

Temporary Power on the Job Site

Here's how to provide safe, code-compliant temporary power for your project

BY JOSEPH FRATELLO

Virtually everything we use on a job site, from compressors and battery chargers to fax machines and computers, requires electricity. Until a project has passed its final electrical inspection, all but the smallest construction sites require temporary power, whether it's provided by a portable generator or through temporary electrical service.

Over the past few years, the shrinking scale and budgets of many projects have underscored how overlooked the issue of temporary power has become. Recently, I started a fairly large project that was expected to last just over a year. The builder refused to pay for a temporary service, so I learned just how miserable and dangerous it was not to have sufficient power available at the job site.

What exactly is temporary power?

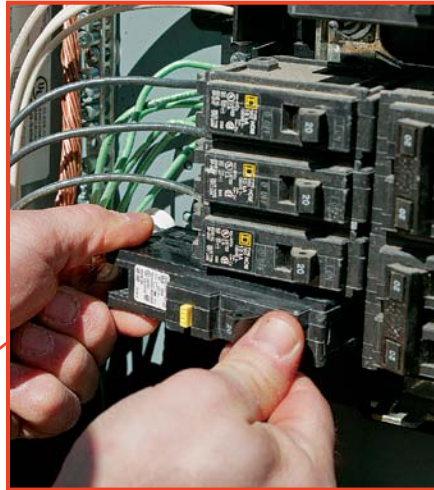
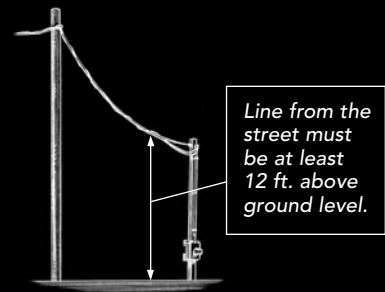
The definition of temporary power depends on whom you ask. The National Electrical Code lists its definition in article 590 of publication NFPA 72: "Installations may be considered temporary as long as you are in the process of construction, remodeling, maintenance, repair, demolition of buildings or similar activities; the temporary power will be permitted for the length of the time needed to complete the project." Your local building department probably has its own interpretation of "temporary," and of course, there are OSHA guidelines. While all may be similar, I follow the NEC guidelines.

A common mistake I encounter on job sites is the assumption that temporary power doesn't have to adhere to electrical codes because it's



STAGE ONE: SET UP A PANEL OUTSIDE

During the early stages of construction, a temporary panel is often the source for job-site electricity. Commonly mounted on a separate pole that's buried about 4 ft. into the ground, the panel is connected to the street and should have 100-amp service. Outlets can be mounted adjacent to the panel or remotely.



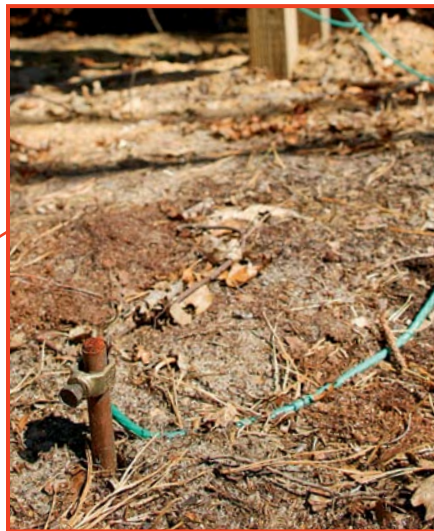
Protect circuits outside.

Installed in temporary panels, GFCI breakers can provide the required protection for non-GFCI receptacles on that circuit. A GFCI breaker should also be used when protecting a 240v receptacle. A single-pole 20-amp GFCI model costs about \$45.



Use the proper receptacle, and cover it.

Any receptacle used outside must be either a weather-resistant GFCI-protected model or connected to a protected circuit, and by code, it must be installed in a covered box. Deep covered boxes keep the outlets dry and also provide strain relief so that extension-cord ends won't become kinked. It's always a good idea to install both 120v and 240v receptacles. Both the deep boxes and weather-resistant GFCI receptacles cost about \$15 each.



For code and safety.

The panel must be connected to a ground rod, but check with local authorities because some jurisdictions require two grounds per panel.

Remote option.

Temporary receptacles also can be installed away from the panel in plastic posts. Power is supplied by 12/3 UF (underground feeder) cable that can be run below grade, up to 250 ft. from the panel.



