

Marine Engine Maintenance Basics

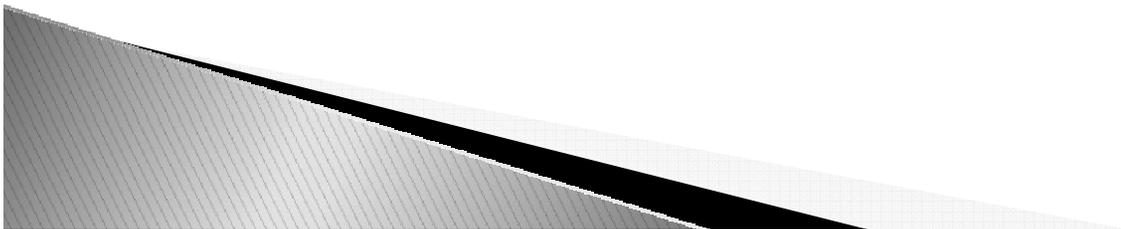


Oscar M. Estevez

2009

Overview

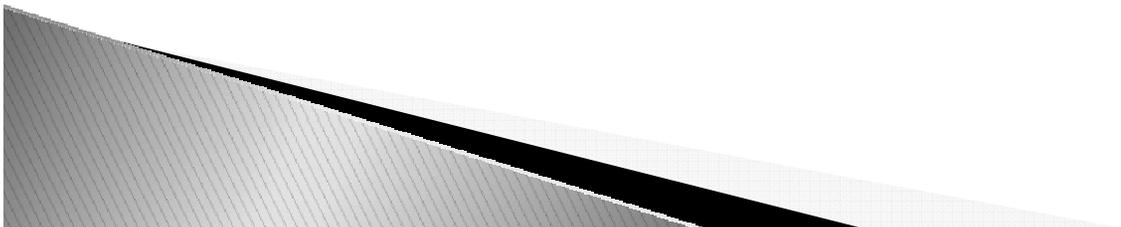
- ▶ Routine Maintenance
 - ▶ Winter lay-up



Routine Maintenance

Check the condition of your boat's engine and systems during the boating season

- ▶ Cooling system
- ▶ Engine Oil
- ▶ Transmission oil level
- ▶ Fuel System
- ▶ Charging System
- ▶ Engine alignment
- ▶ Corrosion



Cooling system

- ▶ **Hoses**
 - evidence of cracks, leaks, deterioration

- ▶ **Raw water pumps**
 - rubber impeller (replaceable)
 - check condition of impeller
 - check for front seal leaks

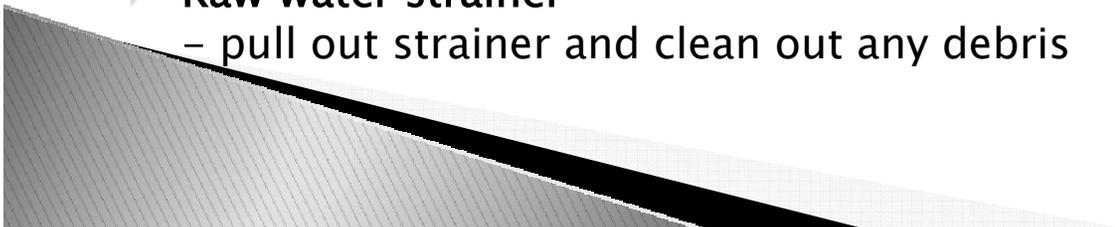
- ▶ **Fresh water pump**
 - metal impeller (not replaceable)
 - check for front seal leak
 - check for wear

- ▶ **Heat exchangers**
 - make sure zincs are new each season
 - check for leaks at end caps
 - common cause of engine overheating due to dirt or corrosion

