

Pro: Power Tool Batteries & Battery Memory

Last Updated: Thursday, March 28th, 2013, Created: Wednesday, November 29th, 2000

Smart chargers can prolong the life of power tool batteries. Today, the only problem with memory in power tool batteries is in our own heads. Yes, we remember when power tools had memory problems but we just don't want to remember that someone told us that power tools have no more memory. Can you remember that? The fact is that NiCad batteries do have charging/discharging characteristics that we call memory but, in today's batteries, memory is only important in sensitive electronic instruments that are affected seriously by very small variations in voltage. Power tools don't react to those small variations and keep on running far beyond what a computer or cell phone would see as a voltage problem. Yet some of us have carried over several habits from the old days when battery operated power tools first came into use, habits that can actually do damage to our battery packs. Locking off the trigger long after the tool has quit turning in an effort to "drain down the battery" moves a battery into what is called Deep Discharge, a state that actually does chemical harm to the battery. Pulling a battery out of the old fashioned chargers (which I still have several of in my shop) when it has stopped, and popping it right back in to get some "extra energy," moves a battery into what is called Overcharge, which can also do harm to the battery.

Choosing the Right Power Pack

This article was supposed to be a comparison of the batteries offered by each manufacturer. What I discovered was that although the batteries have certainly improved over the last few years, what has really been a revolution in battery-operated power tools has been the evolution of the charging mechanisms, and this is changing so fast that a comparison today would be out of date before you received the magazine. So, let's see if we can get enough of a handle on the technology to help to choose your next power tool. Today's battery chargers are actually mini-computers that are constantly testing the batteries and changing the charging strategy millisecond by millisecond to maximize the performance of the battery pack. Each manufacturer is using its own strategy, many of them holding patents on their particular technology. In reality, the NiCad batteries themselves are mostly quite similar: it is the chargers that make the real difference. I will talk about Nickel-Metal Hydride batteries in a minute.

First, batteries like room temperature. Trying to charge them when it is too cold or too hot either will not work well or will cause harm to the battery. Some chargers refuse to operate until the battery comes into the right temperature range. Moral: don't try to charge batteries in hot sunlight, nor on a frozen construction site. Batteries should not be overcharged, so most chargers today test the battery to see how much charge it needs, if any. If you stick in a full or almost full battery, the charging regime is adjusted accordingly. Battery packs are made up of individual cells, of 1.2 volts each. But not all cells are created equal. Some are stronger than others and the battery pack can be limited by the weakest cell in the pack. Most chargers give a main quick charge to all the cells, and then move into various special charging techniques to equalize out the unequal cells. This process tends to rejuvenate the battery pack as a whole. NiCad batteries lose from 1 to 3 per cent of their charge per day by just sitting around, so the final charging is often a trickle to avoid standby discharge. Of note, they lose power faster in higher temperatures, so a battery in a hot truck in the summer can lose half its power over the weekend. Now, each manufacturer deals with all of these things differently in its respective chargers, some measuring cell temperature, others measuring cell voltage, some even testing discharge. All of them are using little CPU computer chips to create their smart chargers. In fact most of the smart chargers will accept many of the batteries from the same manufacturer, eliminating the need for a different charger for each battery type. The FAST CHARGE concept is basically how rapidly they finish their initial rough charging - ranging now from one hour all the way down to Walter's 15-minute Pit-Stop. But all of them require more time than their minimum "fast charge" to really "recondition" the battery pack and all of its cells.

New Battery Option

How about the new Nickel-Metal Hydride batteries used by Makita? Yes they can pack more power into the same size package compared to the NiCad. Yes,

they have eliminated the "memory" problem, which explains their extensive use in electronic equipment. Yes, they are ecologically friendly because it is the Cadmium of the NiCad battery that is the hazardous waste. Yes, as technology improves and prices come down, most, but not all, power tool batteries will probably become NiMH types. But they are not yet for everyone. The downside? They are more expensive and they work very poorly in cold weather, losing 50 per cent of their power at -10 C. For indoor work, their only drawback is price. From a charging point of view, they are quite similar to the NiCad batteries. With these "smart chargers," it may sound like the best thing to do is to simply leave a battery on charge whenever you are not using it, popping it into the charger during breaks and overnight. No. This will tend to keep the battery in a constant "warm" state, which is not the best thing for its chemistry. What is the best way to charge a battery with the new smart chargers? Throw them on charge about 2 hours before you want to use them, no matter what their state of discharge, assuring a full charge and all the other little maintenance charges, without any worry about memory. Use a quick charge during the day whenever you need to, but let them rest at night. Always charge them before use if they have been sitting around for more than a week. Will we see battery replacement gadgets that allow us to plug our battery operated tools into a wall outlet in the near future? Probably yes, but it is not sure that this idea will be as successful as battery replacement for our walkman because it will certainly be more expensive than a second battery and not necessarily more practical, and the tool itself will have to be double insulated, increasing costs even further. With the rapid change in smart battery chargers, I wouldn't choose a tool primarily because of quick charging times unless that was a very critical part of my operation. I would choose the tool by how well it does the job I need to have done and buy an extra battery while I keep my eyes open for changes in the chargers. I would probably remain brand loyal, just to have my batteries somewhat interchangeable and be able to use a single smart charger. **Originally published as an article by Jon Eakes in Home Builder Magazine, the magazine of the Canadian Home Builder's Association.

Keywords:

Batteries, Power Tools, Tools, Maintenance