

Maintaining Modern Outboards

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If you've recently bought an outboard motor, for about the same price as a new car, you probably want it to last.

The good news is that the modern engineering going into outboard motors assures that with care they can last many years, if not the rest of your life.

The bad news is that the modern engineering going into outboard motors makes them more complex and in some ways more delicate, and it is more important than ever that they get the basic maintenance they require.

The universe of outboard motors that commercial fishermen use breaks down into two basic groups: the carbureted two-strokes—mainly smaller engines used as kickers on skiffs and dinghies; and most of the larger engines using either direct-injection two-stroke or four-stroke technology. With output ratings of as much as 250 hp, these are big, heavy, sophisticated and expensive pieces of machinery. The maintenance strategies for the two classes of engines differ slightly.

Kickers

Kickers are about as simple as propulsion units can be, and routine maintenance on them is equally simple. With little more than the plastic pouch of tools provided with the motor you can keep a kicker healthy for a long time. Give them clean fuel with the right oil mixture, make sure the water pump impeller is in good shape and the cooling intakes not blocked, change the lower unit oil annually, and don't hit anything with the lower unit. Your kicker will provide good service for many years. It is rare that a well-cared-for kicker actually wears out. Here are some thoughts on kicker maintenance.

Fuel System

- Install a water-separator primary filter in line between the tank and the engine. Check it periodically for water accumulation, and change the filter canister if it shows signs of collecting rust or dirt.
- Dispose of water and gunk in portable fuel tanks before the season.

Plastic tanks are easier to keep clean. During the winter shake your fuel tanks; if you hear clunking it's ice that will turn to water before the next season. Check the tank vent to ensure that it allows free passage of air when opened.

- Check hose connectors for corrosion or dirt, examine hoses for cracks or abrasion, and squeeze the primer bulb for softness or indication that internal check valves are not working. Always carry a spare primer bulb and connector clamps.
- Use only clean TC-W III oil, either correctly mixed with gas in the fuel tanks to the motor maker's specs or added to the motor's oil reservoir.
- Check carburetors for leaks and ensure that all screws are properly adjusted. A loose screw that finds its way into the carburetor throat can jam or break the reed valves and wreck the engine.
- Each engine has a little in-line "trash filter" before the carburetors to screen debris from the fuel. These are removable and user-cleanable, and should be checked occasionally. However, if you are using a good primary filter, you won't find anything there but clean fuel.

Cooling System

- Check the telltale stream for signs of cooling pump failure or weakness. If the stream is weak or nonexistent, first run a piece of wire up the hose to dislodge any sand or debris that may have clogged it. If there still isn't a strong, steady stream, replace the water pump impeller. Opinions vary on regular impeller replacement; some mechanics say every two years and sooner if operating in silty water. Other say that unless you're chewing up the bottom with your lower unit



Larger outboards require a different approach than small kickers.

your impeller will last many years and there's no point in replacing it until it starts to fail. (If you install a water pressure gauge you'll know if pump output is getting weaker.) I tend to favor the latter approach, as I've had motors go more than ten years with no water pump problems whatsoever.

- When removing the motor from use for any length of time, flush the cooling system with freshwater, using the "earmuff" type collar or a direct hose connection if your unit is made for it. The purpose is to flush out not only salt deposits, but also sand and debris. To be effective you have to run the motor for ten minutes or so, allowing the engine to warm up enough that the thermostat opens. Otherwise, you won't flush the critical cooling passages in the block.

Ignition System

- Check plugs occasionally. Electrodes do wear down with use, but more commonly they foul due to incorrect gap, incorrect oil mixture, or malfunctioning thermostat. Plug condition can tell you a lot about the overall health of your engine. Clean electrodes with a wire brush and gap them before reinstalling. With modern electronic ignition they don't have to be replaced often, but they're so cheap and easy to replace that you might as well keep some spares and replace them if they look bad. If you replace one plug in a motor, replace them all.
- Check plug wires and caps. Cracked plug wire insulation can short out, and caps that have damp or corroded connectors or that don't fit snugly can create resistance and could prevent the plugs from firing.

Lower Unit

- Change the lower unit oil at the end of each operating season, and more frequently if it comes out dirty, laced with metal filings, or smelling burnt. If it is milky, you have a leak in a housing or shaft seal that must be repaired before further use.
- While down there, check the prop for dings and the prop shaft for any looseness or wobble. Remove the

prop and coat the shaft splines with a small amount of grease before re-installing the prop so that it doesn't corrode itself to the shaft. Inspect the housing for cracks or gouges and ensure that the skeg is intact and still protrudes below the arc of the prop blade tips.

Four-Stroke and Fuel-Injected Engines

Manufacturers have employed a number of different technologies to obtain better fuel economy and lower emissions. Carbureted four-strokes, electronic fuel-injected four-strokes, single point fuel-injected two-strokes, and low pressure direct injection and high pressure direct injection two-strokes all find their way onto boats used in the fisheries. Most of them are not designed for owner maintenance of the fuel induction/injection systems and unless you're a factory-trained technician it's best to leave working on them to someone who is.

