

Electrical Q&A FOR Remodelers

In the course of routine remodeling (as if there were such a thing), contractors are likely to encounter electrical problems. These range from minor details

by **Cliff Thomas**

that can be handled on the spot by anyone with

a reasonable degree of experience to serious defects that should only be corrected by a licensed electrician. Accurately identifying these situations is important both for your reputation and the safety of everyone involved. Recently, we asked electrician Cliff Thomas, owner of Hands-On Electric in Santa Fe, N.M., about some of the electrical quandaries remodelers are commonly faced with.

Q. If an electrician comes and does work, does he have to bring the whole house up to code? Are there certain things he has to do and others that are optional? What is permitted versus what is best practice?

A. I think the code is specific enough to make it clear when violations are present. I would ask the local inspector to clarify any concerns or gray areas. Meeting the requirements as set forth by code and inspectors is the only sure way to cover yourself, and liability is a real concern when doing electrical work. I am not aware of any specific National Electrical Code references to old work correction requirements. The local rule for remodeling a residence is that if 50% or more of a building is



being affected, then the entire building must be brought up to code.

If you don't know exactly what you're looking at and how it should look, call someone who does. This stuff (electricity) is responsible for deaths every year that can be avoided.

Q. *When remodeling or adding to an older home, what are some things to look for that indicate the entire house's wiring should be updated or replaced?*

A. If you see any of the following conditions, you should think seriously about rewiring:

- Any system without a ground (bare) wire.
- Cloth insulation, or any worn insulation that deteriorates in your hands when you move the wires. This leaves bare spots along the wire, creating the potential for dangerous shorts.
- Less than 20-amp circuits in the kitchen, laundry, or bathrooms.
- Lights that dim as a result of an appliance being turned on.
- A fuse box, because it generally indicates an obsolete system. Chances are good that you need new wiring, a new panel, and probably a grounded, or GFCI-protected, system.
- The presence of branch-circuit aluminum wire. If you find this, call an electrician.

Q. *Why not just tie into aluminum wiring?*

A. I would never add to an aluminum wire system. Instead, add new wiring back to the panel for any new loads. You are assuming a lot of responsibility messing with old wiring in general, more so with aluminum. Taking on a system you know nothing about is a big step, and the aluminum systems can be flaky.

Q. *Can you keep old armored-cable circuits, or should you replace them? If you disconnect old circuits, what's the rule around tearing out old wire versus leaving it buried?*

A. I would never add on to an old armored-cable system. A ground wire has been included in armored-cable wire for



Figure 1. If you abandon existing work, make sure it is cut far enough back so it can't be reconnected, like the armored cable near the top of the photo.



Figure 2. All splices must be in a box with an accessible cover plate. A splice must never be concealed in a wall cavity.

only the last ten years or so, which means you could be dealing with an ungrounded system. Better to leave the old system to itself and make all your work new and safe. When you disconnect old circuits, it's important that you make them unavailable for connections in the future (Figure 1). Remove exposed sections of wire to avoid future use or confusion when tracing other wires. This will also make for a cleaner job.

Q. *How about upgrading old two-prong ungrounded outlets from the '70s and back?*

A. Upgrading outlets from two-prong to three-prong is allowed by code only if the circuit is GFCI protected. If you do add grounding-type receptacles to an ungrounded circuit, you must not wrap any ground wire around the grounding terminal on the new receptacle. Any GFCI without an attached ground wire must be marked "No equipment ground." Also, any GFCI-protected outlet without an attached ground wire must be marked "GFCI protected. No equipment ground."

To upgrade a two-wire system, you can either replace all of the breakers in the panel with GFCI breakers, or place a GFCI feed-through outlet at each home run location. Although breakers are expensive, locating the home run outlet in each circuit can be time consuming. Using breakers is a labor-saving and reliable approach.

Q. *What are the rules for dealing with old concealed splices?*

A. Any splice that is at all suspect should be checked for mechanical integrity and made code-worthy. All splices are required to be in a box (Figure 2).

Q. *How do you wire a four-wire 240-volt appliance (kitchen range or dryer) if there used to be a three-wire appliance there?*

A. You're probably better off calling an electrician; but if you plan to do the work yourself, first determine if the appliance is fed from a main panel or a



Figure 3. A box extension for single boxes (above) or two-gang boxes (right) can make up for differences in wall thickness.



subpanel. If the feed is from a subpanel, you must install a new four-wire circuit to the appliance to comply with code. Bonding the neutral (grounded circuit conductor) and the ground wire anywhere but at the main panel is a big no-no. If the feed is from the main panel, you can connect the ground wire attached to the frame of the unit (green or bare) to the neutral terminal on the terminal block and change the pigtail to a three-wire type. But when possible, installing a four-wire circuit is still preferable.

Here in the Southwest, most houses are built slab-on-grade and have flat roofs. If you don't have an attic or crawlspace, and the appliance is on or near an exterior wall, you can install new conduit on the exterior. Between the exterior wall and the appliance, there are often cabinets behind which you can hide conduit, with little intrusion or patching. Flexible conduit can be helpful here.

Q. *When you add a new layer of finish, what is the easiest way to bring the electrical boxes flush to the new wall surface?*

A. Arlington Industries (800/233-4717) and Lamson Home Products (800/321-1970) both make an adjustable plastic box extender for just this purpose. Alternatively, a utility (or handy) box extension would provide almost 2 inches of added depth for a single-gang box. For two-gang extensions, an extension ring for a 4-inch square box at 1½ inches deep is also available (Figure 3).

Boxes are allowed to be set back only ¼ inch if the wall surface is a noncombustible material, such as drywall or tile, but must be flush with the finished wall surface if it is combustible, like wood paneling.

Q. *What are the choices for putting new switch and outlet boxes in old walls? Any hints for attaching the boxes?*

A. Remodel boxes, or remodeler straps, also called “chicken legs” or “turkey legs” (Figure 4), are helpful for putting new boxes in old walls. The remodel boxes come in plastic or metal. The plastic ones have ears that lie flat against the box as you place the box into a hole in the wall. Then, by turning screws from the front of the box, the ears turn out from the box and catch the inside of the wall. This places pressure from behind the box, and the flange on the front of the box holds the box firmly in place. The metal version works on the same principle, but will not flex or distort as the plastic box can.

Q. *Any tips for wire-snaking?*

A. A fish tape and small holes at the top and bottom of a wall make for a pretty minimal mess. Long, flexible drill bits are available for drilling across several joists at a time.


I have used a 6-foot flexible drill bit for drilling through hidden studs and snaking wires. Here's a tip: Find one of those nylon nets, like you might find wrapped around a frozen turkey. Keep it in your tool box. You can tie a wire onto it, stuff it into a little hole in a wall, then you might be able to hook it with your fish tape from your fishing location. 



Figure 4. Remodel boxes and remodeler straps (left) are helpful for putting new boxes into old walls. Once in position, the flange on the front of the remodel box holds it firmly in place (right).