

Flight Lines

The Monthly Newsletter of the Spirits of St. Louis R/C Flying Club

“Celebrating 50+ Years - Established in 1965”

December, 2017

FROM THE PRESIDENT:

The days are getting short and the winds are getting stronger so please take every advantage to enjoy the field before its too unpleasant to do so. Hopefully everyone had a chance to spend the holiday giving thanks with family and friends and maybe even took advantage of some Black Friday Sales at your favorite R/C store! We are quickly entering that time of year where flying gives way to building. Make a point to bring your next project to one of our many club meetings and do a quick show and tell or perhaps tap into the wealth of knowledge in attendance to help solve that technical challenge or get some building pointers. **The meetings are much more fun when planes and gadgets are there!**

In this issue of Flight Lines, you are going to pick up on the theme of safety. Many of you have mentioned that we may be getting a little lax at the field so we have decided to kick it up a notch on 2017. Please review the items in this newsletter and next time your at the field, take a moment to just observe the other fliers. You might be surprised at what you see!

Also for we electric fliers, check out “The LiPo Battery Primer” article in this issue!

Happy Flying!



Ralph Grant (2017 Spirits President)

NEXT MEETING:

Join us on Wednesday, December 14th, 2016 at the Merriweather Clubhouse (238 Pond Hollow Drive, St. Charles MO) See Attached Map!

Tentative Agenda:

- November Meeting Minutes Review
- Flight Safety Moment
- Field Committee Report
- Membership Chair Update
- Voice of Membership Survey
- 2017 Event Proposals
- Technical Presentations: Ralph Grant will present his Phoenix Models “Skyboss” Corsair to the group and share a “Glove Free” method of keeping those fingers warm at the field this winter!
- Adjourn to go build!



2017 MEMBERSHIP RENEWAL:

By Ralph Doyle, Membership Chairman

Don't forget that as of December 31st, if you have not rejoined the AMA and the Spirits you may not fly at the field. In particular, anyone who wants to participate in the Jan. 1st event will be flying in violation of club rules.



Also, another reminder, there are a number of members whose AMA membership is coming due soon after the first of the year.

So please, check your AMA cards to verify the expiration date. At this last newsletter of 2016, the club has a membership of 153. The current number of new and renewed members stands at 30. Please return your completed membership applications as quickly as possible!

SAFETY COMMITTEE REMINDER!

By Bob Allen and Steve Cross

Recent observations by the Safety Committee have driven the need to remind us of the following safety items.

1. Please familiarize yourself with the complete listing of Safety Rules that are located on the

club website under About Spirits, Governing Documents. If unsure, ask another member or a Club Officer. If you are viewing this document electronically, [CLICK HERE](#) for a link to the safety rules document.

2. Focus on the following critical safety items:

- Always place your current Spirits membership card on the frequency board each time you fly. There have been several people flying at the field that are not members this insures that everyone has a current Spirits membership and insurance coverage from the AMA. Its for everyone's protection!
- No taxiing of aircraft in the pit areas at any time.
- Please refrain from running any engines or motors under the pavilion.

SAFETY RULE REFRESH:

Did you know?

Operators of gasoline-powered aircraft must have an ABC type fire extinguisher within 8-10' of the aircraft and in view of all fliers.

- No flying of any kind while sitting or standing in the pavilion.
- No flying behind the safety line.

3. Night flying is currently prohibited under our Conditional Use Permit so please refrain from flying after dark at the field.

4. Hand Launching and Belly landing of aircraft behind the safety line puts fliers and people in the pits at risk. Please hand launch and land on or beyond the runway.



MONTHLY MEETING MINUTES:

By Greg Bowles, Secretary

Newly elected President, Ralph Grant called the meeting to order at 7:00 pm. This month's meeting was held at the Merriweather Park Club House.

Attendance:

19 members were in attendance.

New Member(s) in Attendance:

Dave Busch, Mike Freymuth and Robert Dueck.

Secretary's Report:

Greg Bowles, Secretary

A motion was made, seconded and voted to accept the October meeting minutes as published in the 2016 November Flight Lines newsletter.

