

Let There Be Light Below

Part 1: Admitting Natural Light

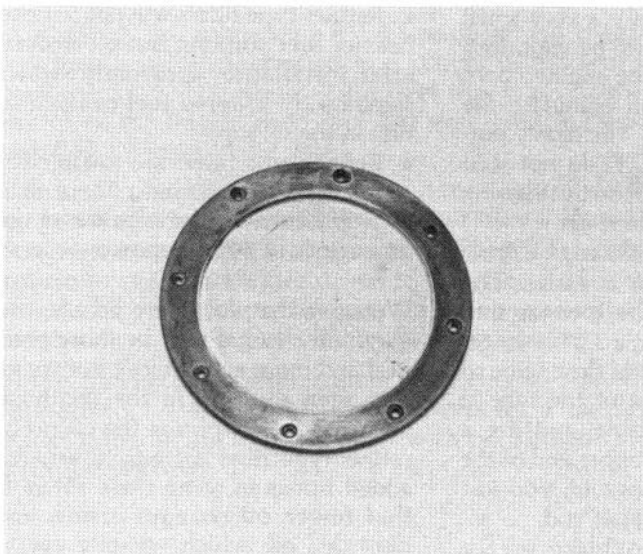
How's the light in your boat? Chances are, you've never given it much thought. Poor lighting, unlike poor ventilation, can make living aboard less convenient, but not unbearable. Lighting in many boats is a helter-skelter afterthought: "Oh yes, we need some light, too." With a little thought and a minimum of cost, you can increase your boat's livability in ways that are subtle, but which add up to a big impact.

Light belowdecks can be divided into two categories: natural light, available during daylight hours, and artificial light, available anytime. How you mix and utilize the two types of light can not only make your boat more comfortable, but can greatly ease the demand on your electrical system. Daylight gets below through hatches, ports, windows, and deadlights. A deadlight is any one of several types of non-opening transparent or translucent devices installed in the hull or deck to let light below. Deadlights include deck prisms, non-opening ports, and gizmos as simple as a piece of transparent acrylic screwed over a small opening cut in the deck.

The key to successful use of light is not just in the sheer amount of light, but where it falls. You can have blinding light in the main cabin while the inside of lockers or engine compartments are still like the dark hole of Calcutta.

Hatch Deadlight

The deck hatch is still a primary source of natural light below. In older wooden or fiberglass boats with solid wood hatches, you can let a surprising amount of light below by simply installing a framed round deadlight in the center of a



A circular deadlight installed in a wooden hatch cover can greatly lighten the interior

hatch. Unless the hatch top has pronounced camber, a 6" deadlight will lie flat enough in the top so that bedding compound will make up the slight gaps left under the edges of the deadlight. A smaller 4" light will lie flat on almost any hatch, and lets in plenty of light.

On our old boat, we installed a 6" deadlight in the wooden hatch over the middle of the forepeak, and a 4" deadlight in the deck at the after end of that same dark hole. What had been a 20' long tubular dungeon suddenly became a light, perfectly habitable location for occasional overnight guests, who previously viewed a night on the forepeak pipeberths with all the enthusiasm of a new inmate being shown his cell at Sing Sing.

Round deadlights framed in bronze, aluminum, and plastic are made by a number of companies, and cost anywhere from **\$8.50** (plastic) to about \$50 (polished bronze or anodized aluminum). Keep deadlight material consistent with the character of the boat: plastic deadlights would look out of place on a meticulously restored classic, and bronze deadlights would be equally absurd on a modern cruiser which already has plastic ports,

Installation

Circular deadlights are easy to install, although the hardest part is usually cutting the hole in the deck or hatch. If you don't mind spending the money, you can buy hole saws up to 6" in diameter which will fit in a heavy duty drill with a 1/2" chuck. Alternatively, you can use an adjustable fly cutter, which consists of an arm with a movable cutter, which is attached to a pilot bit. Because this tool uses a single cutter it is very hard to control when held in a drill motor, it is safest to use it in a drill press, though getting this type of project to the drill press may be impractical. A very heavy drill motor, rock-steady hands, and forearms like Popeye will let you use an adjustable fly cutter freehand, but it ain't easy.

