The Flightline

Volume 34,Issue7 Newsletter of the Propstoppers RC Club AMA 1042 July 2004

Club Picnic Report

Our annual club picnic was on June 19th, 2004 this year at Sleighton Field. Many members and their partners turned out for the day's events, good food, fun, prizes, camaraderie and a recently rare sunny day! The weather cooperated with the exception of some gusty winds.

Like last year, the club picnic started with a series of fun contests, the first being a ground taxi course event that proved very difficult for everyone.

The course was very tight! Most of the planes were tail draggers and we can now call them line draggers!

Line judges at every corner watched contestants' planes; those who had a line cross were penalized by having them do a 360-degree turn with their plane before re-entering the course. This effectively penalized them time without having to do a lot of math with a time penalty. Pilots fought cross and down wind runs to complete this nerve-racking event!

The line judges were very busy between contestant's runs replacing the orange nylon tape lines, which were pinned to the field (next year we'll use chalk lines and make the lanes wider).

The second event was a revision of last years Limbo contest which sent many planes to their grave. Last year's limbo contest we used a nylon string for the limbo line. Wouldn't you know that thin little string is an airplane magnet? It sucked planes right in and spit them out the other side in toothpick-sized splinters (lesson learned). This year we used doubled up crepe paper ribbon that proved to work very well. A few planes that didn't quite make it under sliced right thru without damage. The limbo line was placed at the top of the poles and pilots made three attempts. Each attempt earned a point. No ground touches were allowed and you had to circle around above the line or around the poles for your next attempt. Pilots with at least one point advanced to the next lower level, where they made three more attempts, and so on until we had our event winners.

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Agenda for July 6th Meeting
Sleighton Field, 7:00 pm

- Approval of June meeting minutes
- Membership Report
- Finance Report
- Discuss Walt Bryan Memorial Fun Fly plans
- Show and Tell

Bring your plane to fly before and after the meeting.

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Calendar of Events

Club Meetings

Regular Meeting 7:00 pm
Tuesday 6th July
Sleighton Field

Tuesday Breakfast Meeting
The Country Deli, Rt. 352 Glenn Mills
9 till 10 am. Just show up.
Flying afterwards, weather permitting

Flying Events

Walt Bryan Memorial Electric Fun Fly
Saturday 7th August, Sleighton Field.

Thursday Evenings at Moore Field
Join us for relaxed evening flying. Bring your supper and kids. Let's make this a family affair.
5 pm till dusk every Thursday, weather permitting.

Warbirds over Delaware 9 – 11 July

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.

The President's Message

Dear Fellow Propstoppers,

At last month's meeting the Sleighton School Security Officer asked the club to keep the gate to the field locked at all times. It seems that they, Sleighton Security, are concerned about the equipment still stored in the various Sleighton School buildings. To answer their request Bob Crowell placed a new reminder sign on the gate.

This new gate procedure raised another question about how to keep the gate secure but still allow our guests and those who forget their keys access to the field as we are in the upper area flying. Vice President Dick Seiwell came up with the idea of a combination lock that has a changeable combination. The new combo lock will be locked to the existing key lock that should allow access to those who forget their key or to those who have guests showing up at the field. The combination will be changed periodically and after each event. We will not publish the number, as this would compromise security. The procedure and combination will be given out at the next monthly club meeting July 6th. Find out at the meeting or ask a fellow member what the combo is. Those with a key – don't worry the key lock is still in place.

Perhaps I should remind the members that we have an attractive position with Sleighton right now. We don't know how long it will last but Chris Catania, our contact with the Sleighton management, has said that planning permission and other factors involved with development of the property could last years. We would be crazy to jeopardize our use of this field with sloppy practices that upset the security staff.

Please lock the gate each time you enter or exit the field.

Congratulations to all who won prizes at the Annual Club Picnic!

