The Flightline

Volume 34,Issue1 Newsletter of the Propstoppers RC Club AMA 1042 January 2004

Editorial: "Stuff You Still Need"

OK, it's been a fine Christmas and your stocking was stuffed with good things, but did you really get what you needed? Perhaps you didn't realize it at the time but there are a world of useful tools and gadgets that make our hobby more enjoyable. However, we don't necessarily share our information on such items, so it occurred to me that the newsletter is a good place to do so.

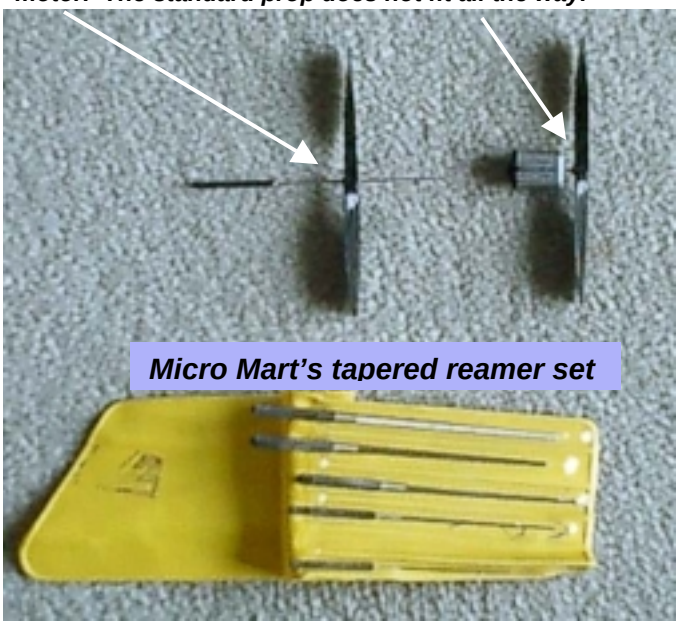
OK, got that? I need your inputs. Phone, e-mail or just give me a note and I will put it together, photos are good but I can research commercial items on the web.

Well, here is one of my "most useful" tools that I bought as a result of the disease that we all suffer; "MicroMart-itis". I don't very often succumb to these enticements while reading their catalog (really?), but I bought myself a set of small tapered reamers. Like most "essential" tools, I don't use them very often, but when I do it is usually a job where nothing else will do.

There are two such applications, one is sizing the holes in control elements like bellcranks and control horns, and the other is sizing the mounting holes in indoor props. Both of these applications require some precision and a means of approaching the right size slowly, so you don't over do it and ruin the part. The MicroMart set shown here consists of six reamers with overlapping sizes from about .020 inches to about .10 inches diameter. With a length of about two inches the taper would be about .007 inches per inch. So it is really easy to control the diameter by watching the incremental depth of cut. One inch more and the diameter increases by .007 inches, 1/8-inch depth is about .001 in diameter.

The picture shows a standard, as-bought U-80 indoor propeller lightly mounted on the popular M-20 motor shaft. The shaft diameter is one millimeter, or about .040 inches. If you look carefully, or use your imagination, you will see that the prop does not fully seat on the shaft. You can force it on further but the shaft is rather delicate, not to mention the motor internals where the load would be reacted from such an effort. Much better to ream out the hole and achieve the proper fit.

Resizing the U-80 propeller to correctly fit on the M-20 motor. The standard prop does not fit all the way.



Micro Mart's tapered reamer set

Control slop is the bane of our hobby. Make the linkage too loose and you have poor control about trim and worse, the potential for destructive flutter. Make the controls too stiff and you also have control difficulties and servo overload. With electric powered models you can suffer from excessive servo current draw that can overload the BEC (battery elimination circuit) causing complete control loss. In a glider, where you may soar for hours (well, many minutes and we can dream about the hour-long flights!), you can deplete the flight battery with the same result; complete loss of control. Of course, this can happen with a gas powered airplane too, if the flight pack is marginal in capacity.

The tapered reamers can be used to size the control horn / bellcrank hole by slowly reaming out to the wire or clevis size until the desired fit is achieved. They work really well in nylon components where using a drill frequently results in an under-sized hole and the next size drill is too big. I usually make my own plywood control horns on my SAM Old Timer models and the reamers work well there too.

So, the solution is to buy yourself an "After Christmas" present by calling Micro Mart to order one. Meanwhile, tell me your favorite tool and I will pass it on.

