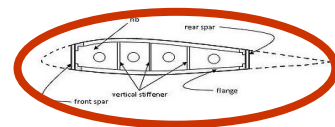


July 2019



The monthly newsletter of the
Kapiti Aeromodellers Club



Aeroplanes at Paraparaumu Airport, 1949.

Shows two Lockheed Lodestar aircraft (ZK-ANB named Karuwai, and ZK-AKW named Kopara), and two Douglas Dakota (DC-3) aircraft (ZK-AQT and ZK-AOZ) behind.
Reproduced with kind permission of the Alexander Turnbull Library.

I can't remember exactly when, but we purchased the Kapiti Coast Historical calendar for 2019.

I just happened to notice this photo the other day for the month of June.

Scary that it's 70 years ago, but a fascinating photo when compared with today's airport.

Note OSH obviously wasn't around then. Cannot see painted lines to follow for passengers and the refuelling rig is 'interesting'.

The development of aviation in our lifetime is scary.

Steve.

From the Scribe:



Another month has whizzed by. Things at the strip have been ticking over with a few good flying days. Even the weekend warriors have had a few opportunities of late.

The June club night was more than I expected (report elsewhere) and gave an insight into a boy's passion exploding into a way of life in adulthood.

My thanks for a few new contributors this month.

Remember, if you have something you think might be of interest, I'm

sure it will be.

Enjoy the month.

Steve

How Do I choose the right electric power system for my model?

From Roger Balfour

Have you ever wondered if there was an easy way to choose a power system for your model?

There is a lot of information available on the net, in fact just so much its difficult to know where to start.

I have found a very good article written by Lucien Miller from a company called innov8tive designs that he presented as a blog. You can read the full article here <https://lucienmiller.wordpress.com/2016/08/10/what-size-motor-do-i-need/>



I have Lucien's permission to use some of the content for our newsletter so what follows is an attempt to assemble the information with examples so the process is easier to follow.

Overview

There are two approaches that can be used to determine the size motor you may require for your next project.

- (1) An IC engine is recommended for the model so a "Glow to electric" conversion is required.
- (2) The model type is determined and the all up flying weight and speed etc is known. This is known as the "watts per pound" method

Glow to electric Conversion

As a rule of thumb a decent ball-bearing ABC type 2-stroke glow engine is equivalent to 2000 Watts for every cubic inch of displacement.

Four-stroke motors require 1500 Watts for every cubic inch

Here are some examples in the table below

Cubic Inch 2-stroke	Input Watts equivalent
0.25	500W
0.45	900W
0.5	1000W
0.6	1200W
0.9	1800W
Cubic Inch 4-stroke	
0.45	675W
0.6	900W

Model Type and Weight Method

Type	Characteristics	Watts per Pound
Motor Glider	Gliders with motor assist to get to flying altitude. Low wing loading	50-60 Watts per pound. A 2 pound glider needs about 100-120 Watts
Trainers	Moderate wing loading. High lift flat bottom airfoils. Spends most time flying at half throttle	70-80 Watts per pound. A Great Planes PT-40 needs around 400 Watts
Sport Models	More advanced aerobatic	100-120 Watts per pound.

	models	A 6 pound Ugly Stick with a .45 ABC Glow needs around 700 Watts
Pattern and Warbirds	Though different classes both have similar power requirements. Pattern ships need power for clean up-lines and speed through large loops. Warbirds have higher wing loadings especially if retracts are fitted.	140-160 Watts per pound. An 8 pound plane with 60 size engine requires 1120 -1280 Watts
3-D Aerobatic	Fly with a 2:1 thrust to weight ratio. Can prop hang at 50% throttle	200-220 Watts per pound. Similar to a 3 pound Sport model with a hot 45 Glow motor
Pylon Racer	Going fast requires lots of power. Races are short duration so only enough battery capacity is provided for the race.	250 Watts per pound and upwards.