Keith Watson, President

Minutes of the Meeting, June 1st, 2004 at Sleighton Field

Board members; Vice President Dick Seiwell, President Keith Watson and Treasurer Al Gurewicz preside over the June meeting at Sleighton

Vice President Dick Seiwell called the meeting to order at 7:00 p.m.

The roll call by membership chairman Ray Wopatek showed 28 members and 1 guest present.

The minutes of the May meeting as published were accepted by the membership.

Al Gurewicz presented the treasurer's report.

Old Business:

Keith Watson reminded us that the first aid kit is available in the lock box at Sleighton field and is accessible by the field key. He said that members who lose a model off the field should inform a Member of the board. Keith also said that the rain date for outdoor summer meetings will be the following Thursday.

Mark Burkemeyer told of his plans for the Club picnic on Saturday June 19th. The club will provide hot dogs, burgers, rolls and beverages.

Members are invited to bring condiments and water. Flying activities will be arranged for that day. Prizes will be awarded for events and a raffle winner.

Towards the end of the meeting the Sleighton security guard reported that the gate had been left open. He indicated that this is unacceptable to Sleighton as they have properties contained in the various buildings and leaving our gate open makes the premises vulnerable to vandalism and theft. It was agreed we must educate our membership in the gate procedure and enforce it some way.

Adjournment of the business meeting and beginning of flying took place at 7:45 p.m.

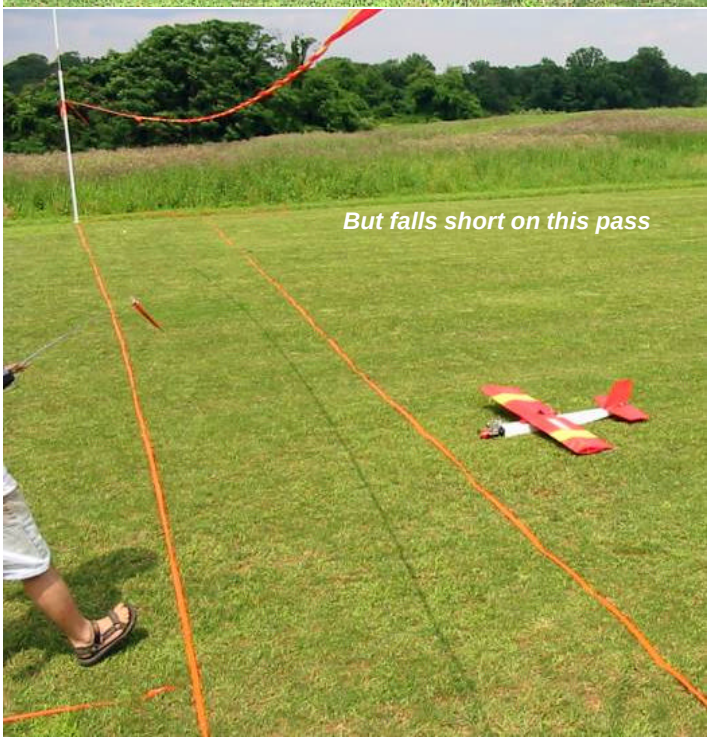
Richard Bartkowski, Secretary

New members Charlie Eshelman and Art Blow learn the art of control with their glider at altitude

Del Glennon with his trusty and spectacular Kadet equipped with large flaps and spoilers. You should see the steep landing patterns.

Club Picnic Report - continued from page 1

Rusty Neithammer approaches the Limbo gate.



But falls short on this pass

John Drake makes the Limbo pass with his IFO

A dark lumbering cloud and a sudden temperature change that had everyone thinking THUNDERSTORM cut the day's events short unfortunately!!!! This turned out to be a false alarm but sent everyone scrambling to clean up and prepare for cover. More events were planned for the day but we cut it short in fear of the storm.

Final event places were a combination from each of the day's events and those with the most total points earned first pick on the prize table.