Dave Harding

Agenda for January 6th Meeting
Marple Newtown Library, 7:30 pm

- Approval of December meeting minutes
- Finance report
- Membership report
- Field report
- New business
- Plan for the Club Auction
- Show and Tell

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Calendar of Events

Club Meetings

Regular meeting 7:30 pm
Tuesday 6th January
Marple Newtown Library

Club Auction
Tuesday 3rd February at 7 pm (not 7:30)

Flying Events

Tuesday Breakfast Meeting
The Country Deli, Rt. 352 Glenn Mills
9 till 10 am. Just show up. Flying afterwards at Sleighton or Moore (weather permitting) or indoors at the Chester Salvation Army Gym
Call Dick Klekotka 610-692-4527

Indoor Fun Fly
At Tinicum School Gym, 7 till 9 pm
Friday 9th January
Friday 6th February
Friday 5th March

Regular Club Flying

At Moore and Sleighton Fields

Daily	**10 am til Dusk**
Saturday	**10 am til Dusk**
Sunday	**12 p.m. till Dusk**

(Electrics 10am till Dusk)

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Propstoppers Web Site; www.propstoppers.org
Check the web site for back issues of the newsletter, pictures of club events and the calendar of future events.
Pictures courtesy of Bob Kuhn and Dave Harding

The President's Message

Dear Fellow Propstoppers

As this year concludes I would like to thank John Zubuski and all those who served the club for a great year. And to everyone, a happy new year!

A sound level meter and procedure was adopted at our last meeting and our Sound Committee: Steve Boyajian, Rusty Neithammer and Bob Crowell, will be keeping us all in check and under the club's 94db sound level limit this coming season. If you or someone else needs to check their plane's sound level this season please, alert us - we would like you to, before the neighbors do!

As the weather changes, for many of us this is plane-building season, but don't forget we have an active indoor fun fly program at Tinicum Elementary School. Check the newsletter for the dates. Come to fly or watch. Many of these indoor planes exhibit cutting edge technologies. It is a fun time for all!

A couple of reminders:

It is time for club membership renewal and to send in your AMA renewal if you haven't already done so. Club membership of $60 is payable at the club meeting or by sending Ray Wopatek a ***copy*** of your ***2004 AMA card*** and a ***stamped, self-addressed envelope***. See the coupon on the back cover of this issue of the newsletter.

The club auction / sale is in February. Don't forget, the February club meeting will start early at 7:00pm. Dust off that extra stuff you have that could be useful to others and items you want to sell for this annual event. Get something ready to sell or just get ready for the bargains!

The Club Officers would like to wish all the members and their families a happy holiday season.

Keith Watson, President

The gym at the Salvation Army, our indoor flying site Tuesday mornings, full of toys and food for the needy at Christmas.

Minutes of the Meeting, December 2nd, 2003 at Marple Library

The meeting was called to order at 7:30 p.m. by president John Zebuski.

The roll call by membership chair Ray Wopatek showed 31 members and no guests present.

The November minutes as published in the newsletter were accepted by the membership.

The treasurer's report was presented by Treasurer Al Gurewicz and accepted.

Old Business:

The president reminded us of the indoor flight dates, which were published in the newsletter.

Sound Committee: Rusty Neithammer purchased an analog sound meter for club use, which will be available for the spring season.

New Business:

New president Keith Watson announced his appointments for the coming year. These include:

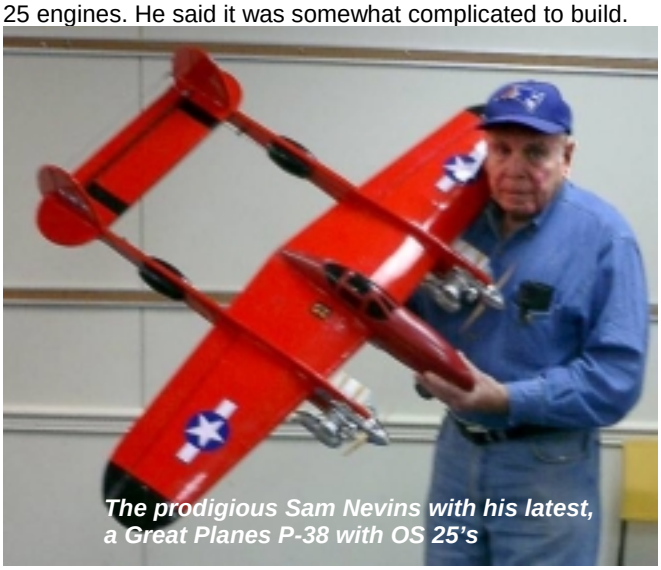
- Field Marshall: Al Tamburro
- Safety officer: Jess Davis
- Refreshments: Tom Tredinnick
- Membership: Ray Wopatek
- Sound committee: Steve Boyajian, Rusty Neithammer and Bob Crowell
- Newsletter: Dave Harding

Several members reported that they encountered unusual interference at Sleighton field last week. Four different frequencies were involved.