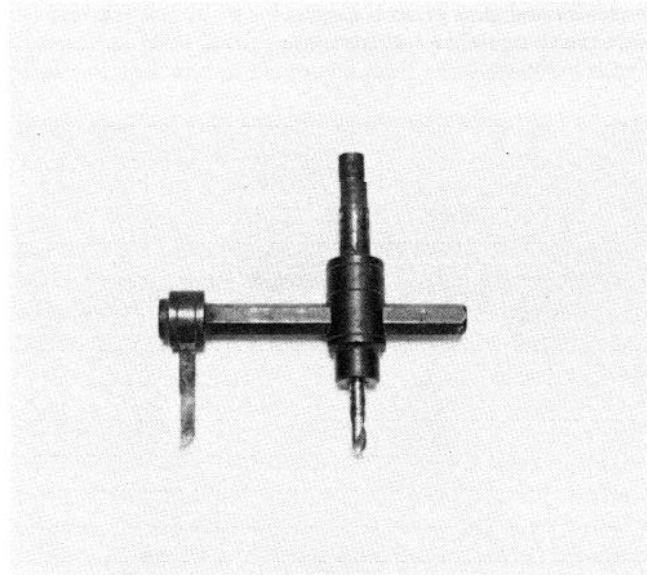
The other alternative is to use an electric jigsaw (saber saw) after drilling a pilot hole in the deck or hatch. This works fine, although the small diameter of the hole you will cut is a bit of a challenge with this tool. If you are cutting through fiberglass, use blades specifically designed for cutting composite laminates; if cutting wood, use a relatively fine-toothed blade designed for finish cuts in wood. If you're cutting a hole in a varnished wooden hatch top, use masking tape on both the top and bottom of the hatch to cover the line you're cutting. The tape will reduce the chance of grain tearout which would ruin a varnished surface, and also reduces the chance of the footplate of the saw marring the finish. Take your time, use new saw blades, and never force the tool. If the blade smokes or the motor bogs down, you're either forcing the cut or using a dull or unsuitable blade. Always, always, always match the blade to the material being cut.

Irregularities in a cut made with a saber saw can be sanded

smooth with sandpaper wrapped around a cylindrical object slightly smaller in diameter than the opening being finished. A piece of a heavy cardboard mailing tube makes an excellent form for smoothing the edges of a circular cutout in either wood or glass, and lets you enlarge the hole slightly if you need to adjust it to fit the deadlight.

Deadlights can simply be bedded and screwed to a deck that is thicker than about 3/4", but should be bolted to thinner decks. If you have a fiberglass deck that is cored with balsa, plywood, or foam, seal the inside edges of the cutout thoroughly with epoxy resin before installing the deadlight. In wooden decks, paint or varnish the inside of the cutout. Condensation will form on metal frames in colder climates, and will discolor or rot unsealed wood.

The bedding compound used will vary with the material of the deadlight frame. Silicone should be used with plastic frames unless the manufacturer specifies otherwise. You can use polysulfide or polyurethane with bronze frames,



An adjustable fly cutter can cut a circular hole any diameter you wish, but it is a difficult tool to use in a hand drill

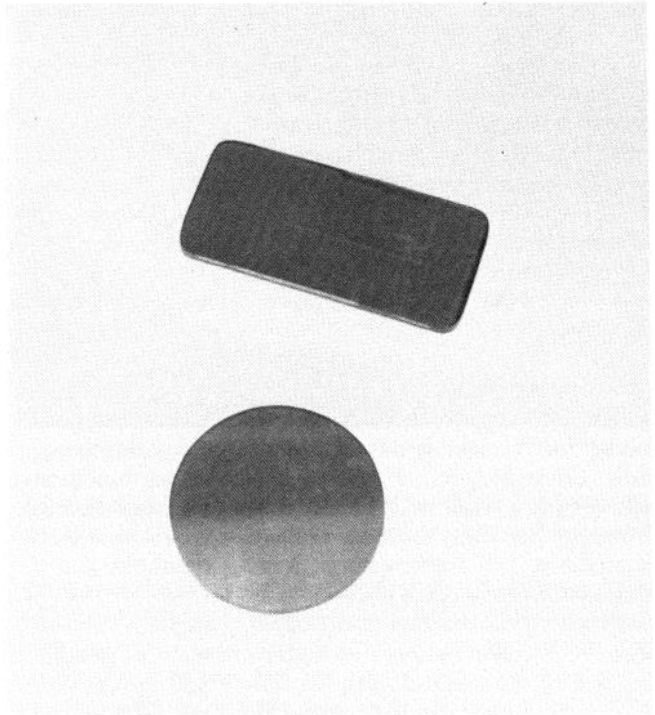
although we'd be reluctant to use polyurethane because removal of the light would be next to impossible if it were required, for instance if the glass were broken. Because some polysulfides can etch anodized aluminum finishes, we'd rather use silicone for aluminum.