Pilot prizewinners were given their choice of the 5 donated prizes in the order they finished. Places: Steve Boyajian 1st Prize (Wattage Tangent donated to club by Keith Watson), Second Place tie between Rusty Neithammer (GWS Spitfire donated by Dave Harding) and Keith Watson (S& W Fuel 15% donated by Del Glennon), Third Place tie between Rich Bourassa (Great Planes Slow Poke 40 kit donated by Springfield Hobby Town USA – Steve Mercaldo) and Rick Grothmann (Propstoppers Logo hat). The tied 2nd and 3rd places were sorted out by a simple coin toss to determine their final placement for prizes.

Prize winning competitors Rusty Neithammer, Steve Boyajian and Rich Bourassa

The other pilots deserve mention also as they too fought thru the gusty winds to participate and showed their skills! The skillful participants were Michael Schaeffer, Robert Crowell, John Drake, Joe Drake, Paul Grothmann, and Richard Bartkowski. Each pilot risked their planes, as the weather was not so cooperative winds were very gusty.

Mark and Paul Grothmann take a break from the intense competition

The club provided a Grand Prize of a GWS Slow Stick kit complete with motor/gearbox/GWS 300 speed controller/Hitec Neon radio/ HS-81 servos/Electron 6 receiver and batteries and charge cord. Everything needed to get started in electric flight. A prize ticket was given to each person who showed up for the days events, an additional chance to pilot participants and a $2 donation to the club yielded another ticket if you wanted to better your chances of winning. The winner of the Grand Prize was Ritchie Tate.

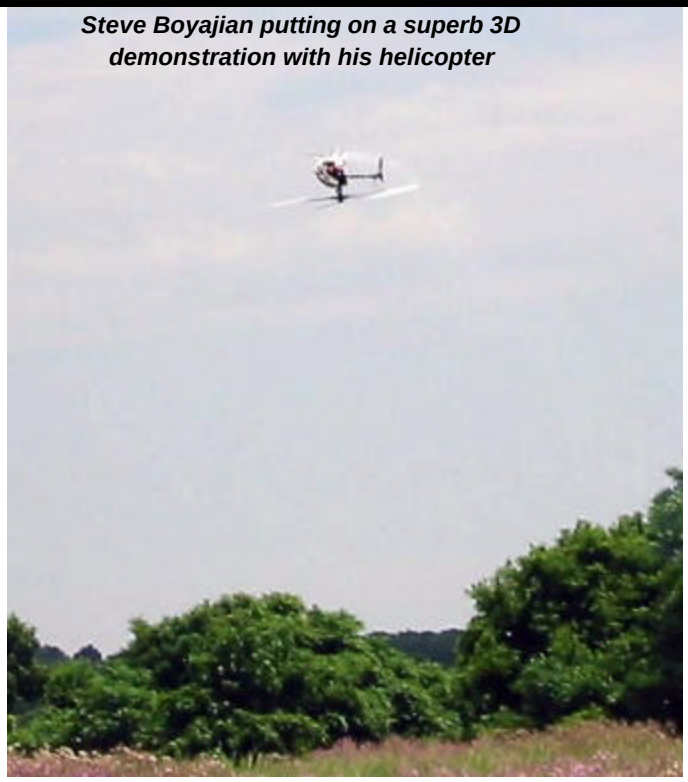
Grand prizewinner Richie Tate

The storm clouds did pass, and after, the prizes were awarded and open flying resumed.

Sam Nevins latest, a Cub with Phasor outrunner brushless electric power

Steve Boyajian's fine helicopter flew magnificently

Picnic Director Mark Berkemeyer and his wife surveying the activities of the members and guests.



Steve Boyajian putting on a superb 3D demonstration with his helicopter

The food was plentiful and I don't think anyone went away hungry. The grill masters were Mark Berkemeyer and his wife who did a wonderful job! Mark has done this for the club 2 years in a row and we cannot thank him enough. Club members brought out their dishes to help with the feast and I would like to thank everyone who took the time to prepare something or provided items for the picnic.