Choosing the Motor

Electric motors attempt to put out more torque and tend to spin larger props at lower speeds than their glow equivalents.

When model design limits the maximum diameter of prop this is when getting the right Kv version of the motor comes into play.

Some manufacturers try to make it easy by labelling their motors with “Equivalent” size ratings. Look very carefully at their motor data as the required Watts may only be achieved with a specific battery size (number of cells) and 2-3 specific props sizes.

Electric motors are essentially “constant speed” machines and will attempt to spin at the same RPM regardless of the load. This is why prop selection is so important for an electric power system as the prop “pulls” the power out of the motor.

For example, an electric motor rated at 40 glow equivalent running on 4 cells will need a 12x8 prop to pull 800 Watts because of the motors Kv value (1000 rpm per volt).

The equivalent glow motor would use a 10x6 prop which if used on the electric motor would make about 400 Watts.

At the other end of the spectrum, if too large a prop is used the motor will make a lot more power but will pull excessive current doing it.

Unfortunately, you may think all is well, however the motor is slowly being cooked to death.

This why it is so important use a Watt-meter and **measure the actual current draw** and make sure that the motor and ESC ratings are not being exceeded.

If you have managed to read this article so far you probably asking yourself “so how do I then choose the right motor”

To explain the method, we will use an example and choose a motor, prop, ESC and battery size for a model.

An Example

We have chosen a Sport model weighing 5 pounds that was originally designed to have a 35-40 Glow engine. We have a ground clearance that limits the prop diameter to 11 inches and we would like to fly fast aerobatics (we choose it to be a pattern model type)

Using “2000 Watts per cubic inch” we require 700—800 Watts of power and using “watts per pound” we also get 700-800 Watts. Let’s choose a motor to meet 750 Watts.

Before we can begin to choose the motor, we need to determine what operating voltage (number of cells) we require the battery pack to be.

Remember from physics somewhere in the dim past that-

WATTS = VOLTS X AMPS

If we were to use a 3-cell battery which provides 11.1 Volts under load then we would draw 67.6 Amps

A 4-cell battery provides 14.8 Volts and we would draw 50.7 Amps.

When sizing batteries it is good to keep the current to voltage ratio between 3 and 5 to give a good power system efficiency.

No Cells	Volts	Watts	Amps	Ratio
3	11.1	750	67.6	6.09
4	14.8	750	50.7	3.42

We will choose a 4-cell battery.

This is where the lack of really good motor performance information from many suppliers becomes a problem. For our example I will use the published data available from innov8tive design for their range of Cobra motors (used with permission).

Choose a motor with a maximum current rating 10 to 20% higher than you actually need. For our example we have chosen a motor with a 60Amp rating and a Kv value that will give us 750 Watts input power operating with an 11 inch prop.

The actual measured test data for the Cobra C3520/10 980Kv is shown below:

Cobra C3520/10 Motor Propeller Data									
Motor Wind 10-Turn Delta		Motor Kv 980 RPM/Volt		No-Load Current I ₀ = 1.84 Amps @ 14v		Motor Resistance R _m = 0.025 Ohms		I Max 60 Amps	P Max (4 S) 890 W
Outside Diameter 43.0 mm, 1.69 in.		Body Length 46.0 mm, 1.81 in.		Total Shaft Length 68.0 mm, 2.68 in.		Shaft Diameter 5.00 mm, 0.197 in.		Motor Weight 210 gm, 7.41 oz	
Prop Manf.	Prop Size	Input Voltage	Motor Amps	Watts Input	Prop RPM	Pitch Speed	Thrust Grams	Thrust Ounces	Thrust Eff. Grams/W
APC	9x6-E	14.8	27.19	402.4	11,965	68.0	1554	54.82	3.86
APC	9x7.5-E	14.8	41.77	618.2	11,061	78.6	1618	57.07	2.62
APC	9x9-E	14.8	45.05	666.7	10,794	92.0	1611	56.83	2.42
APC	10x5-E	14.8	33.00	488.4	11,678	55.3	1960	69.14	4.01
APC	10x6-E	14.8	36.27	536.9	11,327	64.4	1984	69.98	3.70
APC	10x7-E	14.8	42.56	629.9	11,047	73.2	2085	73.55	3.31
APC	10x10-E	14.8	57.53	851.4	10,104	95.7	1789	63.10	2.10
APC	11x5.5-E	14.8	45.51	673.5	10,864	56.6	2697	95.13	4.00
APC	11x7-E	14.8	52.40	775.5	10,420	69.1	2741	96.68	3.53
APC	11x8-E	14.8	56.81	840.8	10,160	77.0	2538	89.52	3.02
APC	11x8.5-E	14.8	60.60	896.8	9,931	79.9	2529	89.21	2.82
APC	12x6-E	14.8	56.94	842.7	10,033	57.0	3146	110.97	3.73
APC	13x4-E	14.8	50.30	744.4	10,565	40.0	3309	116.72	4.45
MAS	8x6x3	14.8	23.36	345.7	12,277	69.8	1428	50.37	4.13
MAS	9x7x3	14.8	36.29	537.0	11,400	75.6	2047	72.21	3.81
MAS	10x5x3	14.8	32.78	485.1	11,693	55.4	2132	75.20	4.39
MAS	10x7x3	14.8	45.60	674.8	10,842	71.9	2560	90.30	3.79
MAS	11x7x3	14.8	53.69	794.7	10,358	68.7	2947	103.95	3.71
MAS	11x8x3	14.8	57.51	851.2	10,111	76.6	2984	105.26	3.51
MAS	12x6x3	14.8	59.12	875.0	10,013	56.9	3309	116.72	3.78

From the chart choosing a APC 11x7 prop gives us the right Input power (775.5 Watts)

We will draw 52.4 Amps from our 4 cell pack.

Determine the ESC size

This is relatively simple. Choose the current rating to be at least the same as the motor maximum or larger. If the maximum current falls between two rating always choose the higher rating.

The ESC will never force more current into the motor if a larger unit is used. It will however operate cooler and more efficiently.

Check that you have selected an ESC that will operate with the number of cells you have chosen. For our example the Cobra 60Amp ESC will operate with a max of 6 cells so it will be fine with 4 cells.

A photo, they say, is worth a thousand words.

At the field on Sunday 9th, a chap named Brent Higham turned up wanting to take a few photos. Obviously, we obliged.

The following week he sent through a few. Certainly not all that he took.

But they're pretty good photos.

He also gave me a rark up for no pilot in the Smith.

I promise, pilot is getting closer.



Steve's Smith Mini Plane



Don's Xtra



Alister
Hausmann's
biplane
aerobat with
company

📷 Holfuy Webcamera: Kapiti Aeromodellers

Sheepish!



▶ ◀ ▶▶ ⓘ 2019-06-11 14:56

Last image: 2019-06-11 15:06 NZST
Ambient temp.: 14.0 °C
Mode: Daytime (Light: 569/1000)

Time	15	12:30	12:45	13h	13:15	13:30	13:45	14h	14:15	14:30	14:45	15h
Speed	7	17	16	17	17	19	18	16	14	17	17	15
Gust (km/h)	5	28	27	28	29	29	27	25	21	26	28	29
Direction		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Direction deg.	W	N	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW
dirp.	3°	349°	348°	347°	345°	344°	342°	338°	335°	335°	333°	334°
Rain(mm)				1						1		
Air - C	1	14.0	13.8	13.5	13.3	13.2	13.4	14.1	14.3	13.9	13.6	14.0

More weather data

ⓘ Click on the small images, for enlarging.

We couldn't afford proper fertiliser, so called in the mobile plant!