The club adopted by a vote the sound policy as published by the AMA for pattern competition.

Show and Tell:

Sam Nevins showed a Great Planes P-38 with 2 0S 25 engines. He said it was somewhat complicated to build.



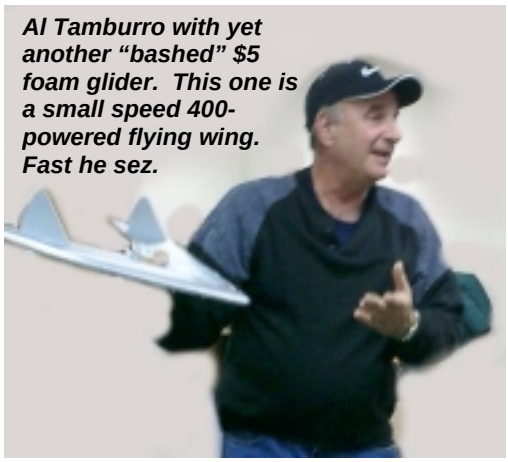
The prodigious Sam Nevins with his latest, a Great Planes P-38 with OS 25's

Mickey Callahan showed a Great Planes ARF Wright Flyer with two geared electric motors. It is now ready to fly and weighs 8-oz.

Mickey also showed a SIG Jenny ARF that he modified to add spoke wheels to give it a scale appearance. He also showed a Home Depot tote for his field supplies.

Mickey Callahan with SIG Jenny and Great Planes Wright Flyer, and a useful field box tote from Home Depot

Al Tamburro showed a home built flying wing made from a foam glider wing. He mounted a speed 400 electric as a pusher. He balanced it by moving his 7-cell pack until it flew well. He said it flew well in the back yard.



Al Tamburro with yet another "bashed" $5 foam glider. This one is a small speed 400-powered flying wing. Fast he sez.

John Drake showed a P51 indoor free flight model that he is building from Depron foam. He colored it in the markings of the D version. He plans to finish it as an electric.

John Drake with his all-foam P-51D electric-powered indoor freeflight model

Dave Harding showed an assortment of tiny electric R.C. components he plans to use this winter for indoor flying.

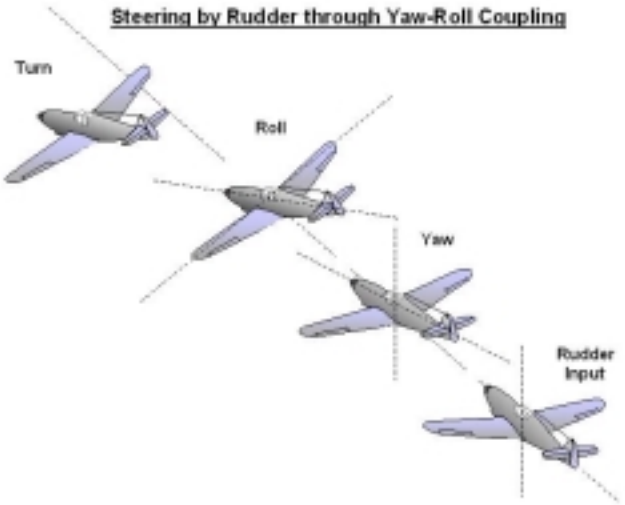
Richard Bartkowski, Secretary

A Discussion of RC Model Control Options; Rudder or Ailerons.

By Don Stackhouse of DJ Aerotech

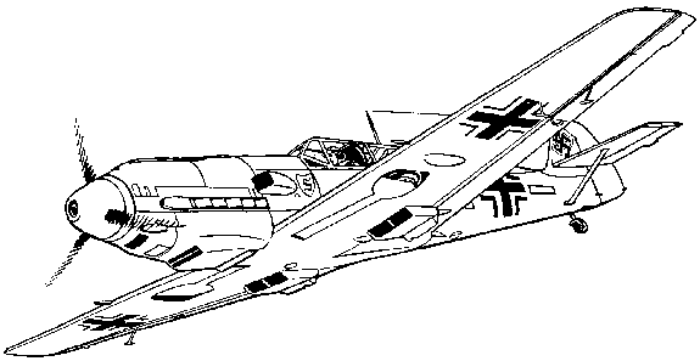
Recently there have been a number of questions regarding the pros and cons on Rudder vs. Aileron control for three-function RC models. The following is a discussion of the relevant factors.

To control roll with rudder (no use of ailerons), you must have an adequate amount of yaw-roll coupling (i.e.: when you yaw the plane, something about its aerodynamics makes it want to roll in response to that yaw). Stable airplanes have some yaw-roll coupling but to use this for primary roll control usually requires some extra dihedral in the wing.