Other members who should be mentioned for their "Above and beyond" participation were Rich Bourassa for running the events, John Tripier, Del Glennon, and Dave Harding who could not be present but helped with prize donations.

From the right, Co-Organizer Rich Bourassa with Dick and Mrs. Klekotka

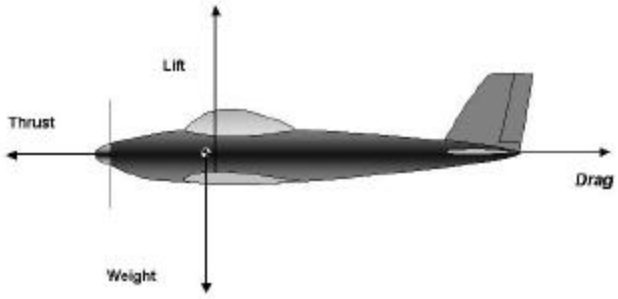
Thank you, to everyone who made this an enjoyable event!

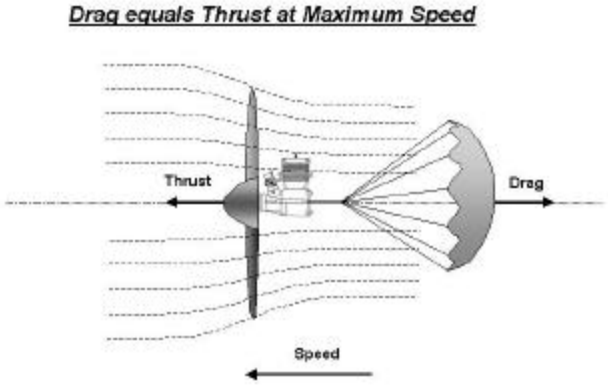
Keith Watson

Tech Note; Drag, Speed and Power

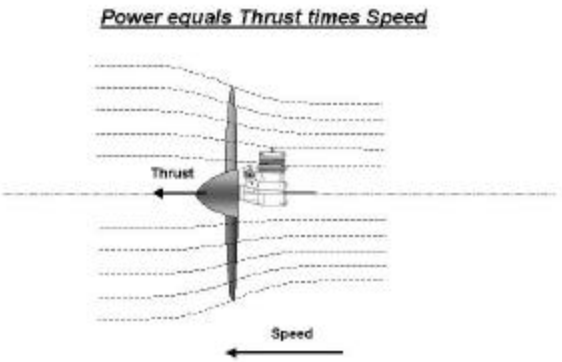
Following the recent Tech Note on Propeller Pitch Speed a number of members asked how they can equip their models to go faster, so let's explore the factors involved and relationships among them.

The most fundamental relationship is that propulsive thrust must equal the plane's drag at the desired speed.





The power required to achieve a given speed is equal to the drag times the speed.



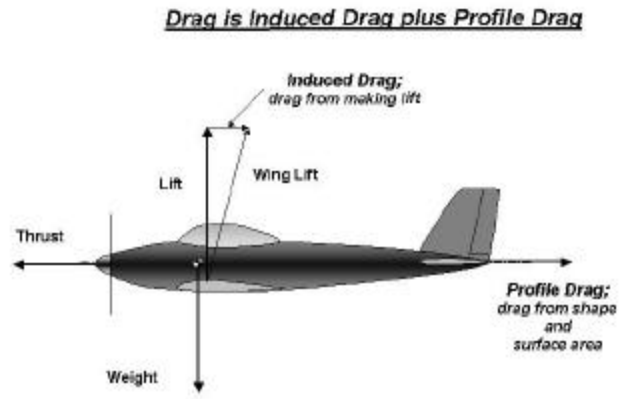
However, this is the power output; the engine or motor power required is greater than the output power because the propeller is not 100% efficient and there are losses.