June Weather Woes - The Van Report



HOLFUY

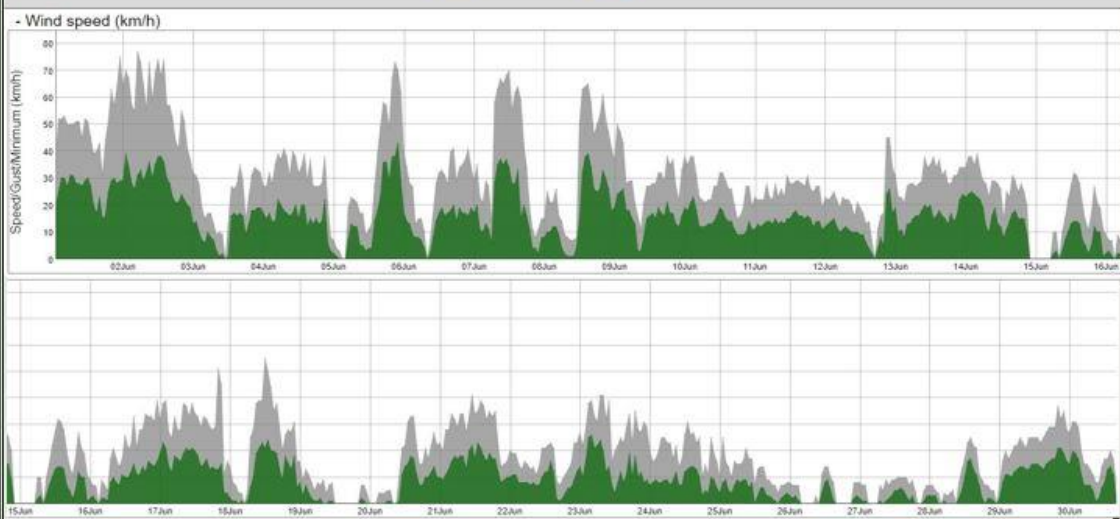
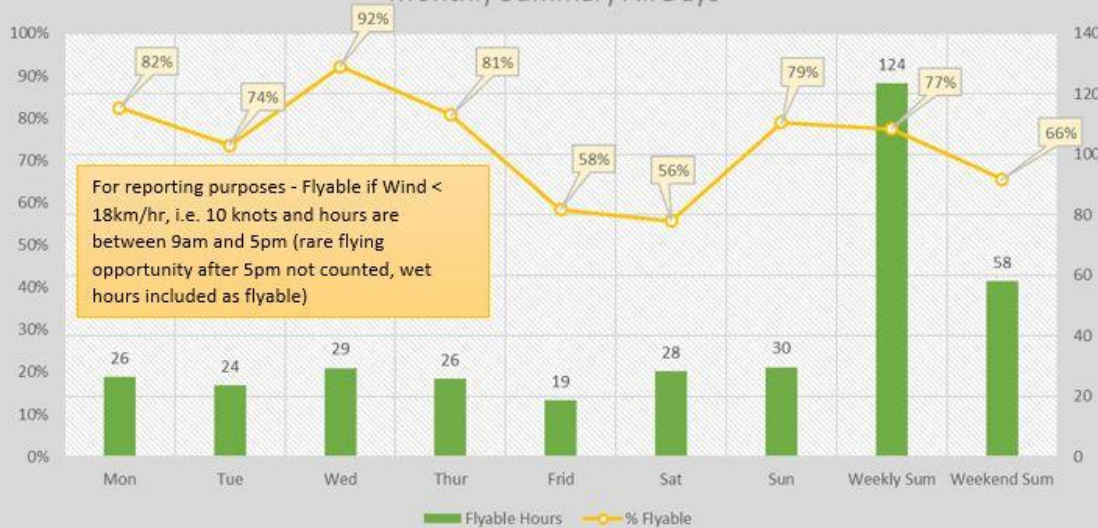


Should I have flown this month!