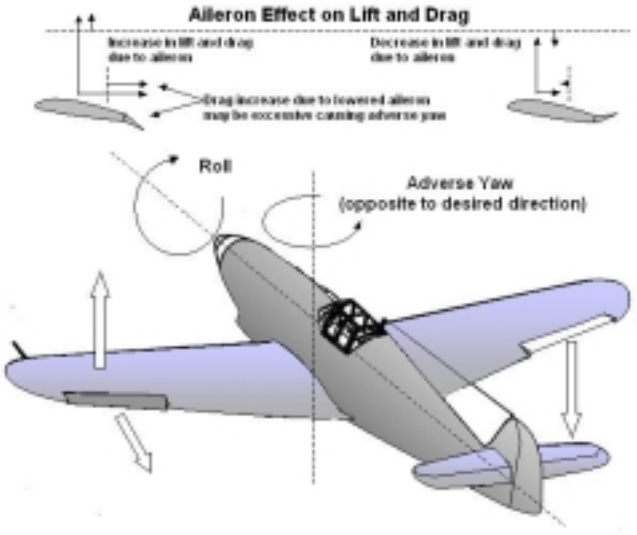
In general, just a few degrees of dihedral are sufficient for adequate roll stability, but to use rudder plus dihedral for roll control generally requires much more dihedral. In my experience, a general rule of thumb for adequate roll control in a typical sport model is at least about 8 degrees of equivalent dihedral per side.

Most full-scale airplanes have their dihedral determined with



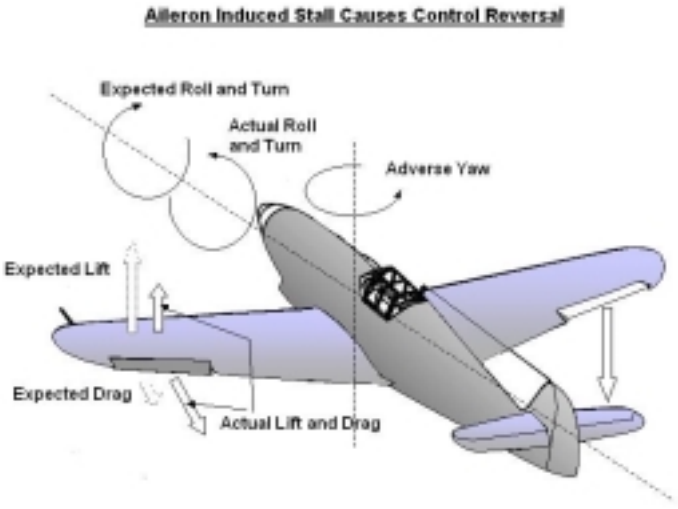
the assumption that the ailerons will be the primary roll control. Therefore, they do not have enough dihedral for decent roll control using rudder alone. This doesn't mean that rudder alone can't achieve good roll control; it just means that those particular airplanes were not designed to be flown that way.

Ailerons by themselves (without any help from rudder) tend to create a significant amount of adverse yaw, unless they are very efficient.



If the plane has lots of dihedral and the ailerons are only of average efficiency, the adverse yaw could couple with the dihedral to cancel out much, if not all, of the ailerons' rolling effect. However, very efficient ailerons can avoid this problem. It can be done, but the typical proportions used for ailerons usually can't do it.

Ailerons will generally give quicker and more precise control of roll than rudder plus dihedral. If you have to do just one or the other, rudder alone is usually easier to build and set up than ailerons alone. This is one reason why we commonly see that arrangement on trainer planes. In addition, ailerons can have some serious handling issues when flying near stall. Depending on the overall characteristics of the airplane and airfoils involved, a "down" aileron can trigger a stall on that side, resulting in what amounts to a reversal of the ailerons.



Spin recovery on an airplane with no rudder can be a problem as well for the same reason. In addition, if the ailerons are used as flaps, the combination of downward flap deflection plus aileron inputs can act like reverse differential, making the adverse yaw problem extremely severe.

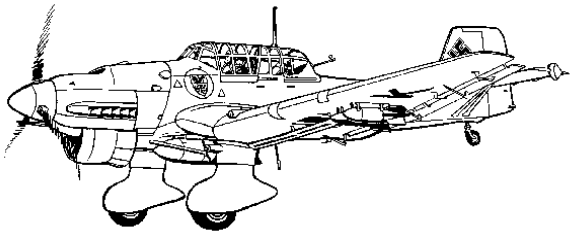
On the other hand, rudder alone tends to make slow rolls decay into spiral dives as the plane approaches a vertical bank during the early part of the maneuver. The use of a more nose-up entry into the roll, plus some aggressive use of down elevator during the inverted portion can offset this to some extent, but it's still usually more difficult to do a good slow roll with rudder alone than with aileron alone. Of course neither is as good as using both together IF they are each used properly. However, almost nothing will ruin a slow roll quicker than misuse of the rudder.

