

# Propwash

Official newsletter of the Propnuts Radio Control Model Airplane Club  
Highlands, Texas

www.propnuts.com

Editor: Paul Shaffer

February 2005

## John McKee

Prop-Nuts life member John McKee, 86, passed away at San Jacinto Skilled Nursing Home. John was born in Ambridge, Pennsylvania. He lived in the Baytown area and worked as an aeronautical engineer at NASA for 37 years. During his active years with the Prop-Nuts he gave many informative presentations at meetings and liked to build large scale models. He will be missed.

## Better performance with less noise

by Brian Dorff

With the ongoing debate about the noise our little engines produce, much is being done to preserve our way of life while respecting the rights of others. At first noise reduction sounds bad for pilots. We think that reduced noise means reduced power, and conventional wisdom supports this. It is not until you fully understand how engines and propellers operate that you will realize the gains that benefit not only our neighbors but our airplanes as well!

There are four contributors to the noise made by models: (in no specific order) muffler type, engine speed (rpm), tip speed of the propeller, and vibration.

### MUFFLER

The mufflers provided with today's engines are quite good for the rpm range that they are designed to run in. Mufflers that come with internal baffles should keep the baffles in. Removing them does nothing to boost power, it increases noise, and makes the engine idle poorly due to lack of back pressure. Pitts-style mufflers shouldn't have more exit area than the stock muffler does, and if it does, one of the ports may have to be partially or completely blocked. Again, this will help idle.

### ENGINE SPEED

(Continued on page 3)

## Club Officers:

**President:** Lloyd Sullivan  
**V. President:** Gail Huey  
**Secretary:** Gary Owens  
**Treasurer:** Marty Mankinen  
**Safety Officer:** Bill Stevens  
**Field Marshall:** Charles Stevens  
**Directors:** Bobby Clark  
Dwain Hughes

## Coming Events

### Club Meeting: Tue. February-15-2005

7:30 PM

Highlands Community Center

February 13

Fickle Finger of Fate Fly-In

Four simple tasks with each winner taking 20% pilot fees  
Jetero RC Club

March 19, 20

3rd Annual Profile Fly -In

All profile RC airplanes welcome  
Space City RC

April 16, 17

Prop-Nuts Annual Flea Market & Fly-In  
Prop-Nuts RC Club

## Happy Birthday To these members in February

Dwain Hughes  
Robert T. Modisette  
Jay Moorhaj  
Steve Paxton  
Troy Peterson  
Stephen Ross

## PROP-NUTS R/C CLUB, INC.

Minutes of the Meeting Held  
January 18, 2005  
Highlands Community Center  
Highlands, Texas

Marty began the meeting with the treasurers report. Motion was made by Charles Stevens and second by Tas Crowson to accept.

December minutes were read. Tas motioned to accept the minutes and second by Charles Stevens to accept December minutes.

Joe Chadwick was visiting from Bayport Aero Club. He joined our club and expressed that there are others from Bayport that are also showing interest in joining our club. Motion was made by the club to accept Joe.

## New Business Discussed

1. Re-instate award for meeting attendance. 9 meetings to qualify.
2. Caterers for Events. Bill Stevens had a couple of ideas he is going to check into.
3. Repairs @ field: shed and slab were the main 2 items. Getting power to the field would be nice if we can do it without field complications.
4. We need to have a membership drive to keep new people coming in.
5. Going back to mall shows for exposure.
6. Ideas on how to get spectators to events.

(Continued on page 2)

(Continued from page 1)

7. All pilots should assist at events.

8. Sanction in for big bird event on 10/8 & 10/9.  
April 17<sup>th</sup> flea market, sanction not back yet.

9. We need to know as soon as possible on confirmation of Curtis and others for the Houston Fun Fly.

10. Charlie Stevens mentioned the need to discuss field regulations again since we have more helicopters mixing with airplanes now. To be discussed at next board meeting.

