CRASH  The 107th CRONICLES!

March 2006

WOW…. Here we are, another month gone by and I have not yet completed the many things that I planned on completing this building season. I guess I better step on it cause soon spring will be here. Its time to take Dan Nochers advise and do a thorough check out of my flying machines to make sure everything's up to snuff. I advise all of you to do the same.

It's now official, this will be the last news letter you will receive thru the U.S. mail unless ***YOU*** tell us otherwise. The otherwise means it'll cost you an extra $10.00 per year to have it mailed. If you prefer your news letter mailed, please remit this along with your yearly dues that are now due. You can also get your news letter through the 107th web site (www.107aersquadron.com) for free. Just click on newsletters and read the directions, then click on the Adobe symbol next to the month you want to read and presto. Just like magic thanks to Ron King and his hard work. You can also print out a copy if you so desire. If however, you still want it mailed, please contact me at my home. (Leave a message if I'm not home.) I'll put you on the yearly mailing list and you can square up with Ron King at a later date if necessary. Please also note that since the web site will be available for anyone to read, no personal information will be listed in the newsletter. This will also be your last news letter if you have not paid your 2006 dues. So if you have not yet done so… I encourage you to do this so that you don't miss out on some of the dumb things that I'll probably be doing all year long. This alone will probably be worth the price of admission! (Did I ever tell you about the time I was hearing voices?)

I was not planning on writing this months news letter but …… do to technical difficulties, ***Editors Note:*** (I think he got Pizza stuck in his keyboard. This wouldn't be bad except that Joe put the keyboard in his microwave to warm up the leftovers!) your news letter Editor Joe Synal was unable to do it this month. I look forward to when Joe takes over. Not because I don't want to do it, but the entertainment value alone excites me! (All right …. No wise cracks!)

Also news worthy is the fact that we will be having a contest of sorts. The contest is …. (drum role please.) naming the news letter. We can not use this name because of a ***DUMB*** oversight by me. (How'd you guess?) I don't know the specifics, but I hope Joe Synal or Bob Boen will fill us in at the next meeting. Please remember I said previously that I don't plan on telling anyone how to do a job that the volunteered unselfishly to do. So with that said, I guess we'll all find out at the next meeting. Nuff said for this month and remember, to build light, is to build right!

Jeff W.

Our Next Meeting will be at the Bridgeview Community Center located at 7400 W. 79th Street. Start time will be 7:00 P.M. ***March 13th 2006***

This Photo is from end of the 2005 flying season. Pictured is Ron King and his Funtana 90 by Hanger 9. Nice job Ron, my only question is.... How'd it fly? (Want your planes picture published? LET ME KNOW! We'll see what we can do.)

Charging nickel-based batteries

The reliability and longevity of a battery hinges, to a large extent, depend on the quality of the charger. Battery chargers are often given low priority, especially for consumer products. In this article, we address the charger as the quintessential provider and guardian of the battery. We look at various charge methods that will increase the performance of nickel-based batteries.

Great Panes Super Chipmunk. NIB $300.00. Contact Marv Sarich.

OS 91 (slightly used) with engine mount, assorted props, and Pitts style muffler. $200.00. Contact Martin Stanley.

A battery should always remain cool during charging because high temperatures shortens battery life. Some temperature rise with nickel-based batteries cannot be avoided. The time during which the battery temperature remains elevated should be as short as possible. The temperature rise occurs in the second half of the charge cycle. The battery should cool to room temperature when on trickle charge. If the temperature remains above room temperature after a few hours in ready mode, the charger is performing incorrectly. In such as case, remove the battery when ready. The caution applies especially to nickel-metal-hydride because this chemistry cannot absorb overcharge well.

Nickel-based chargers are grouped into three categories:

- Slow Charger - Also known as 'overnight charger', the slow charger applies a fixed charge of about 0.1C* (one-tenth of the rated capacity) for as long as the battery is connected. Charge time is 14-16 hours.

- Quick Charger - Also knows as rapid charger, this charger serves the middle range, both in terms of charging time and price. Charging time is 3-6 hours. The charger switches the battery to trickle charge when ready.

- Fast Charger - Designed for nickel-based battery, the fast charger fills a pack in about one hour. Fast charging is preferred because of reduced crystalline formation (memory). Accurate full-charge

detection is important. When full, the charger switches to topping and then trickle charge.

New nickel-based batteries should be trickle-charged for 24 hours prior to use. Trickle charge brings all cells to equal charge level because each cell self-discharges at a different rate. Trickle charge also redistributes the electrolyte to remedy dry spots on the separator brought on by gravitation of the electrolyte during long storage.