The one exception is adjusting the valves on four-strokes. Although the procedure varies by make, all the four-strokes have valves that can be owner-adjusted. Owner manuals prescribe valve adjustment intervals, although after the initial break-in period, it's doubtful that most owners do valve adjustments according to those schedules. If the motor is running rough, valve adjustment is a good place to look for the problem; otherwise "if it ain't broke, don't fix it" seems to be a pretty workable approach for most four-stroke outboards.

Four-strokes have one or more camshafts that actuate valves and which may be driven by belts. These rarely need replacement or adjustment, but if you decide to get into it you'll need a timing light and detailed instructions.

Compared to the relatively forgiving carburetors, fuel injection systems are more particular about fuel cleanliness and quality. In critical applications or remote operations it would be reasonable to employ a dual filter manifold with selector valve (like all diesel engines should have), and on a twin outboard setup each engine should have its own primary filter.

The bigger and more complex engines are likely to have additional systems like alternators, compressors, sensors and electronic monitoring systems, alarms, and slow-down features that kick in if an overheat or under-lube situation is detected. Check drive belts for cracking and glazing, and replace if wear or damage appears.

Aside from the belts, these are systems most owners won't try to repair themselves.

Aside from these special considerations, the more sophisticated engines require the same basic maintenance listed above under "Kickers" and in the general tips listed below.

Note: All maintenance on motors used seasonally should be done at the end of the season, not at the start. This habit will prevent much of the deterioration caused by winter storage.

General Outboard Motor Maintenance Tips

- Changing lower unit oil can be a messy job. Start by putting a pan under the skeg to catch leaking oil. Forget the plastic squeeze tubes of gear oil; use plastic bottle with a pump and hose with threaded fitting for the oil filler (lower) hole. Be aware that the pumps are made with at least two sizes of threaded fitting so be sure to get the one that fits your unit. A pump makes the refilling process much cleaner. (Of course you already know that you drain and fill through the lower hole; the upper hole is a vent for the draining and filling process and the point to check to ensure that the gear case is full.)
- Consult your manual for the location of all zerk fittings and grease with a marine grade grease. Some may be impossible to reach without a flexible hose on the grease gun. Also, grease steering tubes, hood latches, throttle and shift rods on the engine, and other points where there is metal-to-metal contact.
- Consult your manual also for location of zinc anodes; check and replace if half deteriorated. They may be located on the lower unit, on the mounting bracket, and as zinc plugs in the water jacket.
- Check the power tilt/trim system for signs of corrosion or of leaking hydraulic oil.
- Gouged metal and scratched paint can be sanded or wire brushed clean and painted with an aluminum primer and then with enamel finish coat.
- The motor's exterior and under the hood should be washed clean of dirt and salt occasionally, wiped down

and allowed to dry thoroughly. Lightly coat everything under the hood with a corrosion-preventive spray.

- Never run the motor without cooling water, even for a few seconds. The powerhead won't overheat, but the impeller can self-destruct from the heat of friction if not lubricated by water in its housing.
- It's a good idea to maintain an engine operating and maintenance log, in which you keep track of operating hours, fuel consumption, maintenance, and repairs.

Winterizing

It doesn't hurt to leave a motor attached to the boat, even stored outside in sub-zero temperatures, if the powerhead is covered by a fabric hood to keep swirling snow and dust from getting inside. Don't use a waterproof material as it will cause condensation. The motor should rest in the upright position so that all water drains. A motor removed from the boat can be laid on its back or side once all the water is out, but never move it in such a way that the lower unit is higher than the powerhead, or remnant cooling water may drain into the cylinders.

Two-strokes should be "fogged" by shooting fogging oil into the carburetor of an idling engine until it dies. Four strokes can be preserved for storage by shooting some light oil into the spark plug holes while slowly turning over the engine.

Disconnect fuel lines and drain any remaining gas from carburetors. Coil and store hoses out of direct sunlight and where rodents can't chew on them.

Store fuel tanks where escaping vapors won't collect and cause a potentially explosive condition.

Fuels

A great deal of ink has gone into articles about outboard gasoline, what to do with it, and what to put (or not put) into it. Among the claims repeated in the boating press are the following. The only problem is that none of the authors of these articles provides a shred of evidence that any of these measures is necessary or even helpful.

- "Drain and discard all your gas at the end of the season because it would ruin your motor if you were to use it the next season."

- "Fill up your tanks and add gas stabilizer; otherwise the old gas will gum up your carburetors."
- "Fill up with high octane gas at the end of the season and add an octane booster at the start of the next because gas loses its octane in storage and will ruin your engine."
- "Add two-cycle oil and methyl hydrate to your gas before storing it (for both two- and four-cycle engines) to absorb moisture and prevent condensation in the engine."
- "Use any of the many "mechanic-in-a-bottle" fuel additives to clean, repair and generally reinvigorate your engine."

I've run outboards many years on the previous season's leftover gas and never had any of the dire consequences these authors assure us will result from "stale" gas. Maybe the new electronic fuel injection engines are more sensitive to gas quality, but I haven't seen the evidence yet. The only thing on the subject that can be said with any certainty is that a fuel tank left empty in a cold, damp climate will generate some condensation and the resulting water will have to be filtered out before it reaches the induction/injection system.

If you believe in fuel stabilizers/additives, by all means use them. If you have field experience that supports the claims of these authorities, get in touch with me and let me know what you have learned. I'll pass it on to others. Otherwise, just use good filters and don't worry about it. ♦