KEVO'S BOATING TIPS

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Carbon Monoxide (CO) Detectors

In recent years there has been an increase in accidental deaths on the water due to carbon monoxide (CO) poisoning. One reason for this is the phenomenon known as "teak surfing." Teak surfing is holding on to the swim platform of a ski boat (hence the word "teak") and catching the wave it produces at relatively slow speeds. Surfers hold on to the outside edge of the platform until they can actually body surf the wake of the vessel without holding on. Having body surfed for most of my life, I can tell you with confidence that teak surfing cannot be done while wearing a personal flotation devise (PDF).

There are two (obvious) dangers to this activity. First, the prop can seriously injure (or kill) the surfer, which is just a few feet away at best. Second, inhaling the fumes produced by the exhaust can poison the surfer to the point where he or she loses consciousness and drowns. Teak surfing is illegal in California and just plain stupid (in my opinion.)

What is carbon monoxide and why is it so dangerous?

Carbon monoxide is a colorless, odorless gas. It is a common by-product of incomplete combustion when fossil fuels like oil, gas, diesel, kerosene, charcoal, propane or natural gas are burned. According to the Journal of American Medical Association, carbon monoxide poisoning is the leading cause of accidental poisoning deaths in America.

Each carbon monoxide molecule is composed of a single carbon atom and a single oxygen atom. When carbon monoxide is inhaled, it passes from the lungs into the hemoglobin molecules of the red blood cells. Carbon monoxide binds to hemoglobin at the same site as, and preferentially to, oxygen, which interferes with the oxygen transport and gas exchange abilities of red blood cells. Carbon monoxide binds to hemoglobin 250 times better than oxygen. The result is that the body becomes oxygen starved, which can result in tissue damage and death. Low levels of carbon monoxide poisoning cause symptoms similar to those of a cold or flu, including shortness of breath during mild exertion, mild headaches and nausea. Higher levels of poisoning lead to dizziness, mental confusion, severe headaches, nausea and fainting during mild exertion. Ultimately, carbon monoxide poisoning can result in unconsciousness, permanent brain damage and death.

Who is at risk of carbon monoxide poisoning?

Everyone: Because everyone needs oxygen to survive. Medical experts believe some people may be more vulnerable to poisoning, such as unborn babies, infants, children, seniors and people with heart and health problems.

What kinds of carbon monoxide detectors are on the market and how do they work?

There are three common technologies for carbon monoxide detectors:

1. Chem-Optical (Gel Cell) Technology: Chem-optical technology detectors are also known as gel cell or biomimetic technology alarms. These alarms utilize a type of sensor that simulates hemoglobin in the blood.

2. Electro-Chemical: Electro-chemical technology detectors are usually battery powered. This type of sensor usually has a lifetime of two to five years. Some manufacturer's models will require the battery and/or sensor to be changed periodically by installing an expensive replacement. Other models have sealed housing that requires the entire unit be discarded once the power supply is depleted.

3. Semiconductor Technology: A variety of carbon monoxide detectors utilize semiconductor or tin dioxide technology available on the market today. Unlike detectors that utilize chem-optical or electro-chemical technology, semiconductor detectors do not require expensive replacement sensors. Semiconductor sensors sample the air every one to three minutes. When a unit detects a certain pre-programmed level of CO, the detector's microprocessor

stores this information and measures it against time. If the CO level is low or is present only for a short time, the alarm will ignore it and burn the sensor clean (so the sensor doesn't accumulate CO and cause nuisance alarms). However, if the CO level is high or if a low CO level remains for a preprogrammed period of time, the detector will sound an alarm. This programming effectively minimizes the occurrence of nuisance alarms. These detectors are usually hard wired to the vessel's DC power system.

Where should I mount a CO detector in my vessel?

All of the CO detectors I've seen on new vessels installed at the factory are mounted near (or in) the sleeping quarters on a wall about 4 feet from the floor. There are two reasons for this: First, you want the detector to be near where you are breathing the air while you are sleeping so it detects what you are breathing. Second, you want the sound of the alarm to be easily distinguished from a smoke alarm detector, which is usually mounted on a ceiling or higher on a wall.

Which detector power source is best for marine application?

Following are three ways to power a CO detector:

1. Plug in: This method requires AC power at all times to work. This would require shore power, a generator or an inverter to function. (Not appropriate for marine use.)

2. Battery powered: These units offer easy installation and the convenience of locating it anywhere you want. Like a smoke detector, the batteries need to be changed every year. These come with a low-battery indicator.

3. Hard wired: These detectors are powered by wiring the unit directly into the vessel's DC power supply. A qualified marine electronics technician should install them.

Detectors hard wired to DC power are the best choice for marine use. However, this can be an expensive and difficult installation. Nine-volt, battery-powered detectors are a good solution if adding additional detectors or if your vessel did not come with a hard-wired unit from the factory.

What is the difference between a household CO detector and a marine CO detector?

Household detectors are either plug in or battery powered. The only difference I could find between marine CO detectors and household detectors is that the marine ones have a special protective coating on both sides of the circuit board in order to remain reliable in the harsh marine environment. While household detectors are OK for marine use, I recommend getting one made specifically for marine use. They may cost a little more but will give you the peace of mind that they will remain reliable in a marine environment.

As always, feedback is appreciated. You can call me at 925/890-8428 or e-mail me at kevo@yachtsmanmagazine.com. Be safe & happy boating.