- ▶ **Raw water strainer**
 - pull out strainer and clean out any debris



Raw water strainer



Engine Oil

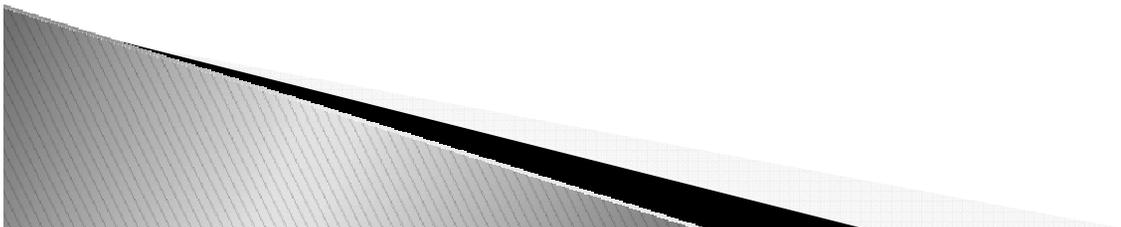
Change engine oil every 100 hours or whatever is recommended by your engine's manufacturer

- ▶ Check level



- ▶ Color of oil

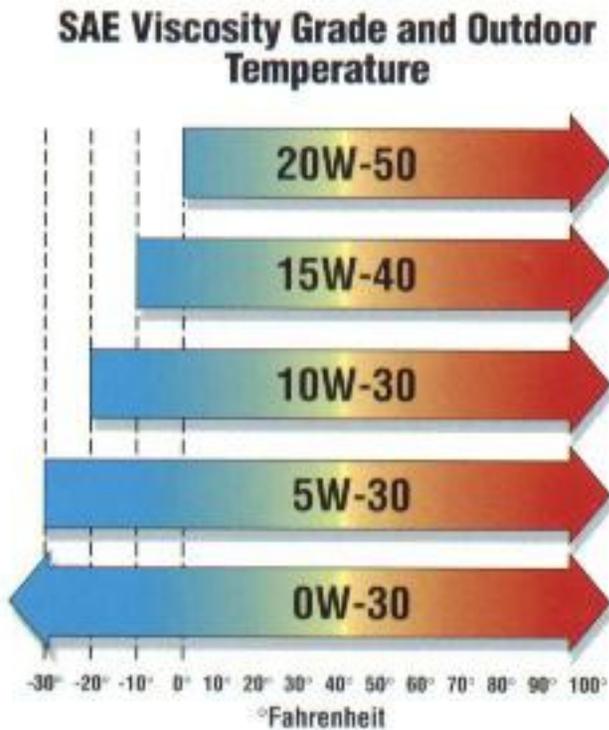
 - black smelly oil needs to be changed



- ▶ Oil filters must be changed with each oil change.
- ▶ Use oil filter recommended by engine manufacturer only
- ▶ When installing oil filter make sure to spread oil around the seal before installing
- ▶ Turn filter until it touches against housing then one-half turn to tighten.
 - *New Yanmar oil filters have an O-ring seal and need to be tightened more .*



Oil Types



- Most marine diesel engines will use either 15W-40 or 20W-50
- Most marine gasoline engines will use SAE 30