Our weather watcher stats show conditions were pretty good for the 2nd 1/2 of the month, a Wednesday weekday was the best choice being flyable 92% of available hours, Sunday weekend by comparison flyable 79%. Despite what the numbers report the camera indicated that conditions also suited grass growth attracting an invasion by livestock on a couple of occasions.

"But who wants to be foretold the weather? It is bad enough when it comes, without our having the misery of knowing about it beforehand." — Jerome K. Jerome, Three Men in a Boat

Monthly Summary All Days



WARNER

still has a number of models etc. he is trying to sell off.

A lot have gone, more to go.

If you are interested in what he might be selling, get in touch with him.

Mob: 022 479 6714

Email: wgsumm@gmail.com

Preparing for the maiden flight.

From Don Lynn.

So, you've just spent the past few months or years in some cases, and your new pride and joy is ready to take to the air. Or is it?

The maiden flight can be quite daunting and there are several things that should be checked over before hitting the gas and hoping for the best.



Preparation, planning and patience are words that come to mind. I have done a fair number of maiden/ test flights and inspections and it is very interesting what some people would be prepared to attempt to fly. It is important to get some competent person to check over the model (it is actually a rule at our club) before making that first flight. If something is found to be suspect, then best to fix it first before continuing. Don't be in a rush. Yes, it may take another week before you can get back to the strip, but better that than a wrecked plane.

Some time ago I was asked to test fly/trim a rebuilt aircraft, when I checked it over, none of the control surfaces were neutral, no keepers on any clevises, one clevis was so bent that it kept slipping out of the servo arm and jamming. On another occasion when checking a model, I pulled the cyano hinges clean out of the rudder. Clean being the operative word. The incorrect glue had been used and had not wicked down the hinge as it should have. These issues show that the builders had definitely not checked their models. Had either of these aircraft been flown, high chance that it would have ended in disaster.

I'd suggest using a checklist, so you don't forget things. Something similar to the one we use for rally inspections would be fine.

Some other things to think about:

- Has the engine had at least one tank of fuel through it, (if it's not electric) and is it running reliably?
- What's your plan should the engine die just after take-off.
- Do you have enough experience to manage an out of trim aircraft? If not get one of the instructors to give you a hand.
- Do you have somebody alongside to assist? (Preferably in the same mode to help trim in case it's too much of a handful to let go of the sticks).
- Are all batteries charged and checked?
- Is the COG correct? Or close enough to give you a fighting chance?
- Is the aircraft fully fuelled or is the flight battery fully charged?
- Have you done a range check?

Most of the above is quite logical and easy but it's amazing how much of it gets missed. If you have any doubts about anything, ask for assistance. It could save you plane.

July Club Night:

Will be a show and tell night.

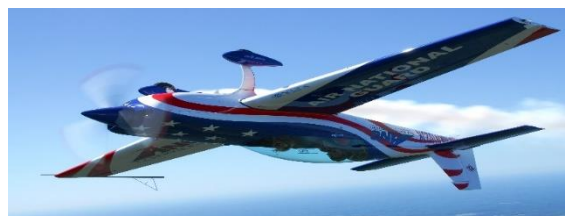
Bring along and show your latest builds, talk about your latest acquisition etc. etc.

These are usually good nights, come and enjoy.

August Club night:

This will be the Neil Upton's show, and all being equal, could be quite special.

*Hatches, catches and latches,
go together.
Battery safely retained?
'nuff said!*



We all need a bit of light relief.

The following comes from one of Pilot Petes recent newsletters. Re-published here with his permission.

After every flight, pilots fill out a form called a 'gripe sheet' which tells mechanics about problems with the aircraft. The mechanics correct the problems, document the repairs on the form and then the pilots review the gripe before the next flight.

Never let it be said that ground crews lack a sense of humour. Here are some actual maintenance complaints submitted by pilots (marked with P) and the solutions recorded (marked with an S) by maintenance engineers.