AMA TEN-YEAR CLUB LEADER AWARD

The Spirits of St. Louis RC Flying Club received an acknowledgement of our 10 years as an AMA Leader



Club. Our Club received an official plaque and all members will receive a patch commemorating our achievement. Thanks Walt Wilson for starting this program.

Treasurer's Report:

Bill Lindewirth, Treasurer

October 2016 we had an income of \$00.00 (the reason being, all the checks received were membership renewals which are not deposited till November 1st which is the beginning of our 2017 financial year).

October 2016 expenses were \$1370.00.

The 2017 Proposed Budget was presented to the

members.

A motion was made, seconded and a vote taken to accept the October Treasurer's Report and 2017 Proposed Budget as presented.

SPIRITS EVENTS:

The following Spirits events are confirmed so mark your calendars!

- The Thrill of the Chill - Jan 1, 2017
- Indoor Fly-In #1 - Jan 14, 2017
- Indoor Fly-In #2 - Feb 18, 2017
- Indoor Fly-In #3 - March 18, 2017

For times, see the attached flyers!...
More to come so stay tuned!

Field Committee Chairman's Report:

Paul Geders, Field Committee Chairman

For runway, taxiway, pit and pavilion areas, Paul has received three bids to reseal the asphalt. The lowest bid was \$3126.00. A motion was made, seconded and voted to accept the bid for resealing the asphalt surfaces next spring.

Paul also suggested we re-seal the asphalt every five years, or sooner if needed, to prevent the cracking issues we have just repaired.

Bill Lindewirth brought to the club's attention the Heli-pad is deteriorating and will need to be replaced or repaired next year.

A work detail will be scheduled in the future to clean and repair our area in the farmer's barn.

Safety Committee Chairman's Report:

Bob Allen, Safety Committee Chairman

A "BIG" thanks to Brendon Weidinger for his past years of service as Safety Committee Chairman.

Discussion of:

Individual and Club review of the Safety Rules.

1. Membership Card must be on the Frequency Board" if you are flying.
2. No taxing in the "Pit Area".
3. No running of engines or motors under the pavilion.

Spinning props can be dangerous!

4. No flying from the pavilion.
5. No flying behind the "Safety Line".
6. No takeoffs from behind the "Safety Line".

Up for future discussion:

1. Li-Po battery charging not allowed in the pavilion; Li-Po bags.
2. Hand launch and landing behind the "Safety Line".

Note: If members do not follow our documented and posted rules...AMA insurance will not cover them.

Membership Chairman's Report:

Ralph Doyle, Membership Chairman

We are now accepting membership for 2017. Presently we are at 9 members.

This year, the membership cards will have the expiration date in "red", if they do not expire on December 31st. This is because the AMA cards expiring on the date you apply, and not at the end of the year as in the past. We are all responsible for insuring our members are active and covered by the AMA.

Contest/Event Committee Chairman's Report

(Position Open):

A "Member Survey" was emailed, attached to last month's newsletter and is also available at the field. We would like to know how the club is doing and any suggestions you may have. Please fill one out and give it to a Club Officer or place the completed surveys back in the original box at the field. The completed survey enters you for a \$100 Mark Twain Hobby gift certificate to be drawn at the January meeting.

Upcoming Spirits Events:

- **"Thrill of the Chill"** – Sunday, January 1st, 2017, 9:00am till "we're too frozen to fly!"
- **"Winter Indoor Fly-In (#1)"** - Saturday, January 14th, 11:00 am-3:00 pm; \$5 Pilot Fee
- Hope Lutheran Church, 1975 South Old Hwy 94 (Hwy 94 and Pralle Lane diagonal from White Castle).
- **"Winter Indoor Fly-In (#2)"** - Saturday, February 18th, 11:00 am-3:00 pm; \$5 Pilot Fee
- **"Winter Indoor Fly-In (#3)"** - Saturday, March 18th, 11:00 am-3:00 pm; \$5 Pilot Fee

Upcoming Local Events:

No upcoming local events.

