

## Zapping Ni-Cads to bring them back to life (revised 9 April 2010)

Ni-Cads are used in many battery operated tools. They have low internal resistance so can give up their power easily. They can get in a state of high internal leakage where they will not hold a charge for very long. The following process is worth trying to bring them back to life.

Rejuvenating Ni-Cad batteries is possible depending on what is wrong with it in the first place. If the cell is not chargeable due to too many recharging cycles then "no" is the answer (electrically worn out). If it received a short reverse charge (typical of single cells when a battery pack of a number of cells is discharged too much) or has formed a bridge of conducting salts between the plates and is discharging rapidly (not holding a charge for very long), then the answer can sometimes be yes.

The way this is done is to zap it with a short burst of voltage and current many times the normal charging rate. Typically, what is done is to charge a large electrolytic DC capacitor to say 40-150 volts then discharge it through a small 1.5 volt cell in the charging direction. This zap will sometimes burn out the conducting bridge that is causing the cell to not hold a charge. Sometimes it doesn't work if the bridge is too big or too spread out. This will conduct the current without breaking it up. If done properly the result is the battery will hold a charge longer than it did before zapping it.

The cell typically after one or more zaps acts like a near new cell in terms of holding a charge. Another way to zap it, is to quickly arc it across a 12 volt car battery. Be very cautious to do all this rapidly, if too much heat builds up too fast, the cell could theoretically explode before the bridge burns out. I have done both of the above approaches many times and have never had a problem, but anything is possible, so be cautious. Wear gloves and safety glasses and stand back. There are times when the bridge is not conductive enough to break the link and no change happens to the battery. I estimate about a 50% success rate.

If it is going to work with the battery at all it will arc heavy current flow at first, then each arcing attempt thereafter will show a slow current flow as the cell goes into a charging mode. Another thing to note is it works better to do it on each cell of the battery separately. If one tries it on the whole battery one may get varied results. For the full battery (made of more than one cell) there may be one shorted and the rest are OK. The good cells will limit the flow to the shorted one if one attempts this on the whole battery.