

Let There Be Light

A blanket of bright light makes any workshop a nicer place to be

BY NANCY McCOY
AND PETER JUDGE

Have you ever had to squint to see a scribe line or line up a pencil mark? Maybe a recent finish looked great in the shop, but once you brought it into the house you found sanding scratches. Your problem might be inadequate shop lighting. Light fixtures are seldom at the top of tool and equipment wish lists, so most home shops are illuminated with a collection of mismatched, outdated fixtures, with little thought given to their overall placement and how they're switched.

As a result, improving your shop lighting will likely mean starting over with new wiring and fixtures. Many woodworkers will think they can handle this job, but it's probably better to hire an electrician who'll let you do some of the work yourself.

LOTS OF AMBIENT LIGHT IS THE KEY



Before and after. Home shops are commonly lit with 30 foot-candles or less (above), but 75 foot-candles is a better target (right). Installing a broad array of fluorescent fixtures will ensure that every corner of your shop has plenty of light.





ADD A COUPLE OF TASK LIGHTS



A few specialists. Sanding and finishing may require smaller, directed lights. For more on task lighting, see p. 63.

An electrician looking at the job can confirm that your electrical panel isn't overtaxed and that there are no other pressing electrical problems. Then you can save some money by mounting the fixtures and running the conduit yourself. Later, the electrician can check your work, run the wires, and make the connections inside the panel. Some electricians are fine with this type of arrangement. Others will want to do everything themselves, so make sure you work out the division of labor in advance.

We used *Fine Woodworking* associate editor Matt Kenney's shop to demonstrate the techniques discussed in this article. Like most woodworkers, Matt thought his shop lighting was just fine. But when the upgrade was finished, he was amazed: "I don't have to get my eyes right up to the work to see what I'm doing anymore. More light just makes everything easier." The lighting upgrade also allowed Matt to start using the entire shop instead of the single well-lit area near his bench. Matt and local electrician Steve Foss worked together on the installation, with Matt installing the fixtures and Steve doing the wiring.

Two types of lighting

Any discussion of artificial light starts with the distinction between ambient and task lighting—you'll want both types for a well-lit shop. Ambient lighting describes general lighting for common cutting and shaping tasks. Task lighting

Fluorescents are the foundation

Light every corner of a workshop—you never know where you might need a clear view. Overhead fluorescents arranged on a grid are the most cost-effective way to create a blanket of bright light.

SHOP-READY FIXTURES

Buzz-free and efficient. Modern fluorescents are the obvious choice for shop lighting. They have electronic ballasts that don't hum or flicker, and they're energy-efficient and affordable. The SB 432 from Lithonia (www.lithonia.com) has a wraparound lens that keeps out dust and spreads the light.

Lower-cost option. Strip (no lens) fluorescents are sold in 2-, 4-, and 8-ft. lengths. If you choose 8-footers, make sure to get them with pairs of 4-ft. bulbs instead of 8-ft. bulbs, which are harder to find and transport.



THE RIGHT BULBS

Modern fluorescents save energy. The fluorescent fixtures shown in this article take 4-ft. T8 bulbs, which sell for between \$3 and \$4 each.

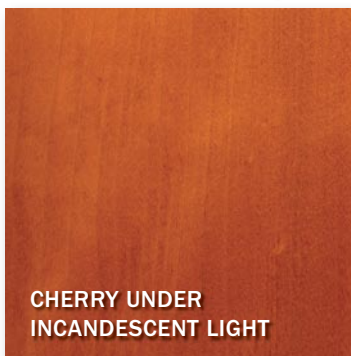
describes a higher level of illumination focused right on the work. However, it's important to remember that once you have an even blanket of bright light, task lighting is reserved for filling in the dark areas.

Don't skimp—It might be tempting to save money on lighting by arranging the ambient overhead lights so that they're strategically placed over benches and machines. But we recommend against this approach because the lights will be in the wrong locations if you ever decide to change your shop setup.

And you never know quite where you'll need light: Will it be on the floor when cutting up a sheet of plywood, or in the corner when picking through the scrap pile? With an even blanket of ambient light, you'll be able to work anywhere. You can save the task lighting for when you really need it, like finishing and joinery.