Transmission

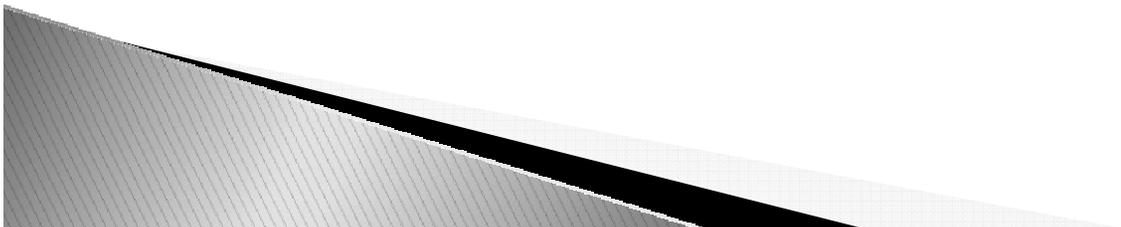
- ▶ Check oil level

- ▶ Top off with oil

–on ZF and Velvet Drive transmissions use automatic transmission oil

- ▶ Check for front and rear seal leaks

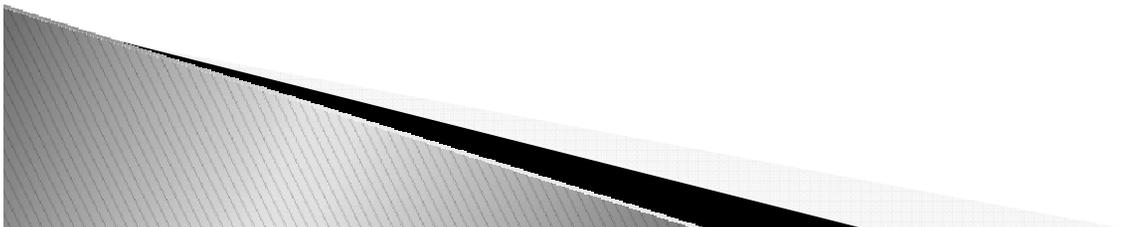
– Check with your manufacturer's service manual for recommended oil type.



Fuel System

Diesel:

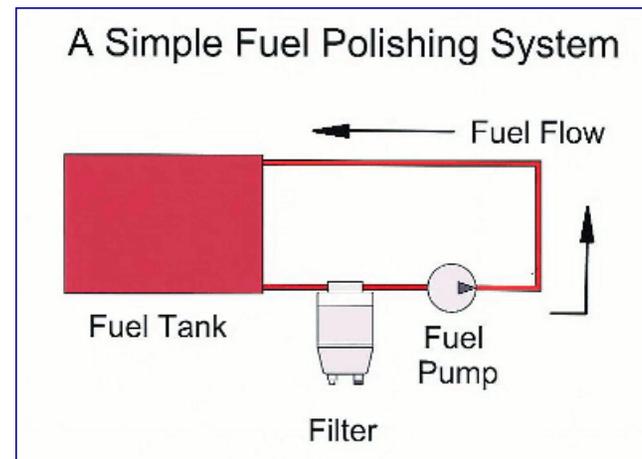
- ▶ Replace primary and secondary fuel filters about every 100 hours
- ▶ Primary filter located before transfer pump
 - remove water and contamination to protect transfer pump.
 - Usually a 10~50 micron filter
- ▶ Secondary filter located between primary filter and fuel injector system, often after transfer pump
 - Usually a 2~10 micron filter



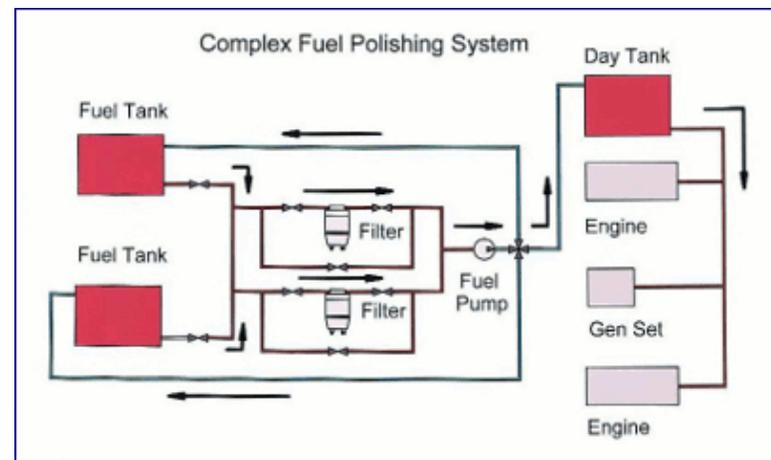
Fuel Polishing

Method of many filtration cycles to remove contaminants.