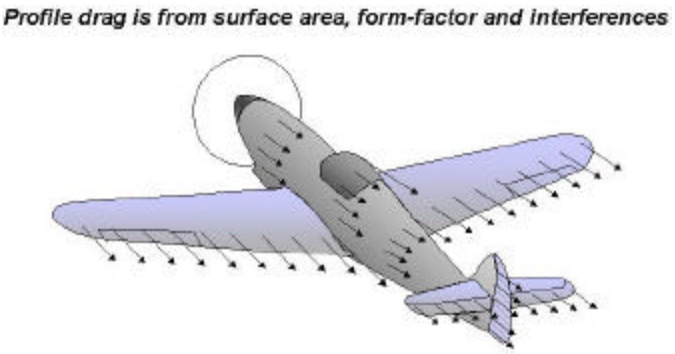
Power Input Required = Power output / propeller efficiency

More on propeller efficiency later.

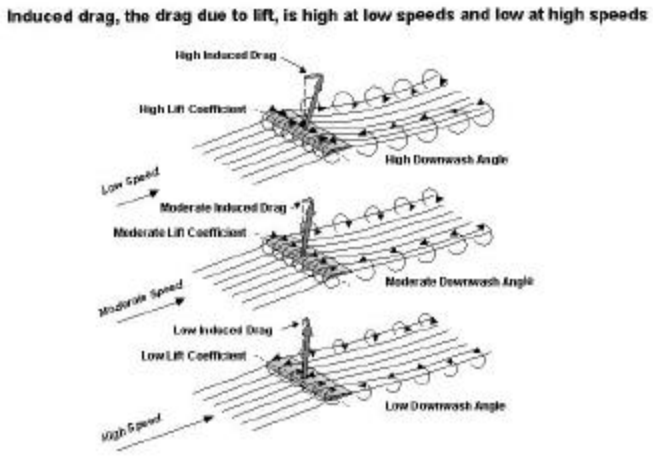
Drag is made up from two major parts;

- Profile Drag
- Induced Drag





Induced drag comes from making lift. It depends on the wingspan, lift and speed. Induced drag increases as speed is reduced. Below the speed for maximum L/D drag increases.



This increased drag region at speeds below that for maximum L/D is the so-called "back-side of the power curve". We have all experienced it in flying our models as we allow the speed to drop too far and then have insufficient power to maintain altitude.

However, since the question is "how do I go fast?" we may assume that the induced drag is insignificant at the speed of interest and we will use just the profile drag in computing power required. We conventionally express this drag in terms of the drag coefficient, Cd. Drag is related to Cd by a reference area. Multiplying the Cd by the reference area and multiplying that by the dynamic pressure calculates the drag. The Dynamic pressure and Drag are related to the square of speed. At sea level it looks like this;

$$Drag = .0012 \text{ x } V^2 \text{ x } A \text{ x } Cd \text{ pounds}$$

Where V is in feet per second and A is square feet.

For an airplane the reference area, A, is the wing area. For a given geometry Cd remains constant with size, (excepting the effects defined by the good Doctor Reynolds. We will ignore this for now.) Therefore we may express the Cd for a given airplane geometry and apply it to all sizes. In this Tech Note we will identify a Cd for a wide range of airplanes to allow you to do the calculation of power for your selection of type, size and speed.

The relationship between Drag, Speed and Power is expressed by the formula;

$$V = 550 \text{ x } Power / Drag$$

Substituting the formula for drag above, we get;

$$SpeedV = 77 \text{ x } \sqrt[3]{(Power / A \text{ x } Cd)}$$

Or;

$$Power = AxCdx\left(\frac{V}{77}\right)^3$$

So we see that the Power required for a given speed V is directly proportional to the size and drag coefficient and the cube of speed. Therefore, if we double the size of a model the power required doubles but if we want to double the speed we need eight times the power; $2^3 = 2 \times 2 \times 2 = 8$

Overleaf I have depicted these relationships in the form of a nomogram. To calculate Power Required you draw a line through the model Wing Area and the Drag Coefficient, Cd, identified by the type of model, to to the reference line. Then draw another line through the Reference line intercept and the desired Speed to the Power Required line. Then read off the power required. Note that this is the power required to propel the airplane. The power you must install to achieve this is greater to account for the losses in the propeller.