Whatever compound you use, screw the deadlight down firmly and evenly, but not so tightly that all the bedding compound is squeezed out. Deadlights are notorious for developing leaks, but most leaks are the result of faulty installation.

Homemade Deadlights

If you really want to do it on the cheap, and don't mind a little extra work, you can make your own deadlights out of sheet acrylic or polycarbonate. Don't use any material less than 1/4" thick--3/8" is better--and keep the deadlights small, since material this thin would not support your weight if you stood on it.

The easiest way to install a homemade deadlight is to cut the deadlight about 1 1/2" larger in diameter than the hole in the deck, and simply let it overlap the deck opening. To keep from being a real toe basher, you'll have to run a router with a roundover bit around the edges of the



With \$1 worth of material and a bit of labor you can make your own deadlights of acrylic or polycarbonate

deadlight before screwing it down. Even so, the deadlight will stand up proud enough of the surface to be a slight obstacle.

In decks thicker than an inch, an acrylic deadlight can be recessed flush with the surface. This requires cutting a rabbet the depth of the thickness of the plastic in the deck before cutting the light-producing hole completely through the deck. With a round deadlight, this can be done with the adjustable fly cutter. First set it for the larger cut (the outside diameter of the deadlight), which is made only partially through the deck, then reset for the smaller diameter of the finished hole through the deck. The rabbet can then be finished cleanly with a sharp chisel before installing the piece of acrylic. Because it is mounted flush with the deck, it



A roundover bit in an electric router is used to radius the edges of homemade plastic deadlights

is not necessary to round over the edges of the plastic deadlight before installing it.

The advantages of homemade sheet acrylic deadlights is that they can be any shape or size you want, and they're cheap to make compared to the ready-made item. The disadvantages are that they scratch more easily than glass lights, and are more labor intensive to make and install. An oblong deadlight about 2" by 4" will illuminate a hanging locker, and uses less than \$1 in materials. On the other hand, it takes perhaps an hour to make if you aren't set up for it, and requires tools that you may not have, such as a router and saber saw.

Replacing Hatchtops

Sheet acrylic may also be used to replace the entire top of a wooden hatch, making literally a night and day difference below. Sheet acrylic 3/8" thick—the absolute minimum thickness for a small deck, hatch cover—will bend to any camber you are likely to find in a hatch top. For boats which sail offshore, 1/2" thick material is more desirable, and is much less likely to crack if you stand on it.

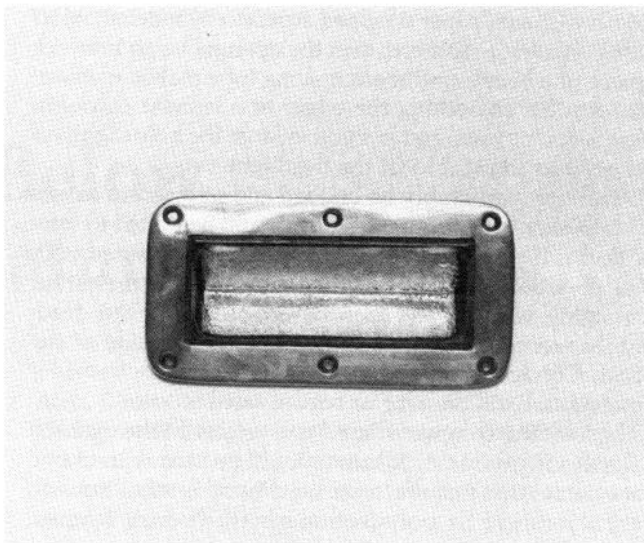
As with acrylic deadlights, the edges of acrylic hatchtops should be rounded over with a router for neatness. In addition, drilling for and installing the fastenings requires care to keep from cracking the acrylic. Holes must be drilled about 1/64" larger in diameter than the fastenings used to allow for the expansion of the acrylic as it heats in sunlight.