Fuel-polishing systems can be relatively straightforward



or even pretty detailed

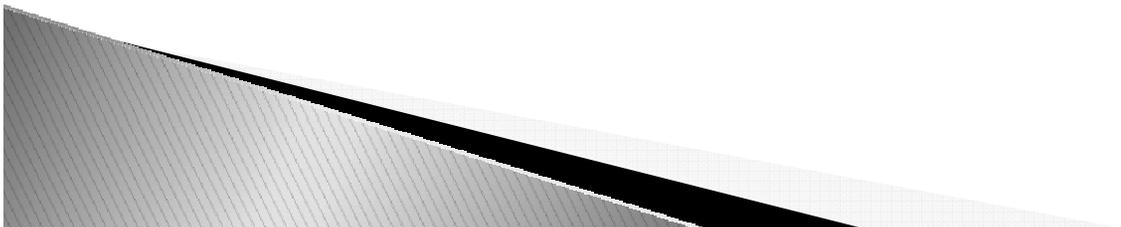




Before and after fuel polishing

ALGAE-X[®]
Fuel Conditioning

Use Algae-X in fuel to protect against fuel contaminants

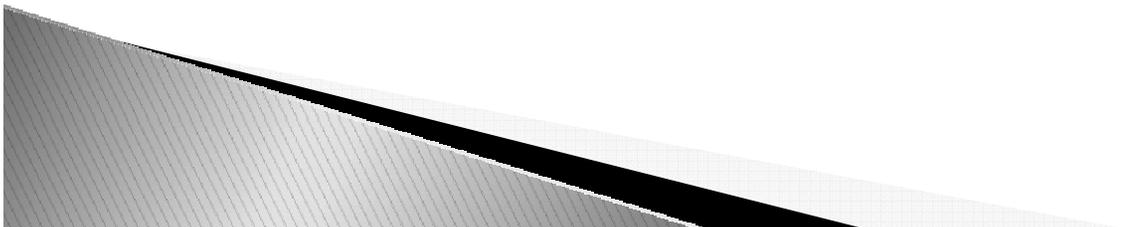


Should I use diesel fuel additives ?

Additives can reduce algae growth and remove water from fuel in the tank.

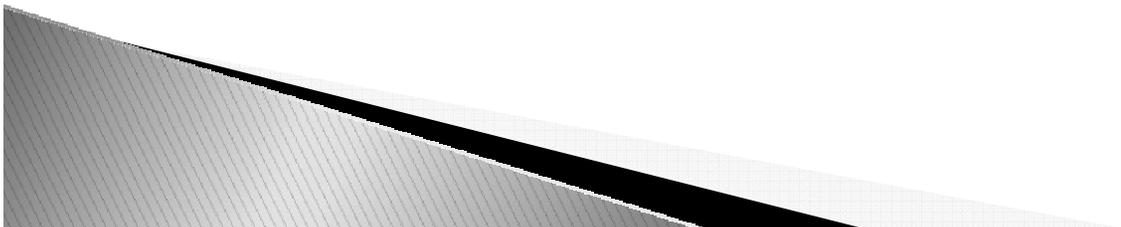
Alcohol based additives may degrade fuel/water separator.

Follow manufacturer's recommendation for additive use.



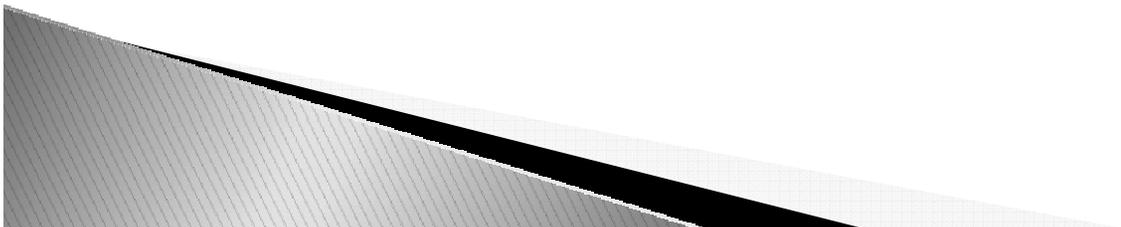
Charging System

- ▶ **Batteries:**
 - Have battery load tested by a professional
 - Clean corrosion from terminals and apply grease to inhibit corrosion
 - Check for bulging or leaking
- ▶ **Alternator:**
 - Check belts are tight and in good shape