* The C-rate is a unit by which charge and discharge currents are scaled. A charge current of 1000mAh, or 1C, will charge a 1000mAh battery in slightly more than one hour. A 1C discharge lasts one hour. Some battery manufacturers do not fully form the cells before shipment. Full performance is reached after the battery has been primed through several charge/discharge cycles, either with a battery analyzer or through normal use. Properly formed cells perform to specification after 5-7 cycles. Most rechargeable cells are equipped with a safety vent to release excess pressure if over-charged. The safety vent on a nickel-based cell opens between 10-13 Bar (150-200 psi). (The pressure of a car tire is about 2.3 Bar or 35 psi.) With a resealable vent, no damage occurs after venting. Some electrolyte is lost and the seal may leak afterwards. A white powder accumulating at the vent opening indicates venting activities.

Charging nickel-cadmium

The cell voltage, pressure and temperature characteristics are similar to nickel-metal-hydride. The overall charge efficiency of nickel-cadmium is about 90% if fast charged at 1C. On a 0.1C overnight charge, the efficiency drops to 70% and the charge time is 14 hours or longer. In the initial 70% of charge, the charge acceptance of a healthy nickel-cadmium battery is close to 100%. The battery remains cool because all energy is absorbed. Currents of several times the C-rating can be applied without heat buildup. Ultra-fast chargers use this phenomenon to charge a battery to the 70% level within minutes. Past 70%, the battery gradually loses the ability to accept charge. The pressure and temperature increase. Ultra-high capacity nickel-cadmium batteries tend to heat up more than the standard version on fast-charge. This is partly due to increased internal cell resistance. To moderate the temperature buildup and achieve short charge times, advanced chargers apply a high current at the beginning and then lower the amount to harmonize with the charge acceptance. Interspersing discharge pulses between charge pulses improves the charge acceptance of nickel-based batteries. Commonly referred to as burp or reverse load charging, this method promotes high surface area on the electrodes to improve the recombination of gases generated during charge. The results are better performance, reduced memory and longer service life.

Full-charge detection is based on a combination of voltage drop at full charge (negative delta V), rate-of-temperature-increase (dT/dt), absolute temperature and timeout timers. The charger utilizes whatever comes first to terminate the fast-charge. After the initial fast charge, some fast-chargers apply a timed topping charged. In an attempt to gain a few extra capacity points, some chargers apply a measured amount of overcharge. The capacity gain is about 6%. The negative is shorter cycle life. The recommended trickle charge for nickel-cadmium is between 0.05C and 0.1C. Because of memory concerns and compatibility with nickel-metal-hydride, the trickle charge is set as low as possible.

Charging nickel-metal-hydride

Nickel-metal-hydride chargers require more complex electronics than nickel-cadmium systems. To begin with, nickel-metal-hydride produces a very small voltage drop at full charge and the NDV is almost non-existent at charge rates below 0.5C and elevated temperatures. Aging and degenerating cell match diminish the already minute voltage delta further. This makes full charge detection difficult. A nickel-metal-hydride charger must respond to a voltage drop of 8-16mV per cell. Making the charger too sensitive may terminate the fast charge halfway through the charge due to voltage fluctuations and electrical noise. Most of today's nickel-metal-hydride chargers use a combination of NDV, rate-of-temperature-increase (dT/dt), temperature sensing and timeout timers. The charger utilizes whatever comes first to terminate the fast-charge. Nickel-metal-hydride should be rapid charged rather than slow charged. Because of poor overcharge absorption, the trickle charge must be lower than that of nickel-cadmium and is usually around 0.05C. This explains why the original nickel-cadmium charger cannot be used nickel-metal-hydride. It is difficult, if not impossible, to slow-charge a nickel-metal-hydride. At a C rate of 0.1-0.3C, the voltage and temperature profiles fail to exhibit defined characteristics to measure the full charge state accurately and the charger must rely on a timer. Harmful overcharge can occur if a partially or fully charged battery is charged with a fixed timer. The same occurs if the battery has aged and can only hold 50 instead of 100% charge. Overcharge could occur even though the battery feels cool to the touch.

Lower-priced chargers may not apply a fully saturated charge. Some will indicate full-charge immediately after a voltage or temperature peak is reached. These chargers are commonly sold on the merit of short charge time and moderate price.