Old Business:

2017 Board of Directors:

Ralph Grant, President
 Mark Been, Vice President
 Greg Bowles, Secretary
 Bill Lindewirth, Treasurer
 Ralph Doyle, Membership Chairman
 Bob Allen & Steve Cross, Safety Committee
 Paul Geders, Dave Brown, Steve Ramonczuk & Mark Been, Field Committee
 "Open", Contest/Event Chairman
 "Open", Pilot Orientation Chairman

New Business:

Pilot Orientation Chairman.
 Introductory Pilot Program.
 Instructor Program.

Technical Presentations:

Technical Presentation #1 - Airplane and RC accessories of the late Robert "Ralph" Amelung were presented to the attending members for sale. Many bargains were to be found.



A big thanks goes to Bob Gizzie, Ralph Doyle, Tony Pozarich, Babe Raab and Mike Freymuth for bringing it all to the meeting. Those items not purchased will be available at next year's Swap Meet in May.

Technical Presentation #2 - Paul Geders presented his Motion RC Freewing F-35 Lightning II V2 (F-16 replacement).





70mm ducted fan, 360 degree thrust vectoring, 3000-KV motor, 45 amp ESC, 6 channel radio required, electric retracts, 4s cell 14.8V 2200mAh Li-Po battery, 800mm wingspan - \$179. Paul states this is a good introductory jet aircraft, once it is setup.

The meeting adjourned at 8:45pm.

Next Spirits' Meeting is Wednesday, December 14th, 7:00-9:00pm at Merriweather Park subdivision clubhouse. An email was sent last month to all members with a map and directions. It is also posted on our website. Spirit yard signs again will be posted to assist members to the meeting.

PLEASE NOTE: There are chains across the parking lot entrances. They presently have orange streamer notating where they are, but they are still hard to see. Only the first entrance chain is unlockable, so please beware.



ARTICLE & PHOTO SUBMISSIONS:

By Ralph Grant, President / Newsletter Editor

If you have an idea for an article or technical piece, please contact any of the officers and we will do our best to provide it. If you would like to submit an article, all you need to do is provide the text via email and a few pictures, we'll do the rest to make it "Pretty" for you. I know there is a ton of knowledge out there so please, share it with the club members.

Don't forget to submit your photo's to the club as well! Just email them to ralph@thegrantz.com and I'll include them in the newsletter.



THE LIPO BATTERY PRIMER

Text and Photography By Ralph Grant

INTRODUCTION:

I believe it was Spider-man’s Uncle Ben Parker who exclaimed, “With Great Power, Comes Great Responsibility”! Recently at the field, there have been several people who have approached me with questions regarding LiPo batteries. Several are complete Newbies (We were all one once!) and some are seasoned veterans that I have watched charge batteries so swollen with no discernable corners or edges that they looked more like sausages than a LiPo battery!

The purpose of this article is to start at the beginning when it comes to LiPo batteries. There is a wealth of information online but I find that the searches on Google and others can lead you astray and don’t seem to cover enough of everything.

I don’t claim to be “Yoda” when it comes to LiPo’s but I do know a thing or two about them after converting completely over from Glow Fuel when I re-entered the hobby in 2009.

Lets not get crazy technical here but I will say that the “Puffiness” of a degraded LiPo is caused by the release of gaseous oxygen when the cathode of the battery breaks down, chemically. If you read on, I will attempt to share my LiPo work-flow and if you dare to

follow it, you will eliminate “Puffed” batteries from your fleet forever.

BATTERY BASICS (CELL COUNT):

Lithium Polymer or as we call them LiPo (pronounced LYE-POE) batteries have revolutionized electric flying. The amount of energy you can get out of this battery in a compact and lightweight form factor is perfect for our models. LiPo batteries come in various cell counts depending on the number of volts that you want to generate. The number of

cells required is typically governed by the design of the aircraft and the electric motor requirements specific to that airframe. Each motor has a kV rating which dictates its RPM (revolutions per minute) for each volt delivered. A single LiPo cell will deliver

on average 3.7volts DC and approximately 4.2volts DC at full charge. The number of cells in a LiPo is usually communicated by this (#) S nomenclature. A single cell LiPo Battery is known as a 1S battery and a 4 cell LiPo is known as a 4S. Table 1.0 shows the nominal Voltage (average voltage depicted on the battery which is about 50%), the Minimum Safe Voltage (lowest charge to safely deplete a LiPo to is 3.0 volts/cell or 0%), and the Maximum Full Charge Voltage (greatest safe voltage to charge

