

MAREP REPORT

Carbon Monoxide

021121

This time I want to discuss a safety issue which isn't "weather," but deals with pressures and airflows in a rather similar way to how they work in the weather world. It has to do with the way we configure our craft for winter boating, and the problems with the "silent killer" carbon monoxide (CO) on our typical "sunbridge" type vessels.

CO is less of a problem in midsummer with all the windows open and all the canvas off – but it can be a real problem in winter when we are more concerned with keeping warm and dry. Unfortunately, even at the best of times many of our modern planing craft are terrible for CO. Just check how many transom-mounted national flags are flying backwards! You just know that fumes are coming forward, given the aerodynamic backdraft created by the hull and superstructure shape. In effect you have a mini low pressure area at the transom.

Aircraft, racing cars, and even the design of the average boulevard scratcher are configured to overcome this problem. It is drag after all. Genmar and US Marine are not there yet, as resolution lies in changes to the shape of the superstructure or a relocation of the exhausts, so we need to pay attention to interim fixes.

Although vessel manuals and other sources warn about CO in the cabin forward when underway, Gay and I have had a couple of bad experiences with CO in the con and aft cockpit area of Ceol Mara. Accordingly, we developed a configuration for the canopies and ventilation which meets the "warm and dry" criteria and also fights CO. However, we have not been convinced that we had the complete answer yet, and we have had passengers who have complained about headaches – so on a fine still day in late November and armed with a trusty CO monitoring device, we tried a few experiments for several hours up and down Indian Arm.

Other boats may differ, but for the aft cockpit and con area for our 32', twin engine, I/O, sunbridge with full canopy aft vessel, we found as follows:

1. Within two minutes of engine start in the slip (no wind), internal CO levels spiked right off the scale (greater than 1,000 ppm). This initial CO "soak" took 15 minutes to dissipate once we were underway. Add to that the time to warm engines, etc., means that we (and you) get hammered immediately with a large dose of CO, which you may not lose for the entire day, and may send you downhill from there.

LESSON: KEEP FANS RUNNING AND ALL WINDOWS OPEN TO VENTILATE THE COCKPIT AREA AT THE DOCK AND WHILE SLOW RUNNING AND CLEARING THE MARINA. Ideally keep your respective heads outside!

2. With only the centre windshield glass open, the con area side lights open, and with either or both the entire aft canopy glass and/or the quarter canopy glass off (such as for warmth and rain protection for the con but the rest open), the CO levels reached very high levels within two minutes, regardless of speed (we tried displacement at 7-8 knots and planing from 21 to 30 knots).

LESSON: IF YOU REMOVE THE AFT GLASS, REMOVE ALL BRIDGE GLASS AS WELL, SO TO OBTAIN SUFFICIENT AIR BLAST TO COUNTERACT THE BACKDRAFT. You will freeze your winter ass off as well!

3. With all aft and quarter canopy glass closed and tight, and all forward facing glass and lights closed (such as one would do for maximum warmth and rain protection), CO rose instantly to prohibitive levels, whether running displacement or planing at various speeds.

LESSON: DON'T DO THIS AT ANY TIME! YOU WILL PASS OUT VERY QUICKLY.

4. With all the aft and quarter canopy glass, panels, and transom door sealed, con area side windows open, and centre windshield glass open, CO levels dropped to and were maintained at "0", whether at displacement or various planing speeds. **However, watch the apparent wind. As soon as we reduced speed to be the same as the wind over the stern (7 knots) the CO levels spiked.**

CONCLUSION: THIS IS THE "FIX" WE HAD BEEN USING, AND IT WORKS. KEEP THE AIR PRESSURE IN THE REAR COCKPIT AREA HIGHER THAN THE LOW PRESSURE AIR OUTSIDE THE TRANSOM BY USING DYNAMIC AIR PRESSURE FROM THE FRONT-FACING OPEN LIGHTS, ACTING AGAINST THE SEALED AIR DAM OF THE CANOPY.

We are now installing an external CO sensor in the aft cockpit, and two rear-pointing fans to draw air through the open con area windows to ensure this high pressure area is maintained at slow speeds and/or with a following wind. The fans will also be on prior to engine start, hopefully to minimize the entry of fumes at the start of the day.

You don't want to mess with CO. It kills thousands every year.

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