

■ ■ Why are some aircraft batteries still spinning propellers at the ripe old age of four years, while others have passed to the junk heap by their second birthday? Assuming comparable quality, the life expectancy of a battery can be directly traced to the degree of tender, loving care accorded it by pilots and mechanics.

From a manufacturer's standpoint, battery failure is not a critical problem. Gill Electric, a Teledyne Company in Redlands, Calif., takes back for adjustments less than 1% of the 24-month-guaranteed power units it produces. Of those received for adjustment, the battery itself is at fault in less than 5% of the cases. The other 95% of battery failures can be traced to mechanical negligence and abuse.

The paramount fault in battery mishandling and failure is overcharging. Faced with a virtual supermarket of new electronic instrumentation to make aviation easier, more enjoyable and safer, pilots tend to overlook their systems more today than ever before. Often in installing a new device, the pilot is not aware that he is approaching the proverbial straw.

Once such installations are completed, the usual course is to modify the voltage regulator to handle increased power requirements. Such adjustments to the regulator also increase the power fed to the battery and the end result is overcharging. Eventually an excess of power will lead to a shortened battery lifetime.

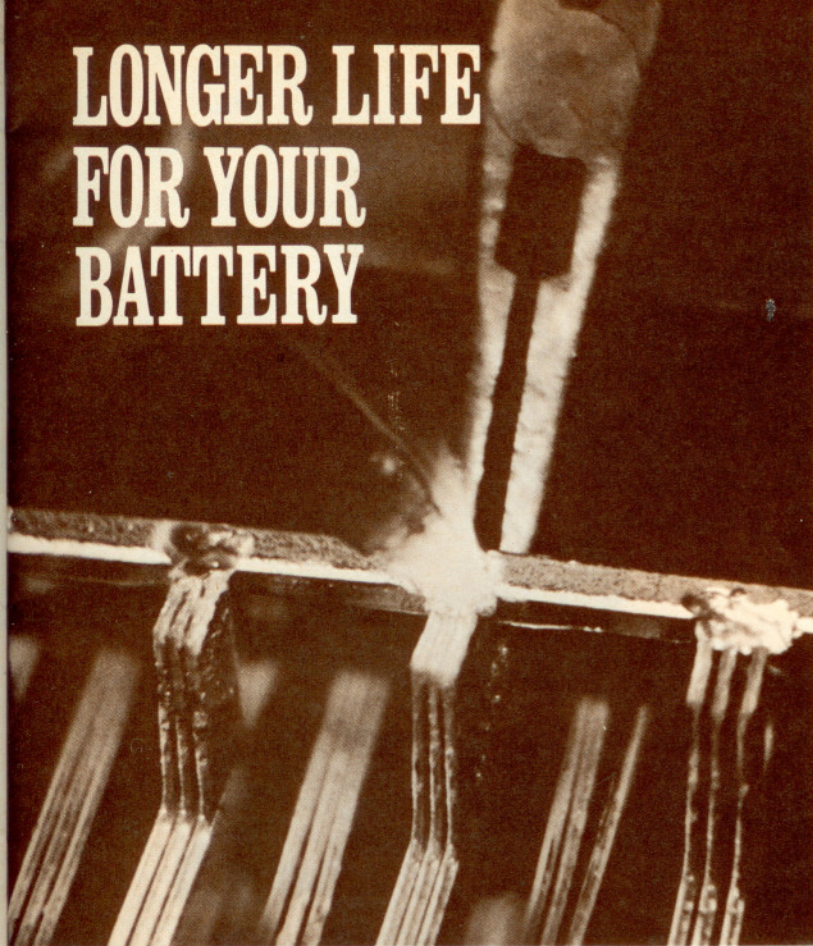
By turning to overcharging as opposed to a heavier duty battery to supply the increased demands, the pilot or mechanic causes the internal battery temperature to rise. This leads to buckling of plates, grid oxidation and shedding of active material. Even in a new, strong battery, positive plates will deteriorate and warp.

How does the average pilot know if he has an overcharging problem? Even if he is not responsible for misadjusting regulating equipment, the pilot can recognize the tell-tale signs of battery abuse. The first warning is excessive use of water. The second is melting or softening of the compound on top of the battery. Caught at this early stage, overcharging can be corrected and battery life prolonged to the average of three or four years.

