

## Powerplants

Proper tools and techniques are essential. Never install a spark plug that has been dropped; always throw it away immediately. It is virtually a given that such a plug has been damaged, most probably in the porcelain, and it will be unlikely that the damage is visible.

Installation absolutely requires a torque wrench. Overtorquing will not improve the connection and may damage both the plug and the bushing. A loose plug will not transfer heat properly and may cause preignition when it overheats. Cleaning plugs requires a special tool, so you may just want to have them cleaned and gapped by a mechanic. However, Appendix A to FAR Part 43—Major Alterations, Major Repairs, and Preventive Maintenance—does allow for the owner or operator of an aircraft to replace or clean spark plugs and set spark plug gap clearance. If you opt to acquire the necessary tools to remove and service your spark plugs, here are a few tips.

When removing the plugs, put them in a tray or other device to assure you will know which plug came from the top or bottom position of which cylinder. Trays designed for the purpose are available, but an egg carton is just as effective if you label the indentations. The threads of the spark plug should also be cleaned before replacing it. Dirty threads cause poor contact between plug, gasket, and engine seat, which reduces heat transfer, causes excessive plug temperature, and increases the chance of seizing the plug.

Many mechanics apply an antiseize compound to the threads to make removal easier next time. That's fine, but never use a graphite-based compound; it acts as an electrical conductor. Instead, use only an authorized antiseize compound, antirust compound, or plain engine oil. When applying, start at least two threads away from the electrodes; otherwise it may run off and short the plug.

Conductive wiring carries electrical current between the magneto and the individual spark plugs and is protected by an insulated sheath known as *shielding*. Designed to protect the wiring from heat, atmospheric conditions, and vibration, the wiring harness also must suppress electrical interference with radio communication and navigation equipment. It is a good idea to periodically check the harness for deterioration from heat and age and the general cleanliness of terminal contact springs and moisture seals, which prevent flashover. If you are doing your own plug cleaning and gapping, don't forget to spruce up the ceramic terminal connector sleeves of the wiring harness with acetone, alcohol, or naphtha. Be very careful when handling either the ceramic or springs with your bare hand, as normal body oils left behind can act as electrical conductors and cause misfiring and flashover.

Once the engine is started, do a thorough cockpit magneto check, including the ground check. Many pilots prefer doing the ground check as the last item before engine shutdown. The plugs and harness, where visible, should be checked for general security. In addition, the harness also should be inspected for signs of aging, cracking, and chafing against the cowling. When possible, check connections for tightness.

If there was ever an aircraft system that deserved to be given top preflight priority, the ignition system is it. All the fancy equipment, retractable gear, and avionics in the world won't be very helpful if the engine stops running in flight.