CELL COUNT	VOLTS (NOMINAL)*	VOLTS (MIN)	VOLTS (MAX)	USAGE
1S	3.7	3.0	4.2	Micro Plane / Heli / Quad
2S	7.4	6.0	8.4	
3S	11.1	9.0	12.6	Common Airplane / Heli / Quad
4S	14.8	12.0	16.8	
5S	18.5	16.0	21.0	
6S	22.2	19.2	25.2	Jet-EDF / Large Scale
8S	29.6	25.6	33.6	
10S	37.0	32.0	42	Giant Scale Plane / 700 Class Heli
12S	44.4	38.4	50.4	

*-Nominal Voltage is the “average” voltage of the pack and how the industry has chosen to describe and compare them.

THE LIPO BATTERY PRIMER (CONTINUED)

a LiPo to is 4.2 volts/cell or 100%).

So lets quickly jump back to that motor kV business. If a motor has a kV of 450 then the propeller will do 450 RPM per volt. If that airplane has a 6S battery (25.2volts at full



charge) then the 15x8 Falcon propeller on the 70" Phoenix Ryan STA in the picture above will turn about 11,340 rpm which is pretty typical for a large sport plane.

BATTERY BASICS (CAPACITY):

Every battery made is typically rated in mAh or "milliamp hours". This is essentially the amount of current the battery can deliver for one continuous hour. Therefore, the 5000mAh battery in the Ryan can put up 5000mA for one hour before its voltage drops to 19.2volts or 3 volts per cell. This 5 amp / hour capacity when we convert from milliamps to amps can quickly be used to calculate the time of flight for the Ryan. If the plane averages about 50 amps at mixed throttle then it will fly for about 6 minutes ($5\text{Amp}/50\text{Amps}=0.1$ Hours). Obviously this is an overly simplified calculation because we rarely fly our birds at a constant speed, however it is a pretty decent rule of thumb and six minutes is where my timer starts to remind me on the Futaba 18SZ.

I also highly recommend investing in a good model airplane Watt Meter like the Astro-Flight

version in the picture below so that you can test your power system on the ground. Every electric aviator needs one of these critters and



it can be had from Tower Hobbies for about \$60 bucks. Money well spent in my book.

BATTERY BASICS (C-RATING):

Every LiPo battery comes complete with a C rating. Actually 2 C ratings (A Discharge and Charge). The purpose of the C rating is to demonstrate the amount of power the battery can put out or the amount of power it can receive during charging. The way you need to think of a C rating is as a multiplier on the capacity. So in the case of the Ryan, I fly a Revolectrix Diamond Label 6S 5000mAh battery that is rated at 60C on its label. This means that since the battery is a 5A battery, it will put out a whopping 300A! Of course as we calculated before, it would only do it for 1 minute or so before it was depleted and it would be completely destroyed!

So, who really cares about a crazy C rating? To be honest, on a big 6S 5000mah battery a 60C battery was really a waste of good money. The C rating on a large capacity battery is more of a bragging status symbol amongst model aviation nerds. Where the C rating really matters is on smaller craft and lower C rated batteries. Lets assume you have a little E-Flite

THE LIPO BATTERY PRIMER (CONTINUED) - BY RALPH GRANT

P-47 Thunderbolt and you decide to go all "Steve Ramonczuk" on it and drop in a Rimfire



1250kV EF1 Outrunner motor and a Castle Edge Lite 75A ESC in an attempt to break the foamie warbird sound barrier. Will your existing 3S, 2200mAh battery with a 30C rating work with this new power-plant? Lets do the math, ($2.2A \times 30C = 66A$ peak). Should you use it? I

personally would not. You want your ESC to be rated higher than your motor/prop combo and the (C rating * Capacity) of your battery to be greater than your ESC. Think of the LiPo as a fuel tank. In this case 66A is smaller than 75A so I would use a slightly better C rated battery in case the ESC needs more power Scotty!