Acrylic or polycarbonate (Lexan) hatch covers don't last forever. They eventually scratch and craze. Replacement is no more difficult than the original installation, however.

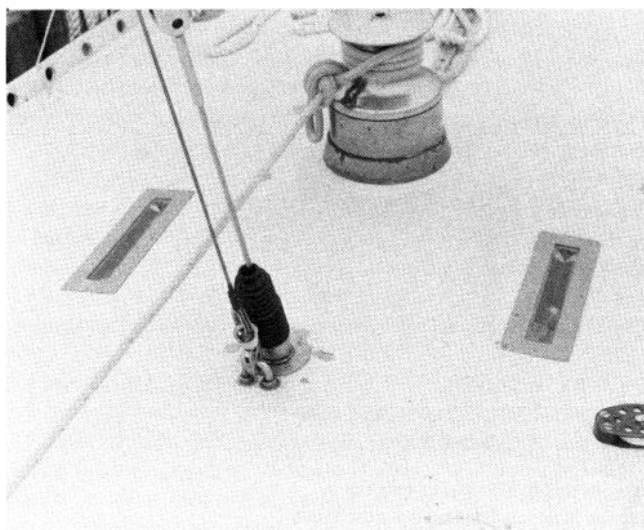
Deck Prisms

An elegant solution to getting natural light into hard-to-illuminate places is the deck prism. The deck prism is rooted in antiquity; it consists of a cast glass prism in a metal frame, mounted flush with the deck. The prism refracts light coming below, admitting much more light than you would expect from the size of the hole cut in the deck. Another advantage of deck prisms is that you can't see through them from the outside into the boat, making them suitable for mounting over a head, berth, or nav station crammed with expensive goodies.

A deck prism factory-bedded in a metal frame requires only cutting a rectangular hole in the deck, then bedding



A metal-framed glass prism is easy to install, requiring only a rectangular hole cut in the deck



On a flush deck boat, prisms are a simple way to illuminate spaces that would otherwise be dark and gloomy

Manufacturers and Importers of Deck Prisms, Deadlights, and Aluminum Hatches

A&B Industries Incorporated
415 Tamal Plaza
200 Tamal Vista Blvd.
Corte Madera, CA 94925
(415)924-1300

Atkins and Hoyle Limited
71 Portland Street
Toronto, Ontario, Canada
M5V 2M9
(416)596-1818

Beckson Marine
Box 3336
Bridgeport, CT 06605
(203)333-1412

Bomar Inc.
South West Street
Charlestown, NH 03603
(603)826-5794

W.H. Denouden (USA) Inc.
Box 8712
Baltimore, MD 21240
(301) 796-4740

Thomas Foulkes
6A Sansom Road, Leytonstone
London E113HB, UK
(440539-5084

Jay Stuart Haft Co, Inc.
Box 11210
Bradenton, FL 34282
(813) 746-7161

Lewmar Marine, Inc.
23 Broad Common Road
Bristol, RI 02809
(401)253-6200

Lewmar Marine, Inc.
876 W. 16th Street
Newport Beach, CA 92663
(714)631-7260

Ronstan Marine (Goiot)
805 Court Street
Clearwater, FL 33516
(813)443-7661

and fastening in place. The disadvantage is cost. Bomar, best known as a manufacturer of aluminum deck hatches, makes aluminum-framed acrylic deck prisms in three sizes, ranging in price from \$80 to \$145. A&B Industries makes a bronze-framed, glass deck prism which retails for \$67. You can also buy both round and rectangular English deck prisms priced at about \$60 to \$90 from Jay Stuart Haft, and some prisms are listed in the catalogs of British mail order chandlers such as Thomas Foulkes.