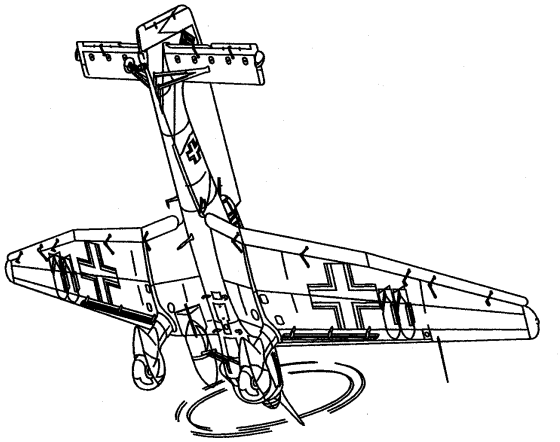
Then there's the whole issue of the balance between spiral stability and dutch roll. Too much dihedral and not enough fin effect (particularly the vertical tail moment arm) can cause dutch roll problems. Not enough dihedral and/or too much vertical tail can cause spiral instability (in a turn, the plane naturally wants to tighten up the bank into a "graveyard spiral"). The inertia of the plane about the various control axes is a major player in all of this as well. These parameters all have to be kept in balance with each other.

The bottom line is that there is a good case for having both ailerons and rudder. If you can only afford one or the other for some reason (weight, complexity, whatever), which option is the best choice depends on the details of the specific airplane involved. As with most things in airplane design, there is no good "one size fits all" answer.

Then Eduardo Escalona asks:

Do you think that the Stuka could be well flown with rudder/elevator only?
I say this because the Stuka has special ailerons very difficult to make in a model so I was thinking in making those ailerons just as dummies and controlling turns through rudder only.

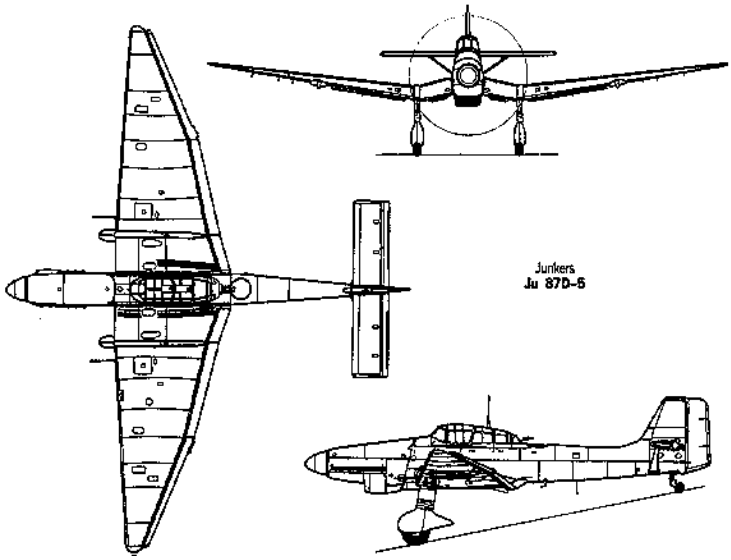




If we ignore the stub sections next to the fuselage, the Ju-87 Stuka has about 9 degrees of dihedral per side, measured at the chord line of the airfoil. The stub sections near the fuselage are severely anhedralled, but they are very small. Technically we should include them in the analysis but we'll ignore them for the moment.

The no-ailerons version of our Roadkill Series J-3 Cub has a little less than that and has very good roll control. However, that's with a high wing mounted directly on a deep profile fuselage. This picture is of the aileron-equipped version, with scale dihedral. Couldn't get a picture of the right one in time!

The Stuka has a low wing. Those anhedralled stub root sections would have little influence on an equivalent dihedral calculation



(Visit http://www.charlesriverrc.org/articles_modeldesign.htm to download a copy of Martin Brungard's equivalent dihedral angle calculator spreadsheet for Excel), but they do tend to accentuate the negative effects of the low wing on the effective dihedral.