What about the Charge C rating we mentioned? The charge C rating is typically 1-5 on most batteries. Big ones like the 5000mAh Revolatrix say you can hammer them with 5C or 25amps during charging. That means that you can fully charge a 50% storage charged one (more on this later) in only 6 minutes ($2.5/25 \times 60$) since you only need to put 2500mAh in it to top it off. If you have a charger that can handle 625 watts (The Revolatrix Cellpro Powerlab 8 is rated at 1344 watts so you could do two!) you could charge that battery in 6 minutes if you were in that big a hurry. However, I would never really charge greater than 2C on big batteries and 1C on small ones

because it is kind of hard on the batteries.

BATTERY BASICS (MORE ON C RATING):

The reality is that you should always error on the side of caution when making decisions on C ratings. Why? Because most of the C ratings on batteries are actually marketing BS used to increase sales. The only way to really check the C-Rating on a battery is to build a test rig and measure it. Make no mistake, there is NO battery out there that can withstand a sustained 40C load for a minute or more without sustaining permanent damage. But, regardless of labels, if money is no object you can be assured that the best LiPo packs out there are by Revolatrix and Dinogy. You can bank on it that either of those will deliver the C rating they say on the label but they are \$\$\$!

LIPO ESSENTIAL #1: QUALITY LIPO'S.

The best thing you can do to insure that you don't damage your LiPo's is to start your journey with the best batteries you can afford.



I hate to break it to you but if you are buying a 4S 5000mAh LiPo and its \$29.99, save your money. I've had excellent results with Admiral, Pulse, Venom, and Revolatrix. Personally, I think Admiral batteries from www.motionrc.com are some of the best value in LiPo's. I've got dozens of them and not one bad cell in the lot and I've never seen one Puff following these

THE LIPO BATTERY PRIMER (CONTINUED) - BY RALPH GRANT

principals!

LIPO ESSENTIAL #2: GREAT CHARGER!

Once you've spent your hard earned coin on batteries, you need a great balance charger that you can count on. It must be big enough to charge batteries at 1C or more quickly and it absolutely MUST have storage charge capability. My own opinion is that the absolute best chargers out there are the



Cellpro Powerlab Series by Revolectrix. These chargers allow you to charge, discharge, monitor, and cycle any current or future battery chemistry.



Their software is fully upgradeable and at 1344 watts when teamed up with a solid 24 volt 55 Amp Power Supply you can charge all your LiPo's for a day at the field in minutes.

LIPO ESSENTIAL #3: MULTIPLE LIPO'S.

To enjoy flying electric planes you need multiple LiPo batteries. There is nothing fun about sitting around as a spectator waiting for



things to charge. The reality is that it's also not great for your batteries to be charged while still warm from discharging in your plane. Get multiple batteries so that you can fly and charge low temp LiPo's. Make sure to get batteries that match your paint scheme as well so they look cool laying in front of your bird!

LIPO ESSENTIAL #4: CYCLE NEW ONES.

A prime athlete would never roll off the couch and run a 100 meter sprint. You shouldn't expect your LiPo's to do it either. When I purchase a new LiPo I always cycle it at least 3 times at 1C on the charger before pulling high amps out of it in flight.

LIPO ESSENTIAL #5: BALANCE.

You MUST ALWAYS balance charge a LiPo. What is balance charging you ask? Depending on the internal resistance of each cell in a battery, each one discharges at a different rate. Its not uncommon for a cheap LiPo to have cells that vary by as much as 1/10th of a volt after it discharges. Balance charging allows your charger to measure the voltage of each individual cell and only charge low cells. When you only charge a LiPo based on the total voltage, the charger doesn't know the voltage it is applying to each individual cell, it only knows the total voltage. As you can see in Table 2.0, each of the LiPo's have the same full

THE LIPO BATTERY PRIMER (CONTINUED) - BY RALPH GRANT

pack voltage of 25.2 Volts which Table 1 says is the fully charged safe state for a 6 cell LiPo.

Both seem safe. The problem here is that on LiPo #1 the bad cell #1 has caused cells 3-6 to be dangerously overcharged at 4.6V which certainly caused damage to the LiPo or worse, caused it to catch on fire! If you don't balance charge you are certainly damaging your LiPo's and putting your property and life at risk while charging to greater than 4.2V!

