

Is Propane a Proper Fuel for Cooking Afloat?

Part II, by Nick Nicholson

Last month, we covered the selection and installation of a propane stove. In this issue, we'll conclude with an examination of the requirements for a safe propane storage and delivery system.

Installing Fuel Tanks

Installing the fuel tank or tanks can be the hardest part of a propane stove installation. ABYC Standard A-1 covers the recommended installation of tanks, and may be hard to comply with if the storage of propane tanks wasn't designed into your boat.

Propane tanks must be stored in a locker used solely for that purpose. It can't be used for spare lines or fenders. The locker must be isolated from any interior space in the boat. In other words, you can't just partition off part of the existing cockpit locker which is entered through one large lid. You could modify an existing locker and lid, however, so that the propane locker lid remains closed when you get into the regular cockpit locker.

Another possibility is to construct a deck-mounted box of wood or fiberglass, but on a small boat, the windage and bulk of such a box may be disproportionately great. Still another possibility is to build a box at the after or forward end of the cockpit, where it functions as a seat or a bridgedeck.

The advantage of a deck-mounted box is that no scuppers through the hull are required. A locker that is part of the cockpit must have an overboard drain. Draining into the cockpit is not acceptable, according to ABYC standards, although we think that with some types of cockpit construction the intent of the standard could be met.

Don't buy any propane bottles until you figure out where you're going to put them. The dimensions of bottles vary significantly with

both the capacity and material of the bottle. Go to the local propane supplier to get bottle dimensions, then figure out what will fit aboard your boat.

You can buy either steel or aluminum bottles. Aluminum bottles are lighter and more corrosion resistant. They also cost two to three times as much as steel, and are slightly larger for the same capacity. Steel bottles are cheap, but you fight a constant battle with rust. If you buy steel bottles, paint them before you place them aboard, even though they're already painted, and touch up the paint whenever it needs it. Remember that the bottles are going to get rolled around whenever they are filled, so it's unrealistic to expect the paint to last.

Whatever material you select, mounting the bottles in the locker deserves some thought. They should be firmly held in place, either by chocks or rubber wedges. Allowing steel bottles to rub against each other in a locker not only will wear out paint, but could generate a spark leading to an explosion if there is a leak in the locker. Besides, the sound of the bottles clanking around inside a locker can drive you crazy.

If you have room for a locker that will hold two bottles, do it. It's frustrating to run out of fuel in the middle of a meal without having a new cylinder.

If there isn't room for two large gas bottles, a pair of rather ingenious adaptors, called *Bird-in-the-Hand* and *Ace-in-the-Hole*, are available. They allow a one-pound (14-ounce) disposable propane bottle to be plugged into the regular propane delivery system in case you run out of fuel. Since a disposable cylinder provides a little over two hours of burner time, it could really save your bacon. The *Bird-in-the-Hand* incorporates a shut-off valve like

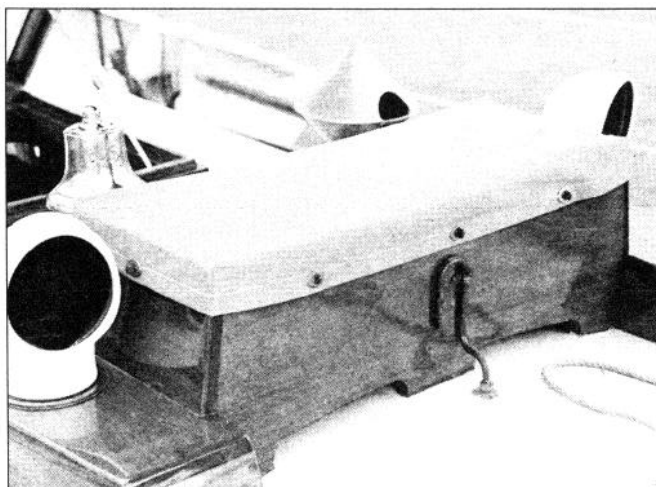
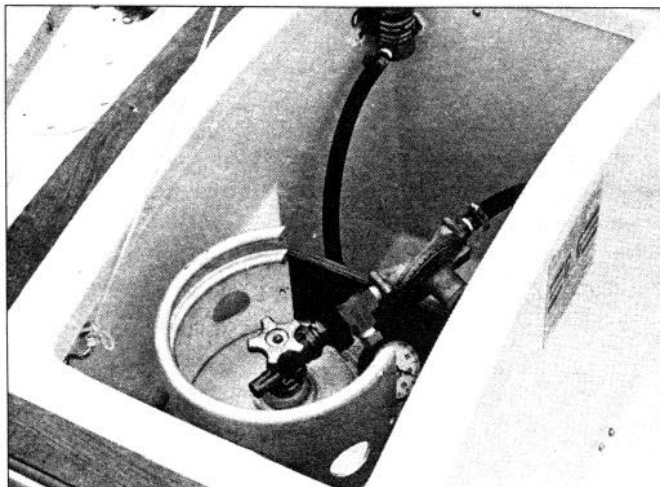
the one on top of a regular propane cylinder, while the *Ace-in-the-Hole* is simply a straight adapter with no provision for manual shut-off. Both adapters are available from the manufacturer, Springer Company International, 2101 West Burbank Boulevard, Burbank, CA 91506, 213-848-2591.