11. It was determined to leave Christmas Party as is.

### **Model Of The Month Award**

Paul Shaffer

### **For Sale**

Giant Stinger: Ask Paul Shaffer for details.

Anyone with spare monokote are asked to see Tas Crow son to help out with Lynn Wrights ROTC training class. They are interested in using the field but a field member would need to be present.

Motion made by Ivan Bonebrake to adjourn.

Gary Owens  
Secretary

### **For Sale**

**Giant Stinger**  
84" plug in wings  
9201 & 9202 Futaba Servos  
2000 ma flight pack  
Less engine and receiver  
**Greg Fotorny**  
**281-481-5488**

Send newsletter correspondence to:

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Houston TX 77018  
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pshaffer2@worldnet.att.net

Answer

Paul Shaffer. The airplane is a u-control Ringmaster with a Fox 29 motor. RC wasn't there yet.

Computer Trouble

I was having trouble with my computer,  
so I called the computer guy over to my desk.  
He clicked a couple buttons and solved the problem.

As he was walking away, I called after him,  
"So, what was wrong?"

He replied, "It was an ID Ten T Error."

A puzzled expression ran over my face.  
"An ID Ten T Error, what's that, in case I need to fix it again?"

He gave me a grin.  
"Haven't you ever heard of an ID Ten T Error before?"

"No", I replied.

"Write it down", he said, "and I think you'll figure it out."

**ID10T**

A large contributor of noise made by airplanes is an over-revving engine. Most modelers try to make their engines run as fast as possible, trying to obtain the rpm at which the manufacturer claims the largest brake-horsepower (BHP) number. What they don't realize is the peak efficiency for the engine occurs at peak torque, which is usually about 65% -75% of the peak BHP rpm.

Example 1: A manufacturer of a .46 engine claims 1.5 BHP at 16,000 rpm. After break-in you find that you can turn a 10 x 5 propeller at 15,500 rpm— very close to the peak BHP, but the airplane's performance is mediocre, it is loud, and consumes way too much fuel. Now you find the engine's peak torque is about 70% of the peak BHP rpm (.70 x 16000 rpm = 11,200 rpm). You switch to an 11 x 7 propeller and find that the rpm is 11,500. You are much closer to peak torque now, and the airplane flies better and is quieter because the frequency of the engine firing has reduced dramatically. The fuel also lasts longer, and the engine will last longer as well since it is not working as hard. A slower engine also helps in achieving the next goal—

**PROPELLER TIP SPEED**

The tip speed of the propeller is critical in quieting the airplane. The point where things gets noisy is 560-feet per second or about 380 mph. Going over 400 mph is a big no-no. Even in an airplane that is built for speed, you should be able to choose a quiet propeller.

Example 2: Same setup as the last example, the 10 x 5 propeller is at 15,500 rpm and the 11 x 7 propeller is at 11,500 rpm. The formula for tip speed in miles per hour is: (Diameter in inches) x (3.1416) x (rpm) / (1056). The number 1056 is a constant that converts inches per minute to miles per hour. A 10 x 5 propeller at 15,500 has a tip-speed of 461 mph (a no-no).

$$(10) \times (3.1416) \times (15500) = (461) / (1056)$$

We want our tip speeds no faster than 400 mph and it should be less than 380 mph if you want to keep your flying site. The 11 x 7 at 11,500 rpm has a tip speed of 376 mph.

$$(11) \times (3.1416) \times (11500) = (376) / (1056)$$

The tip speed is now down to a moderate level. But how do these propellers

compare in performance?

You can calculate airspeed by using the propeller pitch and the rpm of the propeller. The pitch of a propeller is the second number in the propeller designation. This is the distance in inches that the propeller will travel through the air in one revolution. Multiplying the pitch by the rpm and dividing by 1056 will give the calculated speed of the model.

$$5 \times 15,500 / 1056 = 73 \text{ mph}$$

$$7 \times 11,500 / 1056 = 76 \text{ mph}$$

So your airplane will actually be traveling slightly faster with the 11 x 7 than with the 10 x 5, while turning 4000 rpm slower. This reduces engine noise, propeller noise, fuel consumption, wear and tear on the engine, etc. without compromising performance.