6S LIPO BATTERY BALANCE CHARGING (TABLE 2.0)		
CELL #	LIPO #1 UNBALANCED	LIPO #2 BALANCED
1	2.6	4.2
2	4.2	4.2
3	4.6	4.2
4	4.6	4.2
5	4.6	4.2
6	4.6	4.2
Total	25.2	25.2

plane into the ground nose first and the battery isn't adequately strapped in, it could slide

violently forward and rupture itself on the shaft of the motor resulting in a LiPo Fire and complete loss of your plane (Ask me how I know this) in dramatic smoking fashion. While your worried about the connection to the plane, you should also worry about the cooling of the entire system. An overheated ESC, Motor, and

Battery will result in excess losses of power and damage to system components. Always make sure that there is an exit for warm air. The discharge area from the plane should have at least 2 times the entrance area to allow for the expansion of increased temperatures air as it warms during cooling.

LIPO ESSENTIAL #5: INSTALLATION.

Always install your LiPo so that it is solidly mounted with both Velcro and straps. Many of



the fully aerobatic 3D planes like the Extreme Flight MXS above easily experience as much as 14g's. That means your 600g Pulse battery is going to weigh 8.4kg's or 18.4Lbs during high G maneuvers. Nothing will damage a LiPo and completely destroy your plane more than being jettisoned from your aircraft 200' above the runway! In another scenario, if you plow your

LIPO ESSENTIAL #6: POWER SYSTEM.

If your flying a pre-designed foamie from a reputable company, design of the power system is not really of concern unless you change the battery from 3S to 4S or make other modifications. However, if you have built your own custom power system for your dream 30's era racer, you need to insure that the entire system is adequately designed. An excellent tool that I use for this is eCalc, an on-line calculation tool located at www.ecalc.ch that allows you to subscribe to their service and run a series of electric airplane calculations. Basically you input parameters such as model weight, wing area, cooling quality, battery brand/model, ESC brand/model, motor brand/

THE LIPO BATTERY PRIMER (CONTINUED) - BY RALPH GRANT

model, propeller brand/model/size, and several other parameters. It then calculates things like total power draw, approximate flight time, estimated temperature of the Battery, ESC, Motor, estimated speed of the plane, propeller tip speed (break the sound barrier and it sounds bad ass!). It even gives you critical warnings if the ESC you selected is too small, the temperature is too high on your motor, the

used. This is a great tool and well worth the subscription of \$11.00 per year which include Heli, Quad, and other calculators.

The screenshot shows the 'eCalc - Propeller Calculator' interface. It includes a header with '54R Member Full Version' and a search bar. Below are several sections for inputting data: General (model weight, wing area, field elevation), Battery Cell (type, capacity, resistance), Controller (type, current, resistance), Motor (manufacturer, KV, no-load current, resistance), and Propeller (type, diameter, pitch, # blades). At the bottom, there are six gauges: Lead (13.50), Mixed Flight Time (7.1), electric Power (1,595.7), air Temperature (66), Thrust Weight (1.33), and Pitch Speed (190). A 'Remarks' section contains a warning about excessive wiring resistance. A detailed summary table at the bottom provides values for Motor @ Optimum Efficiency, Motor @ Maximum, Propeller, and various battery and aircraft metrics.

LIPO ESSENTIAL #7: MEASURE. TWICE.

The minute you land, check your cell voltages and see if there are problems.



battery is damaged, etc. It provides all of this data across the entire throttle range as well and graphs it for you. Bottom line is that if you use eCalc, the possibility of damaging any component in your power system is slim to none. I have never had a motor burn up, an ESC fail, or a LiPo Puff when eCalc has been

On my more expensive or favorite airplanes I have pretty much gone to telemetry to tell me my total voltage in the air. I'm a big fan of talking telemetry. On the Futaba R7008SB series receiver you can add external voltage for computer radios like the 14SG, 18MZ, or new