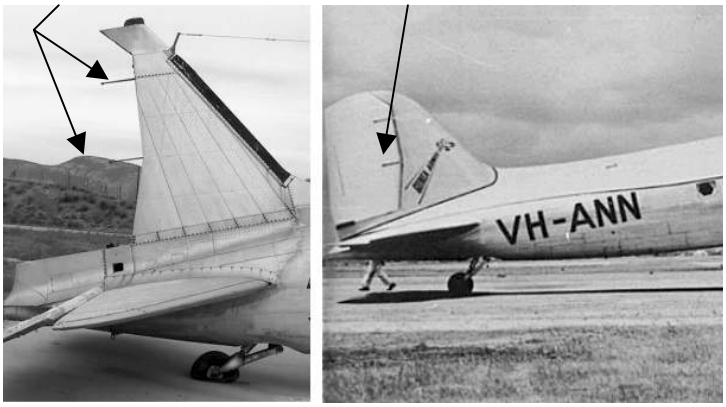
Given that, my gut feel says that the scale dihedral on the Stuka would probably be about equal to 5 degrees or so per side on a model that did not have significant fuselage effects. This is probably enough to get some roll response from rudder alone, but it's likely to be fairly weak. For a backyard model you're planning to fly in little or no wind it might be adequate, but it's not likely to be responsive enough to handle any significant turbulence, or for any rapid maneuvering about the roll axis.

You probably need to add about 3 degrees or more per side to get good roll response. Of course "good" is a subjective term; if you're used to flying LiteStiks without any added dihedral, a Stuka with scale dihedral might seem downright spirited to you! However, 3 degrees of additional dihedral on a Stuka is likely to be

quite visually noticeable. You may want to reconsider building those functional ailerons. It might not be as difficult as you think.

The rudder on our Roadkill Series DC-3 can be built with a scale aerodynamic balance that's structurally similar to the Stuka's aileron hinge requirements. Although the laser parts we include in that kit do make the job far easier, an offset hinge system is not all that difficult to build.

Hinge that allows aerodynamic balancing on the DC-3 rudder



Don Stackhouse @ DJ Aerotech http://www.djaerotech.com

Propstoppers Sound Measurement Procedure

Following observations of excessively noisy airplanes at Sleighton Field the board has re-issued and revised the club's sound level criteria and measurement procedure. In addition, the club has purchased a sound-measuring meter that will be stored in a suitable place at Sleighton Field. There is also consideration of establishing a specific location on the field where such measurements are to be made. This is in consideration of several factors. First the measurements must be made away from other activities for sound measurement and safety reasons. They must also be made away from structures and vehicles that may reflect the sound and upset the accuracy of the measurements. The following is the full procedure, although the referenced AMA addendum is not included. It is available on the club web site.

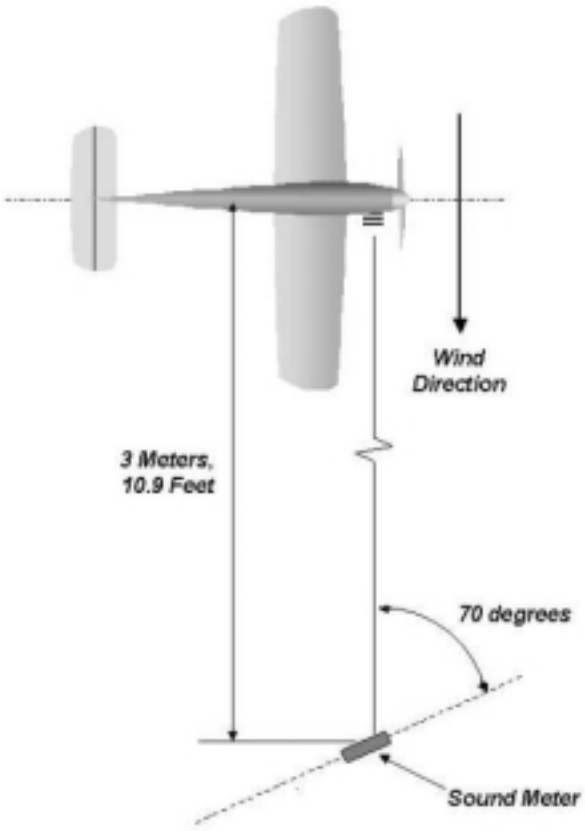
Procedure for Making Sound Level Measurements
Revision 0, December 02, 2003

Equipment: Radio Shack #33-2050 Sound Level Meter (or equivalent)
Tripod to support sound level meter

Reference: AMA Radio Control Aerobatics, Addendum 1 (Sound Addendum)

Procedure:

1. Place the airplane being checked on the ground, away from any structures, motor vehicles, etc. Orient the airplane so that it is facing crosswind with the muffler outlet facing downwind. Install a restraint suitable for the airplane, with the engine running, to be held in place without human assistance. Ensure that there are no other loud sounds present from aircraft, motor vehicles, etc.
2. Always read the muffler side of the aircraft (ex. The right side for upright mounted 2-stroke engines). Place the meter downwind of the aircraft on a tripod 11 to 12 inches off the ground; perpendicular to the fuselage at the muffler outlet; and at a distance of 3 meters (10.9 feet). Position the meter at an angle of 70 degrees from the down wind line. Install the windscreen over the sound level meter microphone.