**Propeller loading Factor (PLF):**

How do you know what to expect switching propellers? Being able to compare propellers before you run them is the key to optimizing your airplane's performance and getting rid of the noise. Say you are happy with the rpm that your engine is turning with the 11 x 7 propeller, but you want to try other propellers to see what you like best for flight performance. Right now you are at the middle of the road, slightly fast and passable vertical performance, but what if you want more vertical? First we solve the PLF of our existing propeller, and then we compare it to others.

PLF= D x D x P	Propeller PLF
(D = diameter, P = pitch)	12 x 5 720
	12 x 6 864
	12 x 7 1008
	13 x 5 845
	14 x 4 784

The 11 x 7s PLF would be 11 x 11 x 7= 847 PFL (compare with the 10 x 5s or 10 x 10 x 5 = 500 PLF)

Now let's see what else is out there. To increase vertical you should either increase diameter, decrease pitch, or both. To keep a PLF close to the same you will have to do both. If you are trying to raise the rpm—decrease pitch—and if you are trying to slow the motor, increase diameter. I would try the 12 x 6 first and then the 13 x 5. They have close PLFs. This is for comparison only. Switching propeller brands or not balancing a propeller, among other things, can vary your results.

**VIBRATION**

How does the vibration of your model relate to the sound it makes in the air? Well, sound *is* vibration. Imagine your beautiful model—a nice wooden struc-

ture covered in drum-tight plastic covering. Think of it as a percussion instrument. The piston is traveling up and down like a drumstick pounding away at your model. And your model echoes every stroke it makes. The same thing happens with an out of balance propeller. Noise!! It's everywhere! Your new mission: get rid of all vibration. Start at the Propeller: It moves 300+ mph at the tip—balance it! It will remove noise because all that vibration won't exist in your airframe. Our neighbors will thank you and your receiver crystal, your servo pots, fuel tank, and Ni-Cds will thank you as well. You will be rewarded with much greater reliability and a longer airframe life span. Also consider a high-quality spinner. They are better balanced and look nicer. Back to the other cause of vibration—the engine. It is not possible to balance a engine dynamically at all speeds, so some vibration will forever be present, especially with four-strokes. The only thing that you can do about it is to isolate the vibration from the aircraft, making less noise in the process. Iso-mounts vary in type and price; from rubber grommets between the firewall and the mount, to specialized mounts for specific engines and planes that cost \$100 or more. A popular one is made buy Dubro and is for any 40-90-size 2c or 4c engine. It sells for \$20-\$30. Well worth the investment! While it may not be feasible to make every one of these criteria work on your aircraft, it is important to keep these points in mind when getting your airplane ready to fly this spring. If we all do a little, we can make a big difference. Remember, a 3 dB difference in sound and the intensity doubles. If you can make your airplane even 3 dB quieter, you have made a huge cut in the noise that everyone around us has to hear. (Although the sound energy is halved for every 3 dB drop, it takes a 10 dB drop for the human ear to perceive the sound being half as loud. A 10 dB drop results in one-tenth the original sound energy.)

From *Servo Chatter*

Anoka County Radio Control Club  
Stan Zdon, editor  
Coon Rapids MN

This article is taken from the January 2005 AMA National Newsletter



President Lloyd Sullivan presenting yours truly, Paul Shaffer with model of the month award for May 2003. Better late than never. I still have the airplane, in one piece.



The January meeting had a good turn out with some good discussions on several topics as per the minutes.



Can you guess who this is ? The picture was taken June 1953. If you have any pictures of your early modeling career, let me know.  
Answer on pg. 2

**A New Wine for Seniors**  
California vintners in the Napa valley area, which primarily produces Pinot Blanc, Pinot Noir and Pinot Grigio wines, have developed a new hybrid grape that acts as an anti-diuretic. It is expected to reduce the number of trips older people have to make to the bathroom during the night.