THE LIPO BATTERY PRIMER (CONTINUED) - BY RALPH GRANT

18SZ so that it will tell you when low. On my 18SZ, it talks (similar to other Spektrum



models) and I have it tell me voltage when I throw a momentary switch. I especially like to check voltage under full power to see if I'm over-taxing the battery. Based on Table 1.0, we know that the 6S safe minimum voltage is 19.2 volts which would be 0%. I generally like to be on the ground with no less than 30% battery life which is about 3.6 volts/cell or 21.6 pack volts according to telemetry. That being said, if the voice over the radio ever says less than 18.0 volts, I know I have depleted at least one cell below my minimum safe voltage of 3.0 Volts and I land immediately. Its not uncommon to hear 20.2 volts under heavy load like climbing vertically and then when I spin out and cruise at half throttle flat and level I hear the voltage go back to 21ish volts. If you don't have telemetry, you really need to get yourself a cell tester and check on the ground. Either of the ones in the image above can be had for less than \$15 bucks. They tell so much more than a simple multi-meter. Some of them will even help you setup servo's, check servo current, etc.

LIPO ESSENTIAL #8: STORAGE CHARGE.

The minute you get home from the field, the work is not over. You must storage charge all

batteries that were depleted and discharge all batteries that were not used. One of the most damaging things you can do is leave a battery



fully charged for long periods of time. This almost certainly is the biggest cause of puffed LiPo's. As mentioned in Essential #2, NEVER buy a charger that doesn't storage charge. Storage charging will balance all cells at a given voltage and render the LiPo in a neutral state. The target voltage I shoot for is 3.85 volts because that is the default storage charge voltage on the Cellpro Powerlab 8. It ends up being about 50% charge, close to the nominal voltage. Storage charging is probably the second most important thing to getting on the ground with a minimum of 30% charge.

LIPO ESSENTIAL #9: SAFE CHARGING.

There is a basic level of LiPo discipline or respect that must be maintained. There is always a risk associated to the convenience of so much power available to you. These little bricks of plastic and Lithium compounds can get angry fast if you mistreat them. Under no circumstances should you deviate from the following charging basic rules of engagement. Don't get lazy here. If these rules won't work for you, stick to glow engines please.

THE LIPO BATTERY PRIMER (CONTINUED) - BY RALPH GRANT

1. Never charge unattended: This is why I like lots of power so that I can charge those LiPo's without getting bored and get out!
2. Never charge without a balance charger: We've talked about this, don't do it unless you have a package of hot dogs available when the impromptu cookout begins.
3. Never charge on or near flammable surfaces: The romans invented concrete specifically to be fantastic LiPo charging surfaces. Use them!
4. Place your batteries in a suitable container while charging: If your LiPo is under 3S and 3000mAh you can get by with one of the many charging bags out on the market.



Put one battery per bag. Studies have shown that anything bigger than 3S - 3000mAh and all this little bag does is provide more combustible material to the



reaction! If your charging larger batteries such as 6S 5000mAh's, you really should invest in something more robust like the Bat-Safe charging box. This device not only contains the heat and fire within its double walled insulated interior, it also vents the gases that are escaping through a flame

arrestor which filters the soot from the gases to reduce smoke damage (quite possibly worse than the fire). This box is a pretty cheap investment at \$50 bucks and is available at www.bat-safe.com. If \$50 bucks is overkill, get yourself a cinder block from the hardware store and place a plastic sandbag over the cell. When your LiPo unzips, it melts the plastic and the sand extinguishes it.



5. Wear safety glasses: If one of these babies lets go, the arc flash will generate hot materials at an alarming rate. It's one thing to get burned but a whole other story to be blind as well. I can fly with a few burns but I'll save using the Force to Fly for the Star Wars movies.
6. Have Sand Handy: These babies burn at greater than 1300°C. Now is not the time to toss your coffee or waste an extra Hoppy IPA on it. Sand is the best material for extinguishing a Class D Metal Fire which is why I recommend doing all your LiPo charging at the beach! You won't find a D on that ABC kitchen extinguisher either so don't bother with it except to extinguish other stuff your LiPo caught on fire.
7. Store them safely too: Remember, storage charge them before putting them away and they won't have much energy. Check cell voltages on a regular basis and re-balance on your storage charge setting as needed!

I also prefer to store my LiPo's in a fire proof cabinet that will allow the pressure to be dissipated. I acquired an old flammable solvent cabinet



THE LIPO BATTERY PRIMER (CONTINUED) - BY RALPH GRANT

that is double walled, insulated, and crazy heavy. I keep all my LiPo's in there. Although upon looking at this photo, I probably should get the flammable materials off the top of the thing

LIPO ESSENTIAL #10: DISPOSAL.

