Software

Although it is fairly easy to transfer a spreadsheet from one piece of software to another manually, for the record I have been using WindowWorks for "pretty" graphics printing, and

Product News and Notes
by Bernard Cawley, Jr.
Charge Ahead - Nov. 1994

Ben Almojuela, 1941 - 6th Ave. W., Seattle, WA 98119

Even more on throttles

Getting tired of speed control news yet? No? Well, good - here's more: First of all, the Jomar Mini-Max has been updated with both hardware and software changes. The MiniMax '95 is now the best behaved of all the micro-processor throttles I have tested. It is smooth, responsive, and survives the interference and loss of signal tests very well indeed. And, in ready to use form it is the smallest and lightest of the bunch at 1.1 ounces. It also has the "smartest" self-setup of any of the units I've tested.

Some of the MiniMax changes were made in response to some testing done by Bob Kopski which allowed him to count missed and extra pulses detec-ted by the receiver. Now Jomar has a little unit, weighing 1/2 ounce, which allows anyone to test a radio installation for these conditions. The self-contained unit is called the "Snitch" and to use it you just plug it into a servo socket in your receiver. I'll write more after I've had a chance to play with it a bit. It occurs to me that the Snitch would also be very useful to the Big Bird contingent since they often have to troubleshoot radio problems from spark ingnition systems.

Two other bits of Jomar news. First, Joe is working on a replace-ment for the SM-4 which will be micro-based. It is to be called the SportMax, and will fit in between the MiniMax and the MaxCell in voltage and current capability. I don't know when it will be avail-able. Also, I just got word that Joe has sold Jomar to Electronic Model Systems of California. Joe will continue to be the R&D man.

Jomar is at 3440 Riverhills Drive, Cincinnati, Ohio 45244 or on (513)271-3903.

The newest throttle I've had a chance to try is the new AstroFlight Model 210 - the first of Astro's family of microprocessor throttles I mentioned last issue. It is another flat package as seems to be the current trend, and at 1.25 X 1.6 is bigger than a MiniMax but smaller than a Flightec SEC-SP or Ace ST2635. It comes supplied with Zero-Loss connectors at the end of 4 inch 13 guage power wires and a with Futaba J receiver lead. It weighs 1.5 ounces in that form. It is of fixed-range design, but will not start up if your transmitter stick is much off of "idle" position. To get it to go you must bring the stick back for a second or two, then advance it. It's software is by Doug Ingraham (Lofty Pursuits) and as such is very well behaved. Operational ranges are 1-16 cells, up to 45A continuous. List price is $84.95, which means a "street price" of $60 or so. There is also a Model 211 with brake and higher current capacity available now.

Speaking of Lofty Pursuits, Doug sent me e-mail the other day saying I had understated the current capacity of the LPSC-l in the April issue and that it can handle 43 Amps. Also, he says he's updated it so that it is smaller and lighter. The 1995 version
will be capable of handling up to 50 Amps, and up to 20 cells (up from 16 for the current version). It will list for $75. Also coming in 1995 is a tiny control for the Speed 400 class of models - 1-20 cells at 10 amps. Contact Doug at Lofty Pursuits, 2274 Aster Ct., Rapid City, SD 57702 or on (605) 343-8760.

I've still not had a chance to try the Al//Robotics FX-35D or Brad Baylor's new unit. I also see that Robbe (in Germany) and others have gotten into the microproces-sor thing. I'm sure I'll have more to say next issue. It's becoming a tradition!

Other Product Updates

The news from Windsor Propeller Company is that they are adding a 10X6, 10X8, and 12Xl0 to the Electric wood prop line. They are also in the process of updating the old standby 12X8 folder with more undercamber (like the wood props) and are adding additional sizes. Look for all of these in the Spring of 1995. I will try to get my hands on some of these for the next issue. (Windsor Propeller Company, 3219 Monier Circle, Rancho Cordova, California 95742).