In addition to providing space for the gas bottles, the locker contains the regulator, pressure gauge (if one is fitted) and electric shut-off solenoid (optional, but strongly recommended), so be sure to allow adequate space. Propane regulators are simple pot metal items available at any gas supply house. At about \$15, they can be considered expendable, and are, in a marine environment.

The drain for a propane locker must be at least 1/2" in diameter. A plastic through hull fitting makes a good drain. The hose for the drain, which may be plastic, should lead downward and overboard through the topsides, positioned so it is above water but lower than the bottom of the gas locker at all angles of heel. This can be tricky, so plan carefully before cutting any holes. The drain should not exit the hull within two feet of an engine or generator exhaust, or in a location where propane fumes could be drawn into the boat through an open port or hatch.

A deck-mounted propane locker eliminates much of the hassle of bottle installation. On larger boats or boats with flush decks, a deck-mounted locker should be reasonably unobtrusive. The primary advantage of a deck locker is that the complicated drain system, with holes through the hull, is avoided. Adequate ventilation of a deck locker is provided by small scuppers in the top and bottom of the locker. The scuppers should total no less than a square inch of area for each seven pounds of propane carried in the locker.

It goes without saying that a deck-mounted locker must be ruggedly constructed and securely fastened to the deck, since it is more exposed to waves in heavy weather. For this reason, the locker should not be mounted at the



forward end of a cabin trunk at deck level. This is the most vulnerable part of the boat sailing upwind in heavy air, as anyone who has ever carried green water on deck knows.

Solenoids

The electric shutoff solenoid has gone a long way toward making propane installations safer. This consists of an electrically-operated shutoff valve in line with the regulator, mounted in the gas storage locker. It's operated by a switch on a panel mounted below. Proper practice calls for operating this switch every time the gas appliance is used, turning it on for use and off immediately afterward. To be really safe, when you are finished cooking, the burner can be left on when the shutoff switch is thrown, and most of the gas in the delivery line will be burned. When the stove goes out, the burner control is then shut off.

The switch panel for the shutoff solenoid may be mounted in the galley for the sake of convenience, but it should not be immediately adjacent to the stove. If there is a stove fire, you want to be able to get to the switch without frying yourself. At the same time, it should be visible and accessible, so the cook will not forget to throw the switch when cooking is finished.

Plumbing

The fewer joints you have in the fuel delivery line, the less likelihood there is of a leak, and leaks are the major concern in a propane

system. Copperwater tubing is probably the best to use for the long run between the fuel supply and the stove. We suggest using flare fittings on the copper tubing instead of compression fittings.

A section of flexible hose is used in the stove well to allow the stove to gimbal. You can have this hose made up by any company that handles gasses. Be sure that the person making up the hose understands the way it will be used. When installing the hose, check once again to be sure that there is nothing that can chafe on it as the stove swings.

It is critical that the fuel delivery tube be protected from damage throughout its length. It should not run through the bottom of lockers, nor should it rest against fastenings or other metal objects. The tubing should be supported at regular intervals either by non-metallic hangers, or metal hangers with plastic inserts. In areas where the tubing must pass through bulkheads, it should be protected with rubber gasketing.

Conclusion

A properly installed propane system is really as safe as any other fuel you can use aboard a boat. But the keys to safety with propane are careful installation and careful maintenance. Propane is not a fuel to be handled casually. It is heavier than air, and if leaks develop in the system, explosive pockets of propane gas can accumulate in bilges or lockers.

At the same time, the convenience of gas cooking is remarkable.

Above left: A built-in propane locker, such as this molded cockpit locker, is the best solution to the propane storage problem.

Above right: Propane bottles can also be mounted on deck in deck-boxes of wood or fiberglass.

Unlike alcohol or kerosene, gas fuels ignite readily with mechanical "sparkers;" no more striking match after soggy match that struggles to light in the damp, breezy marine environment. Because a gas flame burns much hotter, cooking time is greatly reduced, letting the galley slave enjoy more of the cruise away from the galley. The convenience of turning on a burner and lighting it, as insignificant as it may seem, can be a major difference between cruising that is just camping, and cruising that is a genuine pleasure.

For most of us, the experience of cruising or living aboard a boat is far removed from everyday experience, and it's one of the reasons we are willing to undergo a certain amount of discomfort and inconvenience. But let's not be martyrs. Taking some of the comforts of home with you on the water won't in any way reduce the pleasure of the experience.

If you aren't the one who cooks, the cost and trouble of installing gas cooking may seem ridiculous. If you've ever huddled over an alcohol stove, or nursed a fluttering, smoking kerosene flame to life, a gas stove may prove to be the item that will make you think this cruising isn't so bad after all. ■