Once the thing is puffed up like a road kill possum and won't balance you need to get rid of it. Now is not the time to hand your beer to your buddy, say watch this, and poke it with a #11 X-Acto to "let the smoke out"! This is what you do:

1. Balance discharge the battery to no less than 3.0 volts per cell on your charger.
2. Dissolve a cup of salt in a container of water just deep enough to cover the entire surface of the battery and set the battery on top of the Leads so that they are submerged as well. The electrolyte salt solution will slowly discharge the battery. Leave it there for at least 24 hours.
3. Check the LiPo Voltage and when it is 0.0V you have completely and safely discharged the battery. Continue to soak until it is completely discharged at 0.0V.
4. Dispose of the LiPo in the kitchen garbage can. That's right tree huggers, LiPO batteries are completely safe for the environment

unlike NiMH and NiCd batteries in your other devices!

5. Go Fly with another LiPo! This is pretty much self explanatory but if you need some help here, give me a call!

LIPO CONCLUSION:

There are a lot of nay-sayers out there that will use this article as an example as to why they don't fly electric. The beauty of this hobby is that we can all enjoy it in any fashion that we like and there is something for everyone at every skill level and price point. I for one, love the electric convenience of pulling into the flying field and being in the air with a 48" airplane in less than 1 minute. When I'm ready to leave, I toss everything in the truck and I am gone in 1 minute. The convenience is immeasurable and the opportunity it provides for multi-engine is awesome!



Flying a B-17 on glow power was just not something that was within my skill set or patience level. Electric flight and LiPo power has made that possible at an affordable price. Electric power has enabled a number of people to experience this hobby without spending a fortune. You can be in the air for less than \$200 bucks with a high quality airplane with electric power.



THE LIPO BATTERY PRIMER (CONCLUSION) - BY RALPH GRANT

As said in the opening, “With great power comes great responsibility”. If you consult this document and follow its recommendations, LiPo power will be a safe, affordable, and fun power system for all ages for years to come.

Happy Flying on Electric Power!

Feel free to email me at ralph@thegrantz.com with questions, comments, etcetera or even better, come talk to me at the field!

AT THE FIELD:

Photography By Greg Bowles, Secretary





THRILL OF THE CHILL

New Years' Day 2017

Who will be the first to fly?
Annual New Years' Day Fly-In
Regardless of the weather, 9:00 am - ????

**Spirit Field is located at 73 Amreinn Rd.,
St. Charles, MO 63304
(Greens Bottom Rd. & Caulks Hill Rd.)
Spectators always welcome! Free Parking!**

**Free Coffee & Donuts, NO Landing Fee
and Open to all AMA Members
For more info visit <http://spiritsofstl.com>
or Facebook**



Spirits of St. Louis R/C Flying Club
Presents

2017 INDOOR FLY-IN

Saturday, January 14th

Saturday, February 18th

Saturday, March 18th

11:00am - 3:00pm

\$5.00 entry fee & current AMA required

All aircraft must be safe for indoor flight & approved by the event staff

Public spectators are free and welcome

Hope Lutheran Church

1975 South Old Hwy. 94, St. Charles, MO

(In the Gym)

For more information visit our website: spiritsofstl.com



Next Spirits’ Meeting is Wednesday, November 9th, 7:00-9:00pm at Merryweather Park subdivision clubhouse. An email will be sent to all members with the following map and directions. Spirit yard signs will be posted to assist members showing the direction to the clubhouse.

Merryweather Club House

To Hwy 94

To Spirit's field

From the intersection of Upper Bottoms Rd and Jungs Station Road Rd.
 Take Jungs Station 'north' towards Hwy. 94.
 At the third street on the left, turn LEFT onto Willow Bend Drive.
 At Willow Wood Ct there is a STOP sign.
 Proceed around the Merryweather Park Monument.
 At the Pond Hollow Drive, STOP, turn RIGHT.
 The Club House is on your left at the intersection of Clarkson Park Drive.

238 Pond Hollow Drive, Saint Charles, MO