Deck prisms are a particularly elegant and traditional solution to getting natural light below, and are at home on anything from a traditional wooden gaff-rigged cutter to a state of the art aluminum IOR boat. In fact, on the modern flush-decked IOR boat they may be the only way for natural light to get below other than the main hatch and the foredeck hatch.

Whether you use homemade deadlights or readymade deck prisms, they can be used to light up any dark corner in your boat. They are particularly useful over engines installed under the cockpit, over hanging lockers, quarterberths, and forepeaks. They lighten and brighten your boat, and make it seem larger and more comfortable than it was before.

Portlights

Another obvious way to get light below is through deckhouse windows or portlights. As a rule, we would be reluctant to change the configuration of deckhouse windows in a production sailboat, unless they are really inadequate, and you can find ports completely in character with the ones already installed. One of the most distracting modifications we've ever seen on a boat was done by a well-meaning owner who replaced his fixed ports with larger opening bronze ports. Unfortunately, the modern, low deckhouse on the boat was proportioned totally wrong for the new ports, which also clashed violently with the remaining fixed ports, made of aluminum and an entirely different shape. The rule of thumb for this type of modification is that it must look exactly as if it had been designed and completed by the builder, rather than tacked on afterwards by the owner. A simple modification like this could knock hundreds or even thousands of dollars off the value of the boat if done improperly. Ironically, even a job well done probably won't materially increase the value of the boat-except to the current owner.

Extra Hatches

If you want to get really large quantities of light below, the solution may be to add another hatch, or replace an existing deck hatch with a larger one.

Many older fiberglass boats are equipped with fiberglass deck hatches. When they were new, glass hatches were touted as superior to wooden hatches-no swelling and shrinking wood, no varnishing, no leaking. By now, these glass hatches may be little better than an old wooden hatch. Glass hatches were usually made with an unpigmented gel-coat top to let light through, and they do an adequate job of that. But you can't see out of them, and they are usually so flexible that great care is required in dogging them to keep from distorting the cover, causing the very leaks they were designed to eliminate.

If you're really lucky, you may find a modern aluminum framed hatch with a clear or smoked acrylic or polycarbonate top that will fit the existing opening in the deck, not leak, and let you see out as well as let light in.

Aluminum framed deck hatches are available in every configuration under the sun, although sizes have become



Because they can compromise the strength of the hull, ports or deadlights in the topsides must be designed in before the hull is molded

somewhat standardized by manufacturers as they compete with each other for the OEM market (Original Equipment Manufacturer-boatbuilders, in other words), which uses thousands of hatches yearly.

Most aluminum hatches are built with flat-bottom frames, and thus fit best on a nearly flat deck. This makes them unsuitable for mounting atop a cambered deckhouse without building a wooden mounting coaming for the hatch-a fairly straightforward intermediate carpentry project. Bomar makes one aluminum hatch with a slightly cambered frame to fit a crown of about 1/4" in 20", which is enough for normal main deck camber, but not enough for the top of most deckhouses.

Mounting any hatch atop a coaming a few inches high is a good idea. Hatches mounted flush with the deck will usually let water below the first time any solid water comes aboard, while a coaming 3" high will allow water to swirl past the hatch. Except on flush decks, however, a raised hatch may present more of an obstacle than can be tolerated.

Deadlights and Ports in Topsides

You may be tempted to install deadlights in your topsides. Unless the boat was designed for it, don't do it. Holes in the topsides could seriously compromise structural integrity, independent of any weakness of the fixture itself. You should only consider installing ports in the topsides of flush-decked boats with high freeboard and locally reinforced hulls. This is not an after-the-fact, owner installed option on any other boat.

Conclusion

Natural light has many advantages. It is cost-free after the original installation to allow light below is made. It makes no demands on your batteries. Natural light is more attractive, since it is the light we are most used to. It doesn't alter colors. It requires no wiring.

Getting more natural illumination below can be as cheap or expensive as you wish-everything from new hatches costing hundreds of dollars to homemade acrylic deadlights for little more than pocket change. It's a project that requires imagination and a little skill, but it's one of those challenges that makes owning a boat worthwhile. People may not realize why your boat feels bigger or brighter than another seemingly identical boat, but they'll know that it does. And you'll be the one to reap the benefits of a more livable boat.