A number of steps also can be taken by the pilot to increase battery longevity where overcharging is not a problem. During out-of-commission or lay-up periods, the battery should first be charged and then disconnected, with vent plugs tightly in place. During the idle period a battery will lose some of its charge and should be thoroughly recharged at intervals, even though no flights are scheduled. Preflight recharging should be to the point where specific gravity does not rise any higher over a three-hour period. From our experience, we would estimate that these simple, money-saving steps are being performed by only 5% of pilots.

Leaving the battery less than half charged for any long period will result

# LONGER LIFE FOR YOUR BATTERY



Usually when a battery goes dead prematurely, it is due to negligence and abuse. With proper care, that power supply unit might easily double its warranty life

by JOHN D. FIELDING  
and DAVID H. SIMON  
AOPA 211073

Key components of an aircraft battery are the plates, shown being welded into a battery case at Gill Electric. Officials of this manufacturing firm claim that with a little attention aircraft batteries should last up to four years. PHOTO BY LARRY LEE

in sulphated plates. This condition can also occur when electrolyte is not maintained at proper levels. But even this condition can be rectified if caught early by applying a normal rate charge followed by a 60-hour overcharge at 10% of the normal charging rate.

For the meticulous pilot, battery maintenance (or doublechecking the mechanic, if you prefer) should start with installation of a new battery. At this juncture, there are a number of power depleting or damaging conditions which frequently arise. Often batteries are stored on cement floors or in damp areas which cause them to discharge.

Dirty battery compartments will lead to self-discharge, corrosion and leakage. Cleanliness of the plane's battery compartment itself can easily be maintained with a mild soda solution and regular brushing, with care taken to wash off all residue soda.

In installing a battery, the unit should be seated evenly and firmly. Any slope will cause uneven electrolyte levels and result in acid spillage. Batteries should never be secured too tightly. This will cause warping. At the same time, care should be taken to avoid play that could lead to vibration and result in oxide being knocked off the plates.

Generator-battery cables should be examined periodically and terminal connections cleaned by light scraping. A film of vaseline should be applied to the cleaned surfaces and terminal studs. General battery dirt should be brushed off with nonmetallic bristles and vent plugs should be frequently examined to

make sure gas escape holes are clear.

Distilled or approved low-mineral content water should be used exclusively, not merely bottled water. If tap water is approved and used, it should be allowed to run for a few moments before filling. Water should never be transported or stored in any vessel except lead, glass, earthenware, rubber or wood.

In winter, water should be added just before charging if the battery is not in a heated room. If water is added and the battery is left standing in near freezing temperatures, the water will freeze just the same as if it were outside the battery. This results in cracked cells. Summer weather generally can shorten battery life if planes are stored where temperatures frequently reach 115°. The result is similar to that of leaving equipment on accidentally—itself a too common error.

Eventually batteries stored in excessively hot places will fail to hold a charge. Inability to maintain a charge could also be the result of frequent discharges. This is due to excessive use of the starter and other electrical equipment while on the ground and compensating by recharging in the air.

Individual incidents of battery negligence may result in only a few months' worth of cell deterioration. But combined with one or two common battery negligence factors, the result is often a substantially early battery death. And it seems as if that dead battery always happens on the first day of vacation or that most important business trip.

Actually, every pilot should monitor

the life of his plane's battery regularly as it approaches the end of the warranty period. Ordering a standard hydrometer reading to check the specific gravity of the electrolyte should be a regular part of normal servicing routines. Such readings, however, should never be taken immediately after adding water. Allow a day or two for the water to mix with the electrolyte and thus avoid a false reading.

Does all this seem like a lot of trouble for a moderately priced piece of equipment? It's not!

Most of the steps involved in battery precautionary maintenance will be performed gratis, if you ask the mechanic. And it is certainly worth the trouble to avoid having to put in a new battery on that first day of spring vacation. □

## THE AUTHORS

John D. Fielding and David H. Simon both are employed by Gill Electric and both have wide backgrounds in the aviation and electronics industries. Fielding is general manager of Gill Electric. He received his flight training more than 35 years ago, but now lets his son, John, Jr., handle the controls of the family *Bel-lanca*. Simon is director of public relations and advertising for Gill Electric, and holder of a commercial pilot certificate with instrument rating.