The Illuminating Engineering Society of North America (IES) recommends between 20 and 50 foot-candles for woodworking. One foot-candle is the amount of light produced by an ordinary candle measured from 1 ft. away. We suggest 75 foot-candles because you'll need more light as you age, and the cost difference is negligible. Even if your eyes are fine now, you'll need the additional light soon enough.

Light-colored surfaces boost light—Another consideration is how much of the light produced by your fixtures is reflected by the ceiling and walls. A clean, white surface may reflect as much as 85% of the light that initially hits it, while a dark, rough surface can



CHERRY UNDER
INCANDESCENT LIGHT



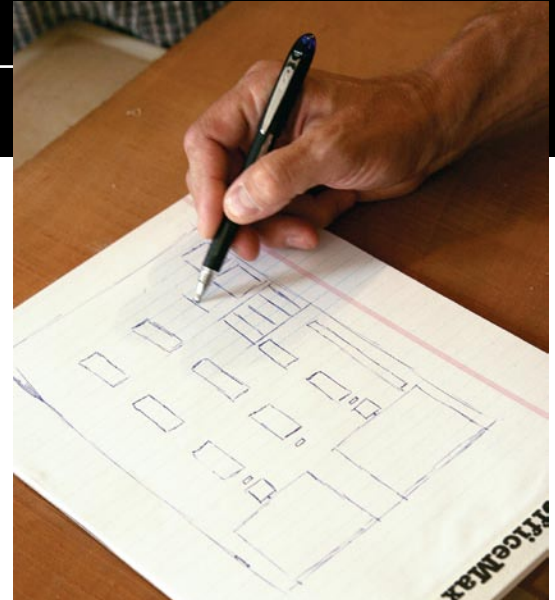
CHERRY UNDER
3000 K FLUORESCENT



CHERRY UNDER
7500 K FLUORESCENT

True colors. A bulb's color temperature can make a big difference in the appearance of wood species and finishes. Ideally, you should select bulbs rated 3000 K, so the shop lighting matches your home lighting. Color temperature is found on packaging and sometimes right on the bulb.

LAY OUT LIGHTS FOR COMPLETE COVERAGE



Help from an expert. An electrician can help you determine the necessary fixtures and their placement. If you provide your own layout, be sure to ask if moving things a little or rotating the whole layout 90° will make the job easier and less expensive.

reflect as little as 10% or 15%. If your shop is cluttered and dusty or has exposed insulation, you'll need to boost lighting levels by another 30% to 50%, compared to shops with clean white walls and ceilings.

A functional lighting layout is simple

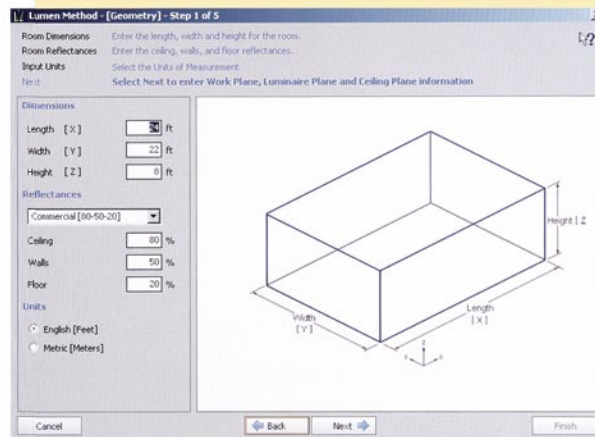
Once you've made a decision on the level of lighting you want in your workshop, laying it out is as easy as 1-2-3.

1. Choose your fixture—The most common shop fixture is an open “strip” fluorescent (see photo, facing page). These work pretty well, but without a cover they experience more “dirt depreciation,” which is the drop in light output caused by dust on the bulbs and housing. It's easy enough to clean off the fixtures once in a while with compressed air, but it's even easier to select fixtures with an acrylic lens. Not only does the lens keep out much of the dust and spread the light, but it also provides a bit of safety when you're swinging around long boards.