Out since last issue are the AstroFlight helical gearboxes for the 60/90 motors. Also out since last issue is the Electric Motor Handbook by Bob Boucher. As I mentioned in that issue, this is a book anyone who is into the technical side of

E-power will want to add to his (or her!) library. It is full of good information. I am especially enlightened about motor timing after reading the book.

Recommended in the book, as an aid to setting timing, is the Astro Model 100 Ammeter/Voltmeter. I have recently added one of these to my suite of test equipment. What a pleasure it is to be able to plug this thing in between a motor and throttle on the test stand and get both current and voltage on a big LCD display, just by flipping a switch! The unit is in the same case as the 205/207 speed controls and comes with Zero Loss connectors. If you're into testing power systems, it will make non-computer-based testing lots easier. (AstroFlight is at 13311 Beach Avenue, Marina Del Rey, California 90292)

One other neat gadget I've just acquired: a custom gear puller for both 5/32 inch shaft motors (Astro 05/15) and 1/4 inch shaft motors (Astro 25-90). This tool is designed by John McCullough and available from New Creations R/C (see below). A version with jaws for both shaft sizes is $22.95. Either one is $14.95.

Just mentioned in the November issue of the Westmoreland Electric Soaring Society newsletter Watts Current is new low-wing aerobatic ship called the Brigadier (NOT to be confused with the Old-Timer Brigidier). Its for 200 watt and up power systems and is now available from Hobby Lobby for $189 (see below). The video image in the newsletter shows a very clean low-winger with wide set wing mounted main gear. It's about the size of the Schneider Sport (65 inch span).

Electric Suppliers

I've recently joined Compu-Serve (my address is 75613.2621) and in my first few days up there I have had some exchanges with several E-power suppliers includ-ing Al/Robotics. SR Batteries and Lofty Pursuits. Also up there is Hobby Lobby, and there may well be more. The Electric R/C forum is quite active.

Hobby Lobby, as always, is a good source for electric items - especially from Europe. If you don't have their catalog, you should, They can be reached at 5614 Franklin Park Circle, Brentwood, Tennessee 37027 or call them on (615) 373-1444.

Another supplier worth mentioning is New Creations R/C for a full line of Astro Flight equipment, plus Leisure, some Robbe, and several speed control suppliers (Jomar, Flightec, Lofty Pursuits, Steve Neu, Al//Robotics). Lots of other stuff, too. Kirk Massey can be reached at P. 0. Box 496, Willis, Texas 77378, or call him on (409) 856-4630.

For batteries, I've had good luck with B&T Racing. They have Sanyo cells in 1400 SCR and 1700 SCRC either individually or in matched sets, Sanyo 600SCR and 1000SCR cells, battery pack building supplies and more - at the lowest prices I know of (for example, loose 1700SCRC cells for $3.75 each). They may be contacted at 508 Lake Winds Trail, Rougemont, North Carolina 27572, or call on (919) 471-2060.

Any of these suppliers can help if you can't get what you need from your local hobby shop. Some shops in this area do stock Hobby Lobby distributed items, so by all means check with them first.

Nickel Metal Hydride vs Nickel Cadmium
By Doug Ingraham, Lofty Pursuits

There seems to be a lot of interest in the NiMH cells for use with RC. This interest has peaked with the recent introduction of the HydriMax batteries from Hobbico. I did some research to discover if the touted advantages are real. I have a data sheet from Gates on their GMH-1 100AA and GMH-2400CS cells which is where the information for the NiMH cells comes from. The specs on the GMH-1 l00AA are a slightly less than the claimed specs from the Hobbico advertisment.
Claim: For the same size and weight, nickel-metal hydride (NiMH) batteries offer twice the capacity of NiCds.

I found that the closest sized AA cell that Sanyo makes is the N-700AAE. This table compares the specifications of the respective cells.