3: Turn the sound level meter ON by rotating the range dial to the first position, "Batt". Verify that the battery is good by observing that the meter reads in the acceptable "red" range.

4. Set up the sound level meter as follows:

Weighting:	A
Response:	Slow
Range:	90

5. Start the engine of the airplane under test. After the engine has been started and properly tuned, and the adequacy of the restraint verified, ensure that there are no persons closer than 3 meters/10.9 feet to the airplane. Run the engine up to full throttle

6. Note the reading on the sound level meter.

7. Acceptable reading = 94 db (or lower).

A Sure Guide to Determining a Modeler's Skill Level

By Jeff Raskin

After a while in this hobby, you can walk up to someone, look at his or her model or workshop, and immediately put the person into one of four classes: Novice, Builder, Expert, or Master. Here are a few tips so you can tell one from another.

1. Take a good look at the control horns. If you weren't reading this guide, you might think to look at how they are positioned and attached, but here's the real secret.
   - Novice: They still have the little bumps where they used to be attached to the plastic runner.
   - Builder: The little bumps have been neatly cut off.
   - Expert: The horns are scratch-built from aircraft plywood, sanded, and varnished.
   - Master: The horns are handmade from polished T2024 aircraft aluminum and carbon fiber, coated for corrosion protection with the metal parts anodized to match the finish of the aircraft. Did I mention the stainless steel ball joints?

2. Covering quality is a dead giveaway.
   - Novice: It looks like the entire Belgian Army has slept on it for a week.
   - Builder: It looks like it has been slept on by a cat for one night.
   - Expert: It is as crisp as a freshly made bed.
   - Master: It looks as taut as a bed made up by a drill sergeant at boot camp.

3. Study the trailing edges of the wing.
   - Novice: Square and over 1/8-inch thick
   - Builder: Nicely rounded
   - Expert: Feather edge
   - Master: Uses the trailing edge to shave

4. How well are the uncovered wood parts finished?
   - Novice: Raw wood
   - Builder: Sanded and painted
   - Expert: Sanding sealer, five coats of urethane paint, and each coat was wet-sanded, followed by rubbing compound and a fine European hard wax
   - Master: Impossible to tell how it's done because it looks like one piece of polished granite; wear sunglasses

5. On many models, it is possible to see the framework. Look carefully.
   - Novice: Hard to tell that it's an airplane
   - Builder: Reasonably straight and true
   - Expert: Joints have no gaps, no warps, corners, gusseted, looks like it was carved from a solid piece of wood with the grain always going in the strongest direction
   - Master: It was carved from a solid piece of wood with the grain always going in the strongest direction.

6. What aircraft do they choose to model?
   - Novice: Piper Cubs
   - Builder: WW II fighters
   - Expert: Anything with elaborate detail or impossible surface finish and markings, scale operating engines, retracts, and working instruments; windshield wipers start automatically when it rains
   - Master: Piper Cubs

7. What glues did they use?
   - Novice: Mucilage
   - Builder: CyA, epoxy
   - Expert: CyA in three viscosities, aliphatic resins, four different epoxies, contact glues, special canopy cement, and has a friend in the adhesives industry
   - Master: Parts interlock so well that no glue is needed

8. Find out what shop equipment they use.
   - Novice: One old hobby knife
   - Builder: Hobby knife, supply of fresh blades, handheld electric tools, box full of small tools
   - Expert: 2,000 square-foot shop with drill press, lathe, milling machine, table saw, router, vacuum-forming machine, foam cutter (all computer-controlled), rolling tool chest with larger tools, and a magnificent walnut machinist's tool chest with expensive precision tools
   - Master: One old hobby knife and a sharpening stone

9. Aerodynamic knowledge
   - Novice: Totally mystified since sixth grade
   - Builder: Has read one book on the topic and has forgotten it
   - Expert: Runs simulations on computers that make NASA jealous, solves differential equations mentally, and can give name, date of publication, and the author of every theoretical work since 1892
   - Master: If it looks right, it is right.