Overleaf from the Power Required nomogram is another that allows for the approximate selection of the propeller.

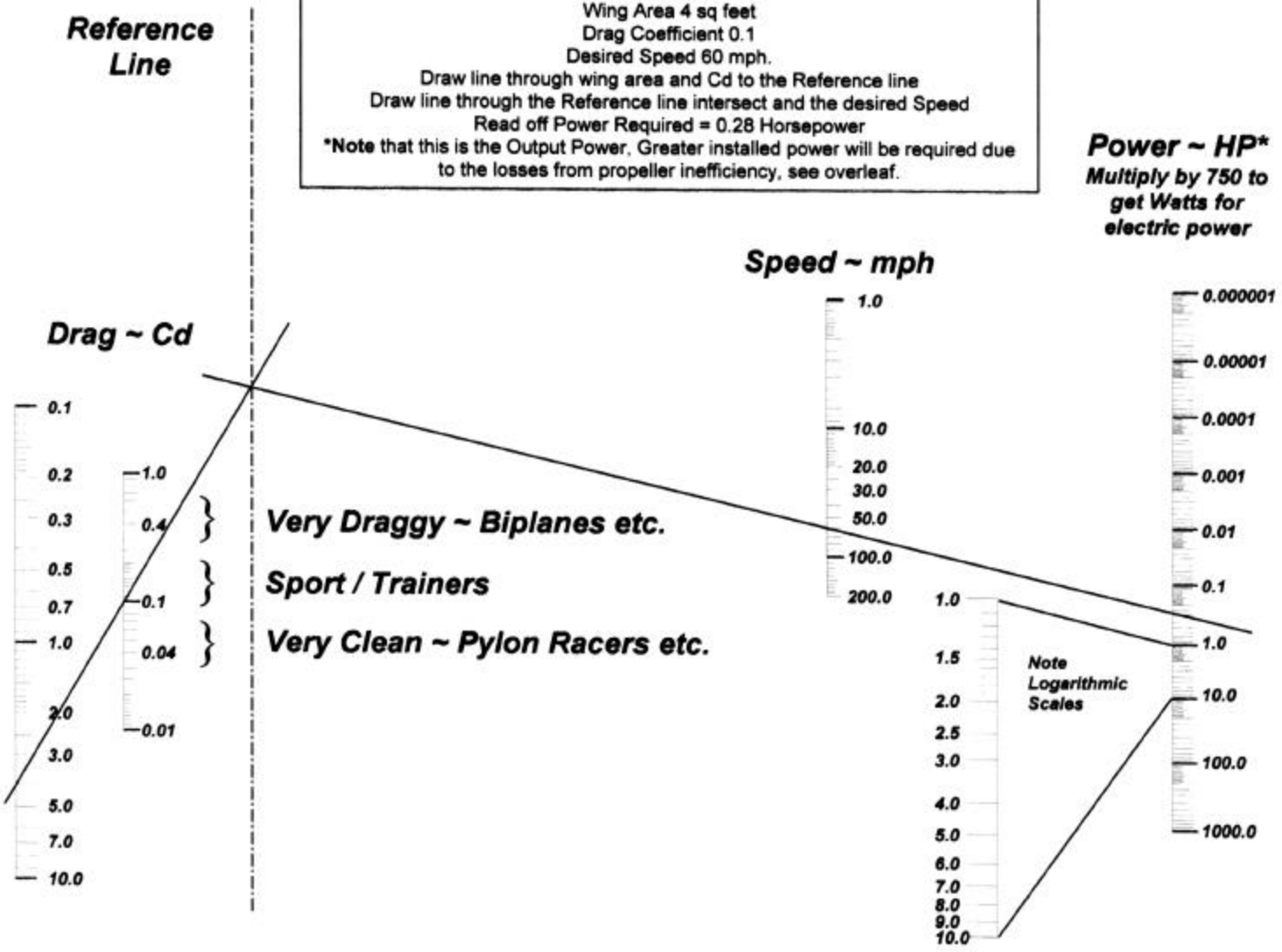
Here you draw a line from the engine / motor Input Power and the desired RPM to the reference line. A second line is drawn through this point and the Speed to the Propeller line. This will indicate the Pitch / Diameter ratio of the desired propeller and its approximate propulsive efficiency. A third line through this point is drawn through the next RPM line to the reference and finally, a fourth line is drawn from this point through the speed line to the Propeller Diameter.