The new wine will be marketed as Pino More.

### Propeller speed chart

Match your **rpm** on the left to your propeller diameter on top. The intersection shows your propeller tip speed in miles per hour. After proper muffler installation (and perhaps soft mounting your engine), propeller speed is the next biggest factor in reducing aircraft noise. You will want to prep your engine for tip speeds in the mid 300 **mph** range for quiet operation.

A red line would be anything over 400 **mph**. Note that the new, larger diameter propellers will present a larger challenge to keep to keep tip speed down; at 10,000 **rpm** your 17-inch propeller has a tip speed over 500 **mph**! Bold numbers within the body of the chart represent a good target for tip speed—probably slower than you'll realistically achieve. As a side effect you will be operating more efficiently, since propeller efficiency is lowest at high **rpm**.

This chart is a modified version of the chart that appeared in the Spring 2000 K-Factor

		Propeller Diameter in Inches							
RPM	11	12	13	14	15	16	17	18	
6000	198.3	214.2	232.0	249.8	267.7	285.5	<b>303.4</b>	321.2	
6500	212.7	232.0	251.3	270.7	290.0	309.3	<b>328.7</b>	348.0	
7000	228.0	249.8	270.7	291.5	312.3	333.1	353.9	374.8	
7500	245.4	267.7	290.0	312.3	334.6	356.9	379.2	401.5	
8000	261.7	285.5	306.3	333.1	356.8	360.7	404.5	428.3	
8500	278.1	303.4	328.7	363.9	379.2	404.5	429.8	455.1	
9000	294.5	321.2	348.0	374.8	401.5	428.3	455.1	481.8	
9500	310.8	339.1	367.8	395.6	423.8	452.1	480.4	508.6	
10000	327.2	356.9	386.7	416.4	446.1	475.9	506.6	535.4	
10500	345.5	374.8	406.0	437.2	468.5	499.7	530.9	562.1	
11000	363.9	392.6	425.3	458.0	490.8	523.5	556.2	588.9	
11500	376.3	410.5	444.7	478.9	513.1	547.3	581.5	615.7	
12000	392.8	428.3	464.0	499.7	535.4	571.1	606.8	642.5	
12500	408.0	448.1	483.3	520.5	557.7	594.9	632.0	669.2	
13000	425.3	464.0	502.7	541.3	580.0	618.7	657.3	696.0	
13500	441.7	481.8	522.0	562.1	602.3	642.5	682.6	722.8	
14000	458.0	499.7	541.3	583.0	624.6	666.2	707.9	749.5	
14500	474.4	517.5	560.7	603.8	646.9	690.0	733.2	776.3	
15000	490.8	535.4	580.0	624.8	669.2	713.8	758.5	803.1	
15500	507.1	553.2	599.3	645.4	691.5	737.6	783.7	829.8	
16000	523.5	571.1	618.7	666.2	713.8	761.4	809.0	856.5	

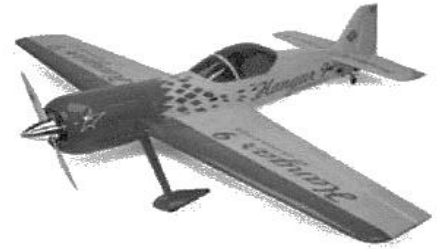
From Servo *Chatter* Anoka County Radio Control Club  
Stan Zdon, editor Coon Rapids MN

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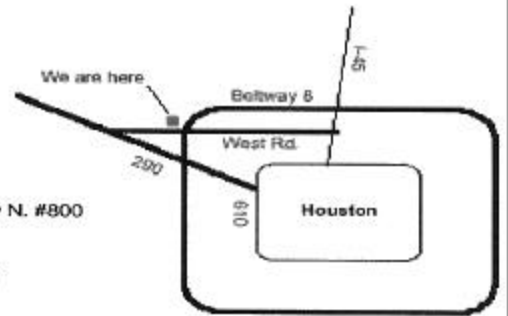
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