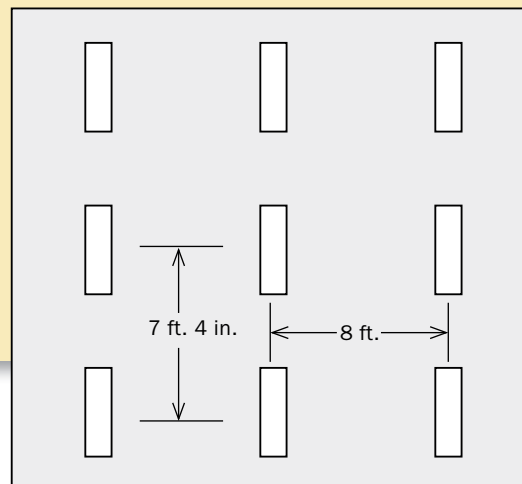
Our favorite fixture for a home workshop is Model SB 432 from Lithonia (see facing page). They have a lens, and their electronic ballast means they won't hum loudly and they'll work in cold temperatures. This fixture used to cost about 25% more than strip fluorescents, but we found them at Amazon.com for \$55, which is the same as or less than some strip lights.

2. Select the bulbs—One of the complaints we often hear about fluorescent bulbs is that the light is bluish and unnatural. This used to be true, but fluorescent

Free layout software



DIY layout. Visual Basic (www.lithonia.com) is a free lighting design program. Once you've entered the shop dimensions and selected a fixture from a pull-down menu, the software generates a layout based on the foot-candle requirement.

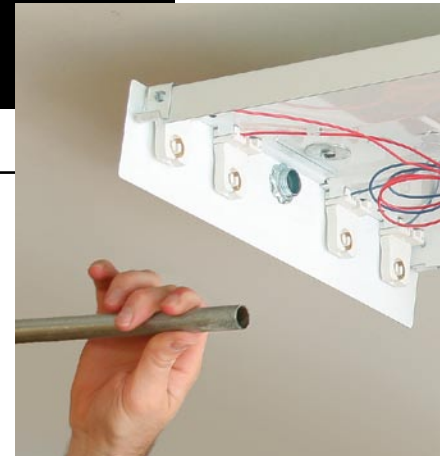


SAMPLE SOLUTION

This lighting layout is for a two-car garage shop (22 ft. by 24 ft.) using 4-ft.-long, 4-bulb fixtures.

Fluorescents (continued)

INSTALLATION: SAVE MONEY BY PITCHING IN



Hang your own fixtures. Fluorescent fixtures are surprisingly light, so toggle bolts let you put them wherever you want on a drywall ceiling (left). You also can fasten the lights directly to framing members with screws. Another task you can do yourself is to install the straight conduit between fixtures (above). Before tightening the toggles or screws completely, use the wiggle room to squeeze in the pipe. Always be sure to ream the conduit ends, as any sharp edges will damage the wires' insulation.



Leave the wiring to a pro. With the fixtures placed, you can bring back the electrician to install the rest of the conduit, run the wire, and make the necessary connections. This will likely take a day or less.



TIP

Zoning saves energy. A simple but effective setup is to have one zone for your bench or finishing table and another for the machine area.

bulbs are now available in a wide variety of “color temperatures.” Measured in kelvins (K), color temperatures of fluorescent lights commonly range from 2000 K (warm red) to 7500 K (cool blue).

Why is a bulb's color temperature important? Ideally, the lighting in the shop should be the same as the lighting inside your home, so your projects look the same in both environments. Most likely you have warm incandescent lighting in your home, so you should select warm fluorescent bulbs with a 3000 K color temperature. This will help your finished projects look the way you intended, and the cost difference compared to standard bulbs is negligible.

3. Plan your layout—Most electricians and lighting showrooms can provide a lighting layout for a garage shop easily, but if you want to do the layout yourself, we suggest using Visual Basic, a free program found on the Lithonia Web site (www.lithonia.com). Start the program by entering the shop dimensions and ceiling height, then specify a lighting level (75 foot-candles in our case). The program then gives you several options on the reflectivity of your walls. You can then select a light fixture from a pull-down menu, choose the type of ceiling and lens cover, and the software will tell you how many fixtures you need and how to arrange them.

