**LiFe BATTERY STORAGE** (Peter Frestel)

Several blokes have recently bought new batteries, specifically LiFePO4 batteries and I thought I might mention a few things for those who are not aware. I have been told and after a bit of extra research, that one should take a little extra care with these batteries. Please, if anyone thinks I'm wrong or can add to the following, then please pass comment a.s.a.p..

Lithium batteries have fast become one of the more popular types of rechargeable batteries. There are a couple of different types of lithium batteries and the LiFePO4 is one of the most popular because they are not as prone to bursting into flame as readily as Lithium Ion Polymer batteries (LIpo's).
LiFePO4 batteries are often just referred to as "L.I.F.E." batteries or "life" batteries and the PO4 (phosphate) is dropped.

So, the names of these batteries can be confusing. On the Periodic Table, Fe (from the Latin word ferrum), stands for "Iron". In effect, we have Lithium IRON (LiFe) batteries and we have Lithium ION (LiPo) batteries and the two should not be confused. To avoid confusion, I think of LiFe batteries as "Lithium Ferrous" batteries. Ferrous being derived from that same Latin word Ferrum.

In general LiPo batteries are often used where high energy density is important such as drive systems for drones, RC electrical aeroplanes, scooters, bicycles and RC cars/buggies. These are the types of batteries you often hear about catching on fire in electric scooters, bicycles etc..
LiFePO4 batteries are often used in applications where safety and longevity are the primary concerns such as in electric vehicles, renewable storage systems, and RC control systems (radios, servos etc.). They too can catch on fire but not as readily as LiPo's. When lithium batteries catch on fire, they are very difficult to extinguish. I'm told that submersing in salty water is a way but I'm not sure about that.

So, apparently lithium batteries do not like to be stored neither fully charged nor discharged (flat), LiPo batteries particularly so. When stored fully charged for longer periods, the batteries can swell and when battery charge is depleted too low, they can get to a point where they can become damaged and will not accept charge again. I have found articles saying that LiFe batteries can safely be stored fully charged but I have also found articles that say not. It seems that a popular "rule of thumb" is to store lithium batteries below 80% and above 20% charge.

I'm told that if, for example, you fully charge a lithium battery but do not use it, it can be left for a day or two but for any extended period, you should consider discharging it again. Similarly, if you have depleted a battery's charge and plan to store it, you should consider storing it partly charged. Keep in mind that, apparently, these batteries can self-discharge at 1% to 3% per month.

So where am I going with this? I checked the two LiFe batteries I recently bought and both were at 1% charge. Stored that way, the battery service life would probably be reduced or even damaged. I'm guessing that several other blokes have

the same with their new batteries. I'm not saying for definite, but given the information, I would suggest that you check your batteries and at least charge them above 20% if you're planning to store them for a while.

If you don't already have one, I would suggest you buy a "smarter" battery charger. I don't consider them to be expensive – well under $100. You're looking for one that can charge multiple types of batteries such as Nicad, Nickel-Metal Hydride, Lipo, Life batteries. For LiPo and LiFe batteries it needs a balancing function to balance multiple cells. You're also looking for charging, discharging, and storage functions. Charging and discharging are obvious but what about the storage function? If fully charged and you select "storage" the unit should discharge your battery to a suitable level for storage. If the battery is flat, it will charge up to a suitable level for storage. I tested one of my chargers and for a fully charged battery, it reduced the charge to 71% and for a flat battery, it charged it up to 21%.

I haven't looked to see if my chargers can check battery percentage because I happen to have a small battery and servo testing device which gives battery percentage. However, if you have a suitable charger, you do not really need to know percentage. Just carrying out the "storage" function should suffice. Also, the charger will probably show for how long it has charged or discharged, as well as by how many milliamps. By the way, when selecting any function on your charger, be sure to select the correct battery type because that affects charging rates and levels.

Speaking of levels, the charging rate you select is very important. If you pump in charge at too many amps you can lessen the life of your battery or even damage it or worse still, it could "overheat" and catch on fire. When charging lithium batteries, it is recommended to keep well clear from flammable items. If I'm leaving the room, I put the charger with battery on the tiled floor. You should remain attentive. I periodically feel the battery's temperature. You should never leave your home while charging lithiums!!!
It is said that if, for example, you have an 850mAh battery then you can charge it safely at 850 milliamps (0.85 Amps) and so on. I just set 0.5 Amps for most of my batteries, to be safe. You might see written on the battery something like "5C charging" – I'm told this means you can fast charge at up to 5 times 850 milliamps (4.25 Amps) but I think extreme caution should be taken when doing this and if done regularly, once again, you are likely going to shorten your battery's lifespan.
In addition to the "5C Charging" you might also, see on the same battery , for example, "20C". This is NOT saying you can charge at 20 times the current but has to do with the ability of the battery to supply up to 20 times the stated Mah current capacity.

Wow, this has become long-winded – apologies. I really just wanted to suggest you do not store your LiFe batteries with no charge. I hope this helps somebody?