Simple Guidelines:

- Avoid high temperature during charging. Discontinue the use of chargers that cook batteries.
- A charger for nickel-metal-hydride can also accommodate nickel-cadmium, but not the other way around. A charger designed for nickel-cadmium would overcharge the nickel-metal-hydride battery. (**Editors Note: This article was written in 2003. Since then, digital chargers have emerged which can charge both types of batteries safely. Just make sure you set the charger to the appropriate battery type setting.)** nickel-based batteries prefer fast-charge. Lingering slow charges cause crystalline formation (memory).
- If not used immediately, remove the battery from the charger and apply a topping-charge before use. Do not leave nickel-based battery in the charger for more than a few days, even if on trickle charge.

- A well-designed charger is a reasonably complex device. Taking short cuts will cost the user in the long run. Choosing a well-engineered charger will return the investment in longer lasting and better performing batteries.

About the Author:
Isidor Buchmann is the founder and CEO of Cadex Electronics Inc., in Vancouver BC. Mr. Buchmann has a background in radio communications and has studied the behavior of rechargeable batteries in practical, everyday applications for two decades. Award winning author of many articles and books on batteries, Mr. Buchmann has delivered technical papers around the world. Cadex Electronics is a manufacturer of advanced battery chargers, battery analyzers and PC software.

Don't let this happen to you! Your batteries are the heart of your system. Check'em charge'em, cycle'em. Know what there doing. An investment in a good quality charger/cycler is minimal compared to what can happen! JEFF W.

Annual Dues are now due. $40.00 for individual, and $45.00 for family membership. See Ron King at the meeting, or contact him for other options.

Nice job Bob!

Meeting Minutes

107th Aero Squadron
Meeting Minutes for 2/13/2006

Location: Oremus Community Center
7900 Oketo Avenue
Bridgeview, IL.

Next meeting: March 13, 2006

I. Call to Order

- Jeff called our 7:00 meeting to order promptly at 7:04 PM, give or take a few milliseconds. 24 club members attend this meeting

II. Announcements

- Jeff announced that Bob Doornbos was back in the hospital with further complications with his leg, and had to have it amputated. Jeff passed a card around for all the attending club members to sign, and will forward it on to Bob with our best wishes for a speedy recovery.
- Ron King announced that the deadline for membership dues for 2006 ($40 bucks and no centavos) is March 31st. Ron said he needs all the dues paid up by then, as he was leaving right away for another one of his "around-the-world" cruises (would not be attending the March meeting), and he "needed to cover expenses".
- Bob Quitter showed off the new "107th Aero Squadron" sign which will be suitably affixed to the frequency board sign, next to the Palos sign. Kudos to Bob for taking the initiative on his own, without feeling the need to arrive at consensus with 99% of the club members, or worrying about the tree police coming to arrest him, because he was defacing "public property"!

III. Treasurers Report

- Ron King indicated that our balance on hand as of the meeting was $1093.55, which included dues collected at the January meeting ($480.00) by Bob Quitter. Our approximate balance at the end of 2005 was about $500.00, which included payment of major expenses for the banquet ($933.17) and the final bill for grass cutting ($360.00) which was our split from Palos.

IV. **Secretary's Report**

- The secretary's report for the January meeting was published in the January newsletter. Nobody griped or complained about its accuracy, so I guess it's been accepted and approved.

V. Old Business

- Jeff indicated that the costs for printing and mailing the newsletter was approximately $10.00 per year, per member, if we continued to mail hardcopy to each club member. The club members voted to make this $10.00 "expense" an additional optional "surcharge" to the 2006 membership dues effective immediately. A "sign-up" form will be passed around at the March meeting for those members who want their copy of the newsletter printed, and delivered via US mail. For those members, their annual dues will be $50.00. For those members that want to get their copies of the newsletter via e-mail (in .PDF format) the club membership dues will remain at $40.00 per year.

VI. New Business

- Jeff announced that Marv Sarich would act as liaison with Palos Flying Club to coordinate activities and schedules, since he is a member of both clubs.

- It was also mentioned that Fox Valley Aero was having a swap meet on February 25th, and that RC Barnstormers have a swap meet scheduled for April 15th. Details and locations can be read in AMA's current monthly publication.

VII.Show & Tell

- John and Jason Joseph brought virtually identical World Models CAP 232's to the meeting. John's version weighs 4 lbs., 15 oz., and will be powered by a Saito 72. Jason's CAP will get a Saito 56 for power.

VIII.Adjournment

- Jeff adjourned the meeting exactly at somewhere between 8:30 and 8:45 PM.

Respectfully submitted,

da Club Secretary