	GMH-l l00AA	N-700AAE	(notes)
Typical Capacity (mah)	1100	770	discharge rate of 0.2C
Minimum Capacity (mah)	1000	700	
Cycle life	500	1000	to 80% of new capacity
Diameter(mm)	14.1	13.8	
Height (mm)	49.0	49.5	
Weight (g)	24.5	27	
Selfdischarge	25	15	percent per month
Internal Resistance	0.036	0.011	Ohms

This table is for sub C sized Cells.

	GMH-2400CS	N-1700SCE	(notes)
Typical Capacity (mah)	2400	1850	discharge rate of 0.2C
Minimum Capacity (mah)	2150	1700	
Cycle life	500	1000	to 80% of new capacity
Diameter(mm)	22.1	22.0	
Height (mm)	42.2	42.0	
Weight (g)	52	53	
Self discharge	25	15	percent per month
Internal Resistance	0.025	0.0055	Ohms

Twice the capacity? The numbers don't lie.

At higher discharge rates, the capacity of NiMH and NiCds will be reduced, but the NiMH suffers much more from this effect. In addition, the voltage drops off much faster under load due to the much higher internal resistance. From email and voice conversations with Larry Sribnick of SR batteries, there are other disadvantages associated with NiMH cells.
* High self discharge rates that are greatly elevated by

temperature.

* More sensitive to vibration than NiCds.

* Suffer from vent weeping. This can break down wires and insulation over time.

* Require a charger that is designed to detect the flatter peak.

* Cannot be charged at rates greater than C safely. *[this is coroborated by tests done by PSEMF member Ron Standley - bec]*

* Only a few different cell shapes and capacities.

* Lower number of cycles.

* Internal resistances 3-4 times higher than NiCds.

* Higher price.

Many of these problems will be solved by simply waiting a few more years. The one that will prevent the use of these cells in the electric flight environ-ment is the inability of the cells to be charged at rates greater than C allowing quick turnaround. NiCds have a great advantage in this area because the chemical reaction when charging is endothermic. The cells actually get colder when being charged, and this allows elevated charging rates. The temperature rise seen in NiCds only occurs when the cell approaches a full charge. The NiMH charging reaction is exother-mic, so the heat of reaction must be eliminated through conduction to the outside case and eliminated via conduction or radiation, or the cell will cook from the charging losses.

Conclusions

I will not be flying these cells in my planes because the smallest cells available are larger, heavier, and have a higher internal resistance than the smaller NiCds and cannot be fast field charged. This makes them inappropriate for use as a receiver pack in an electric powered model. They might be usable in a slope or thermal sailplane since you need a larger capacity pack for these applications and vibration is not an issue.

I may buy a set of cells for my transmitter if I should ever need to fly longer than the 3 hours I get now with the factory 500 mAh NiCd cells. Before I did this, I would get high capacity NiCds (750 mah) which will fit in the same space as the 500 mAh cells and would give me 4.5 hours of duration without the self discharge worries.

Unless you are going for extremely low current draw (under 2 amps) these cells offer no practical advantage as a power source for an electric motor because the voltage sags and the capacity drops quickly under higher loads. Also, the fact that a 1 hour charge rate is the best available today makes them less than practical for most electric flight purposes.

Final notes

After I wrote the above conclusions I read a note from a modeler who lost an airplane because the NiMH batteries in his transmitter died on him unex-pectedly. His transmitter low battery alarm started beeping at him and in less than 20 seconds the power failed and his model crashed while he was bringing it in for an emergency landing. Since he had charged it the night before we can only assume that it self discharged due to elevated temperatures in his car and from sitting in the sun. I was able to replace the 500 mAh nicads in my transmitter with a pack from SR batteries that has a rated capacity of 1000 mah in an AA sized cell as was the comparison above. The actual capacity of this pack is 1100 mAh which gives me over 6 hours of operating time on my Airtronics Infinity 660 transmitter. This is only 100 mAh less than the rated capacity of the NiMH cells. SR Batteries is an Air Show Team Sponsor so think of them the next time you need to replace a pack.