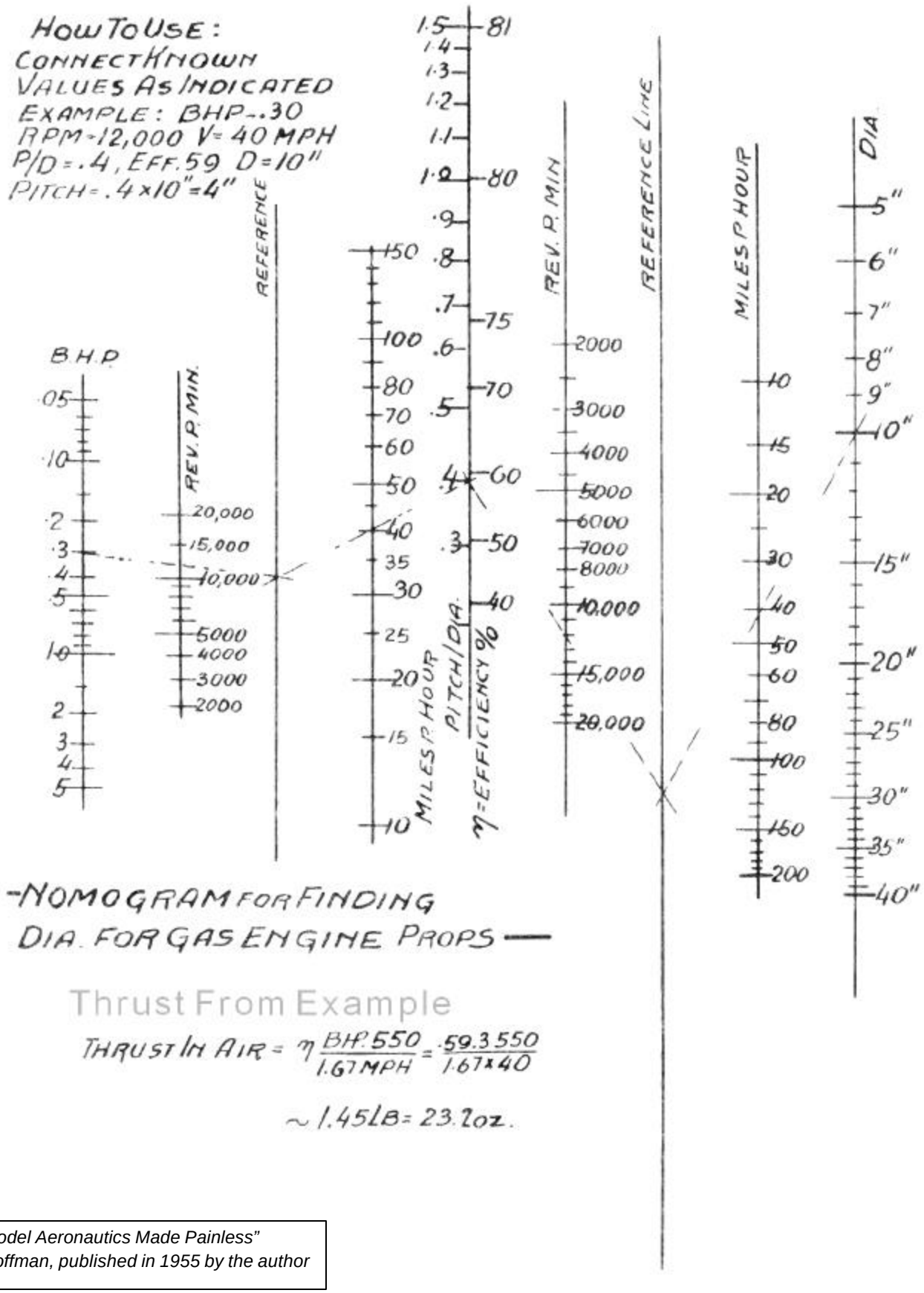
This most useful nomogram was taken from an excellent early work "Model Aeronautics Made Painless" by RJ Hoffman, published in 1955 by the author. A great little book if you can find one.