P: Left inside main tyre almost needs replacing.

S: Almost replaced left inside main tyre.

P: Test flight OK, except auto-land very rough.

S: Auto-land not installed on this aircraft.

P: Something loose in cockpit.

S: Something tightened in cockpit.

P: Dead bugs on windshield.

S: Live bugs on back-order

P: Autopilot in altitude-hold mode produces a 200 feet per minute descent.

S: Cannot reproduce problem on the ground.

P: Evidence of leak on right main landing gear.

S: Evidence removed.

P: #2 propeller seeping prop fluid.

S: #2 prop seepage normal. - #1` #3 and #4 propellers lack normal seepage.

P: DME volume unbelievably loud.

S: DME volume set to more believable level.

P: Friction lock causes throttle levers to stick.

S: That's what they're there for.

P: IFF inoperative.

S: IFF always inoperative in OFF mode.

P: Suspected crack in windshield.

S: Suspect you're right.

P: Number 3 engine missing.

S: Engine found on right wing after brief search.

P: Aircraft handles funny.

S: Aircraft warned to straighten up, fly right and be serious.

P: Target radar hums.

S: Reprogrammed target radar with lyrics.

P: Mouse in cockpit.

S: Cat installed.

P: Noise coming from under instrument panel. Sounds like a midget pounding on something with a hammer.

S: Took hammer away from midget.



WANTED

Crozy wants some dope. Not sure what strength or how much, but if you can help, then get in touch with him.

Ian Crosland:

cath.ian@xtra.co.nz

ph: 04 297 2917

June club night

What a fantastic talk from Martin Burdan. Martin is a member of a syndicate that owns Harvard 96 which is based at Paraparaumu airport. We thought we would get a talk just about this aircraft and his interest in it, but we ended up hearing about the passion for aviation of a boy which grew into a lifelong love of planes from the earlier 'warbird' era.



So taken was he that he seems to have seen every movie of the era. Even when watching the old TV, took snapshots of planes on the screen. He wrote to noted pilots, including Douglas Bader and received replies from them. He is certified on some 30 different aircraft types, has flown a spitfire, and for a time was a pilot with The Vintage Aviator.

His talk was enthralling and enjoyed by all.

Thanks to Peter Kettle for organising.



Monthly Tomboy Meeting for JUNE

Results of Meeting held June 25th

The day was calm and cool with a friendly flying atmosphere.

Three rounds flown by 4 members, with the scores shown below.

Terry Beaumont	Leads with 793 points which included 1 spot landing
John Miller	2 nd with 661 " " " 2 " "
Ian Crosland	3 rd with 615 " " " 2 " "
Warner Summerton	4 th with 589 " " " 2 " "

Despite the calm conditions we had a few challengers

Warner flew into the fence and damaged his tomboy but was able to complete the last round with his small playboy.

Terry had 2 very good flights but lost sight of the model in the third round while climbing vertically, only to find it a minute later when we heard the impact on arrival in the sand hill, no damage.

John Ellison suffered from transmitter issues, so no show.

I apologize to Peter Kettle whom I didn't make contact with. (He wasn't the only one – ed)

Any Club Members wishing to join us and fly Tomboy Events are welcome,

Warner may be persuaded to sell you a Tomboy ready to fly?

Terry Beaumont 0274434803

Wellington Model Aeroplane Club annual auction.

Go to their website for pre-registration instructions etc: <https://wmac.org.nz/>



Visitors from other Club's Welcome.

Next Club Meeting: WMAC Annual Auction Night – Wednesday 31st July 2019

The Annual Club Auction will be held at the Belmont Memorial Hall, starting at 8.00pm. Click [here](#) for a map showing the location of the hall.

***IF YOU'VE GOT STUFF TO AUCTION PLEASE PRE-REGISTER IT NOW –
OR YOU WILL MISS OUT***