Doug Ingraham
Lofty Pursuits
2274 Aster Ct.
Rapid City, SD 57702
Phone: (605) 343-8760
CIS: [75116.473]
Internet: dpi @lofty.com

Notes from the Workbench

One of the little flying field "accessories" I've not used before is a battery cooling tube - you know, a 12V fan of some kind on the end of a suitable tube, into which you put a hot battery pack to cool it after a flight. After seeing Randy Smithhisler's at the recent PSSF gathering, and having taken hot packs out of the Schneider Sport after flights, I decided to make one. It's not seen service as intended just yet, but I have found another use for it. It's just great for keeping a ferrite motor cool while seating the brushes (I was break-ing in a Speed 700 I got at the Hawks swap meet). Just put the running motor (on a piece of foam rubber) inside the tube with the airflow going through the motor, and it stays cool while the brushes wear in - at least using the "run it with no load on half voltage" break-in method.

I was in the new Barnes & Noble bookstore a couple of weeks ago and picked up an English publication called *Modeller's World*. This particular one was issue 13, and it is devoted to "Small Electric Flying Models". By that the editors mean small R/C models powered by the Mabuchi 380 family of motors and others of similar size. These include the Graupner Speed 400 series, the Kyosho AP-29, and the AstroFlight 035 at the upper end of the range. Other motors in this size class are the Peck Silver-Streak and the HiLine Elf-50. The publication discusses motors, gearboxes, radio systems, various types of planes. It even has a construction feature on a small high-rate speed control, and a chapter on ducted fans! As a small model lover myself, I have found it fascinating reading. I now find myself poring over the Hobby Lobby catalog, since they are the U.S. source of much of the power system equipment described in the magazine, and

wishing more of what is available in the U.K. was available in the U.S.A.

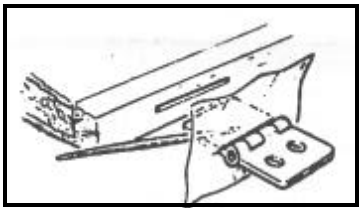
These small models, running on $10 motors and using smaller cells (even the very inexpensive 600AA's), can be a lot of fun for the money. I am particularly intrigued by the ease of doing affordable multi-motor projects, and by the performance of the Speed 400 pylon racers. The little racers look like a candidate for a plane you can just keep in your car and have fun with almost any time.

For another small model that is very interesting, see the January 1995 issue of *Model Builder*.

Three Handy Hints from *Flightline newsletter - editor: Ed Obermeyer*
11840 Mangrove Ln., Cincinnati, OH 452476
Protect That Plane!

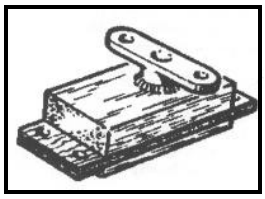
Hanger rash is the bane of every modeler. A cheap and easy way to afford some protection to your pride and joy is as follows. For a wing cover try taking a beach towel and fold it in half, lengthwise. Sew the towel together down its length and across one end. Presto, a wing cover. For the tail surfaces, find three styro- foam blocks of appropriate size. Hog out slots in the blocks such that you can slide a block over each end of the horizontal stab and over the top of the fin. You can even get fancy and glue some dowel stock into the styrofoam block so you can rubber band it in place. Presto - chango, tail feather protection.

Hinge Sleeve



A very non-messy way to keep epoxy out of hinges, is to cut small rectangles of discarded backing from those iron-on coverings. Cut a small slit so that the piece is a tight fit over the hinge, pushing it right up against the hinge knuckle. Apply the epoxy to the hinge with a toothpick, then slip the hinge in place. After the epoxy has set, tear the plastic strip out, then cut a new piece to be used when attaching the control surface.