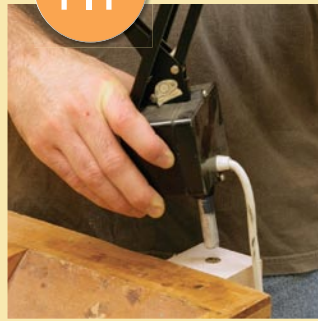
Using the SB 432 fixture and assuming a 22-ft. by 24-ft. two-car-garage shop with 8-ft. ceilings as an example, the program says we need nine fixtures, arranged in three columns of three fixtures each (see drawing, p. 61).

Task lighting

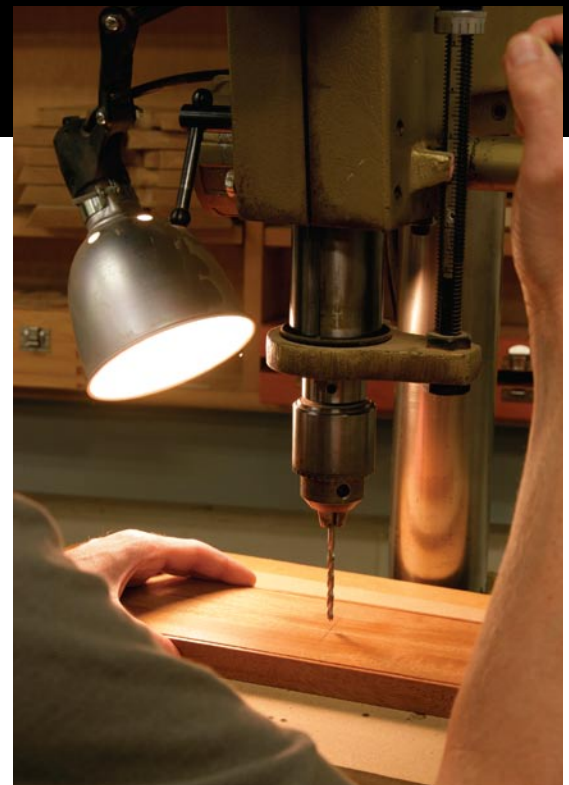
With most of the light provided by overhead fluorescents, task lighting is about filling the gaps.

Desk lights shine bright. When the shadow from your own body makes it tough to see, an inexpensive swing-arm desk lamp can fill in the dark areas.

TIP



Attach a mounting block to your bench. Many desk lights have a post that can fit into a block screwed to your bench for easy installation and removal.



Tall machines cast a shadow. Bandsaws and drill presses, with their large cabinets and motor housings, often block overhead lighting, but the fix is easy: a magnetic-base task light aimed right at the work.

Zoning saves money and energy—Rather than having all your lights controlled by a single switch, it's a good idea to divide the space into work zones. For example, you could put the finishing table in one zone, the bench or assembly table in another, and the machine area in a third. For the cost of a little extra cable and a few switches, the energy savings is well worth it.

Another nice feature is an occupancy sensor that turns on a single light whenever you walk into the shop, especially when your hands are filled with tools or materials. Because an occupancy sensor will turn off the lights when it doesn't detect movement, it can occasionally leave you in the dark.

Task lighting

Overhead fluorescents are good for general ambient light, but for finishing and bench work you'll need additional task lighting. Swing-arm lamps like those found on drafting tables are great for aiming light directly where you need it. Twin-head halogen work lights are great for finishing because they can provide raking light that makes it easier to see runs and other problems.

Having a well-lit shop is a lot like having a well-heated one. The shop becomes a more welcoming place, a playground for your creativity. □

Nancy McCoy is a certified lighting designer in Novato, Calif. Her husband, Peter Judge, is an avid woodworker.



Raking light reveals surface flaws. Inexpensive stand-mounted halogen worklights are a great way to provide low-angle light for surface prep and finishing (above). The raking light can highlight machine marks that are invisible under overhead light (right).