Engine Alignment

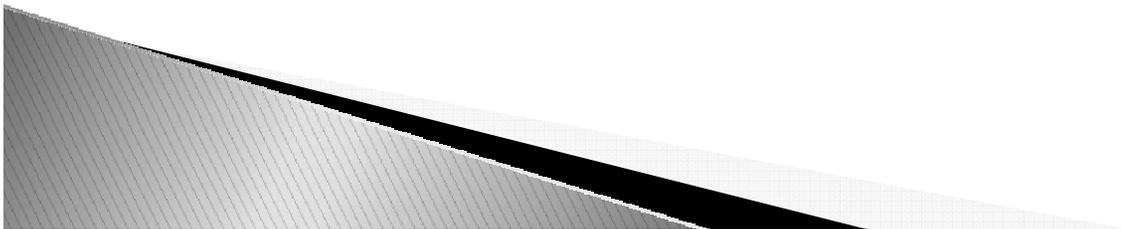
- ▶ Inspect engine to determine alignment of shaft
 - rotate shaft by hand
 - shaft should spin freely with no ‘hard spots’
 - ‘hard spots’ or any resistance could indicate that the engine is out of alignment
- ▶ Packing gland
 - non-dripless systems should drip every 30 seconds
 - dripless systems should be dry
 - ~if not dry then engine could be misaligned or coupler is not adjusted correctly*
- ▶ Cutlass Bearing
 - check for side-side, up-down play by hand



Corrosion

Common places to check for corrosion:

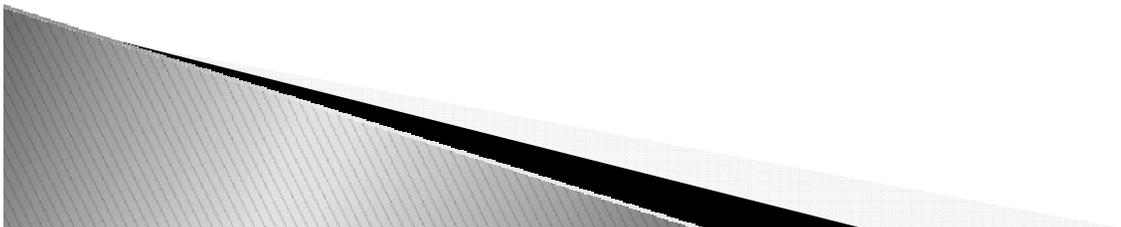
- ▶ Engine exhaust manifold
- ▶ Motor mounts
- ▶ Electrical connections
- ▶ Heat exchanger area
- ▶ Engine control linkage
- ▶ Replace zincs every season



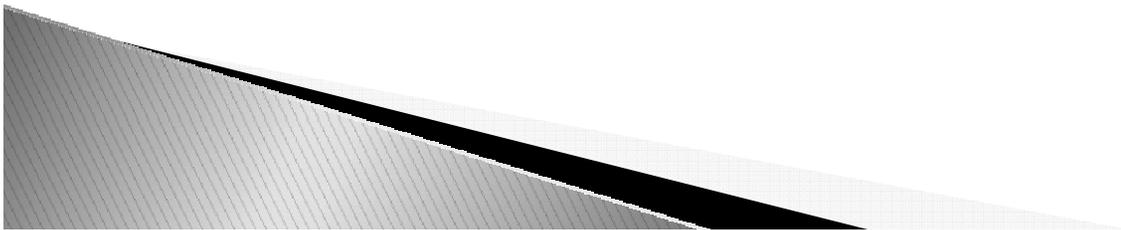
Winter Lay-Up

Protect engine during freezing weather . Your boat should be turn-key ready for spring.

- ▶ Top off fuel
- ▶ Warm up engine to operating temp
- ▶ Remove oil and change filters
- ▶ Replace oil
- ▶ Start up engine to check for leaks
- ▶ Replace fuel filters
- ▶ Bleed fuel system
- ▶ Disconnect and drain water strainer
- ▶ Run antifreeze through engine
- ▶ Reconnect hose to water strainer
- ▶ Disconnect batteries
- ▶ Spray engine down with T9 oil to prevent surface condensation
- ▶ Change transmission oil
- ▶ Replace zincs
- ▶ Check alternator belt condition



Questions ?



Maritime Workshop

Wood . Steel . Fiberglass
Boat Restoration & Repair

Oscar M. Estevez
7878 Quaker Neck Road
Bozeman, MD 21612

410.745.2566 *home*
410.725.0516 *cell*