Dummy Servo



This simple dummy servo allows radio installations to be planned, mounting holes to be drilled, and pushrods to be adjusted without the inconvenience of trailing servo leads. Make these to match your servos in size and the hole centers the same. Be sure the servo arm is glued on exactly at 90 degrees to the fore and aft axis, i.e., centered.

From *Watts Current* Dec. '94
editor Rich Simpson

There is something new to try:

Graupner has a little cylindrical gearbox that looks like (but is not) a planetary drive with output shaft exactly concentric with motor shaft. And gearbox is exactly same dia. as motor. The motors used are SPEED 500 and 600. But, get this: the prop -- a new one -- is a 12 x 10 Scimitar folder! (repeat: 12 x 10 !!) Output of SPEED 600 combo is about 23 oz. thrust (static) with running time of 5.5 minutes at full speed on 1400's. I will probably try this in a week or two because it just screws into the SPEED 600 holes in nose of UHU. The little SPEED 600 combo gearbox & 12" prop powered the Graupner SB-13 flying wing very nicely. It ought to hurl UHU into stratosphere.

New Modeling Source
from Electric Flight U.K. winter 1994
(see Feb. 95 issue for more info on the belt drive)

The talents of leading electric fliers Bob Aberle and Tom Hunt have combined to set up ModelAir-Tech, R/C Model Aircraft Products and Engineering. among the numerous product lines available are semi-kits of the "Pucara", "Beech D-18", "A-10 Warthog" and plans for the vintage/old timer "Kerswap" model. The new "H-1000" belt reduction unit, which can handle one or two motors, up to a combined power rating of 1000 Watts, is also in their inventory. ModelAir-Tech, PO Box 12033, Hauppauge, NY 11788-0818 Tel.: (516) 979-1475

Flint's R/C Swap Meet
4th Annual
Sunday, March 12
Flint Baker College at 1050 W. Bristol Rd.
near Fenton Rd.
about 1/2 way between I-75 and I-475
Time 9 a.m. to 2 p.m.
Admission $3, under 12 $1
Advanced Table Registration $13.00
After March 1, $15.00
contact Gerard Klink (810) 659-1323

New Gear Box
ModelAir-Tech, PO Box 120333, Hauppauge, NY 11788-0818 Tel: (516) 979 1475
From the winter 1994 Electric Flight U.K.

The talents of leading electric fliers Bob Aberle and Tom Hunt have combined to set up ModelAir-Tech, R/C Model Aircraft Products and Engineering. Among the numerous product lines available are semi-kits of the "Pucara", "Beech D-18", "A-10 Warthog" and plans for the vintage/old timer "Kerswap" model. The new "H-1000" belt reduction unit, which can handle one or two motors up to a combined power rating of 1000 Watts is also in their inventory. For more details, contact the above.

Mid-America Electric Fun Fly Dates!

JULY 15 & 16, 1995
For More Info contact
Ken Myers (810) 669-8124

The February Meeting

Ken Myers showed his ModelCad plans for his Bipe-E. This is a large biplane designed to be a floater and just fly. You'll see more on this project as it comes along. He then discussed several converstions he has had with others, around the country, over the past month.

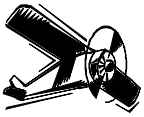
Richard Utkan showed his HiLine Blue Flame ducted fan motor and shared his idea of putting two of these units on a WASP. It should be an interesting project.

Jack Lemon brought plans for the indoor ROG plane, rubber powered helicopter and paper indoor props. He then demonstrated how to make the props. (see photo)

Ken also shared how he is archiving electric flight data using Adobe Acrobat. (note computer in photo.

The next meeting will be Thursday, March 2, at 7:30 and will included a demonstration on building on glass.

The Mid-America Electric Fun Fly Dates:
July 15 & 16
for more information, watch the Ampeer or call:
Ken Myers (810) 669-8124
Keith Shaw (313) 973-6309



The Ampeer
Ken Myers
1911 Bradshaw Ct.
Walled Lake, MI 48390

Next Meeting, 7:30, March 2
at Dublin Comm. Center