10. Radio system choice
    - Novice: Two-channel radio with elevator on left stick
    - Builder: Four-channel radio with two sticks
    - Expert: 17-channel radio made in Germany with an unpronounceable name and more levers and switches than the cockpit of a 747
    - Master: Free flight

11. How they fly their airplanes
    - Novice: Crashes on takeoff
    - Builder: Crashes on downwind turns
    - Expert: Only crashes when it's someone else's fault
    - Master: Knows better than to fly them

From The Clanking Armor, Lincoln Sky Knights R/C Club
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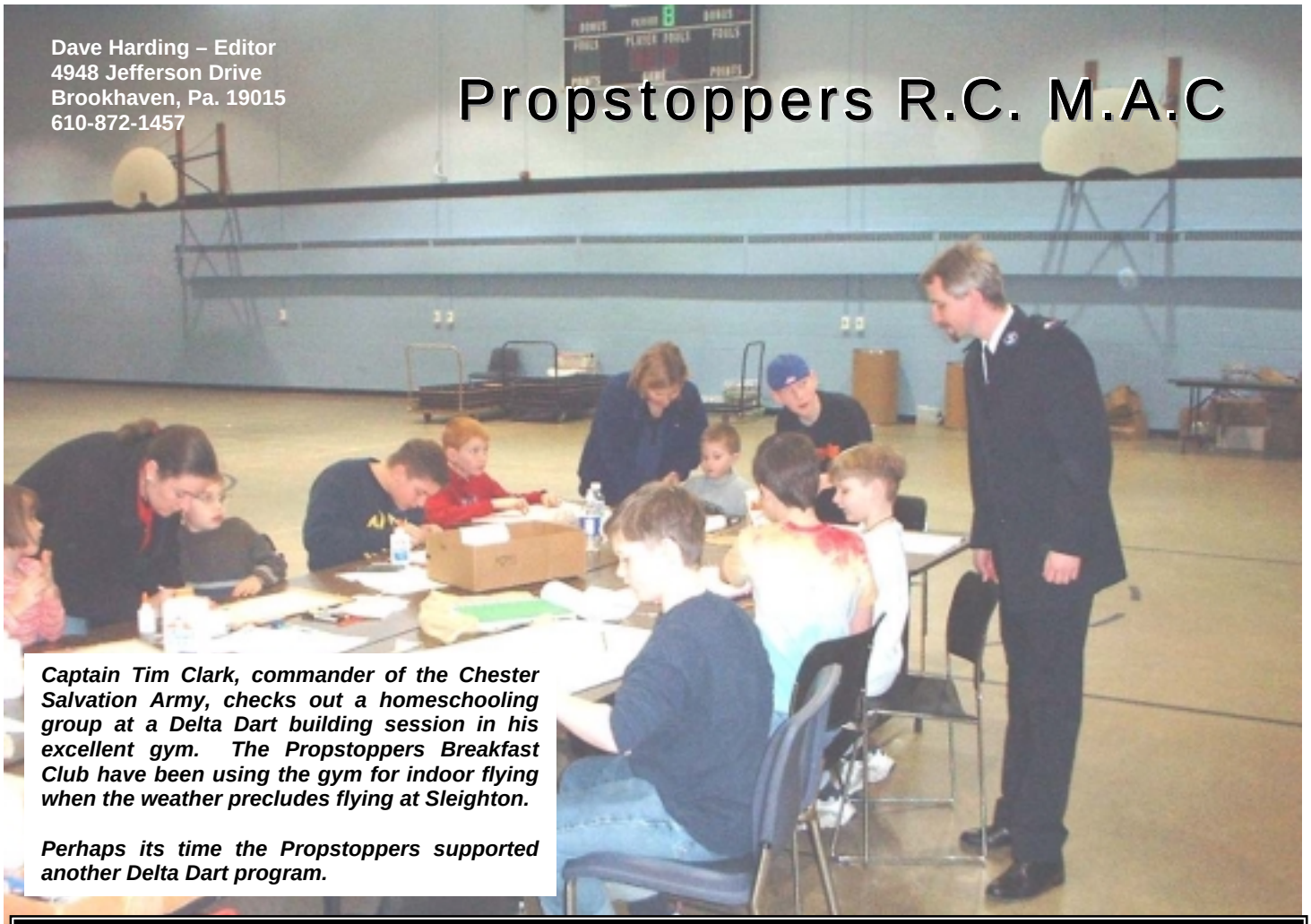
Propstoppers R.C. M.A.C



Captain Tim Clark, commander of the Chester Salvation Army, checks out a homeschooling group at a Delta Dart building session in his excellent gym. The Propstoppers Breakfast Club have been using the gym for indoor flying when the weather precludes flying at Sleighton.

Perhaps its time the Propstoppers supported another Delta Dart program.

Membership Renewal For 2004

Membership renewal for 2004 is now due. You can renew by mail or at the club meeting in January.

Dues are $60.

Ray Wopatek
1004 Green Lane
Secane, PA. 9018
Please enclose a ***copy*** of your current
A. M. A. Membership card,
And Please, Please enclose a Stamped self- addressed envelope.
Ray Wopatek Membership Chairman

Mick Harris helps with Delta Darts at the Chester Salvation Army.