Continued on page 10

Power Required Computation Nomograph

Example; Trainer
Wing Area 4 sq feet
Drag Coefficient 0.1
Desired Speed 60 mph.
Draw line through wing area and Cd to the Reference line
Draw line through the Reference line intersect and the desired Speed
Read off Power Required = 0.28 Horsepower
*Note that this is the Output Power, Greater installed power will be required due to the losses from propeller inefficiency, see overleaf.





-NOMOGRAM FOR FINDING DIA. FOR GAS ENGINE PROPS—

Thrust From Example

$$\text{THRUST IN AIR} = \eta \frac{BHP \cdot 550}{1.67\,MPH} = \frac{.59 \cdot 3.550}{1.67 \times 40}$$

$\sim 1.45\,LB = 23.2\,oz.$

From "Model Aeronautics Made Painless"
By RJ Hoffman, published in 1955 by the author

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Propstoppers R.C. M.A.C

Summer meetings at Sleighton, magic!

Tech Note; Drag, Speed and Power continued from page 7.

Now to match the input power and propeller to the power required to propel your model to the desired speed you need to iterate this last step to get the output power from propeller selection to match that calculated in the first nomogram. So here is what you do.

Enter the Propeller Selection nomogram with the power required calculated in the Power Required nomogram. Follow through the process to the point where you indetify the propeller P/D ratio and its efficiency. Now divide the initial input power by the propeller efficiency and repeat the whole process in the Propeller Selection nomogram.

Let's use Hoffman's example. He uses a motor that has 0.3 horsepower at 12,000 rpm in a model that does 40 mph. The propeller for this case has a P/D of 0.4 and an efficiency of 60%, or 0.6. Therefore the input power to achieve an output power of 0.3 is 0.3 / 0.6 = 0.5

We need a motor that makes 0.5 horsepower at 12,000 rpm driving a propeller with a P/D of 0.4 to achieve an output power of 0.3 horsepower.

"But wait" you say, "I don't know the power or peak rpm for my engine. How do I do the calculations?"

Well, one way is to read the magazines and get the data from the engine tests. One of these days I will publish the power required to turn some popular props at various speeds.

Now the electric powered guys have a slightly different set of problems in using this data. In addition to the prop losses they must account for the motor losses too. Also, electric power gives you the option of gearing the propeller and this must be addressed. On the other hand, the power available, in watts, is easier to obtain, as it is volts times amps divided by the motor efficiency. Remember, one horsepower is approximately 750 watts So, for electric power first calculate the power required in the first nomogram. Select your motor by examining the efficiency, power and rpm from the motor's catalog, then enter the propeller selection nomograph. Here the process is the same as the gas model but you will also want to try different gear ratios. Do this by changing the rpm appropriate to the gear ratio you choose ~ divide the motor rpm by the gear ratio.

So there you have it, a bit crude, I didn't have my research materials and tools available as I wrote this between Wimbledon sets at my Mother's house. But I think you will find the process illuminating. How fast do you want to go? I'll check you out at Sleighton.

Dave Harding