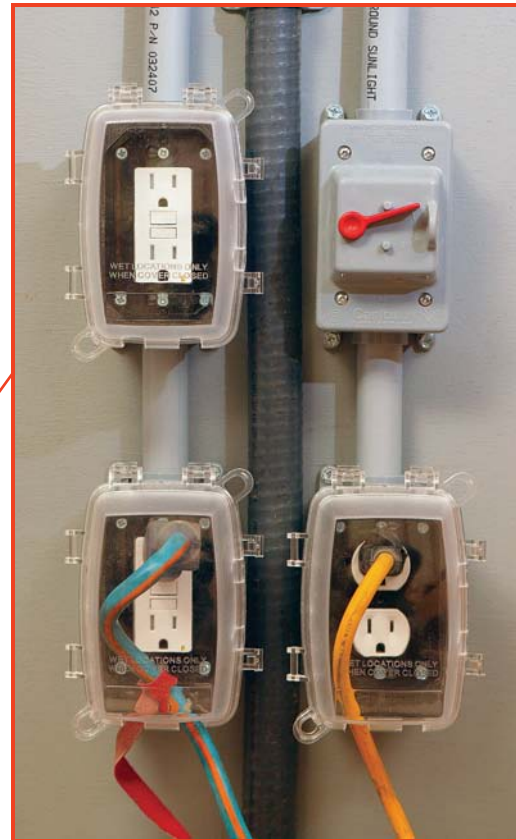
Drawings: Dan Thornton

STAGE TWO: MOVE THE PANEL INSIDE

After the structure is closed in, it often makes sense to move the panel inside. On larger jobs, the most convenient place to locate a temporary panel is by the main entrance. GFCI-protected receptacles can be installed in deep boxes at the panel or in more central locations.



If the line from the street to the house is not buried, it must be kept 15 ft. above ground level.



Keep the lights on a separate circuit. It's a good idea to provide a separate circuit and switch for the temporary lights. If someone trips a breaker with a tool, they won't be left in the dark. The switch is a convenient way to control the lighting.



Indoor only



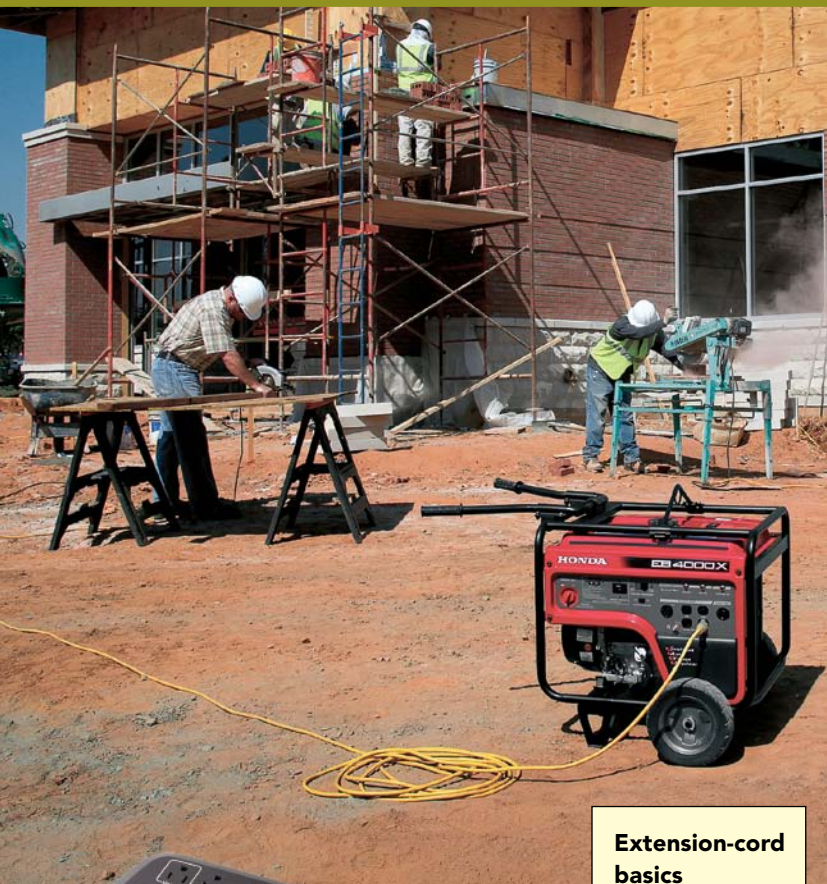
Indoor or outdoor

Use the right receptacles. Weather-resistant GFCI receptacles (marked WR and TR) are also tamper resistant and are used inside or out. Their T-shaped slots are configured for 20-amp plugs. Tamper-resistant-only models (marked TR) are meant to be used indoors.

THE SECOND-BEST OPTION: GENERATORS

Portable generators are a convenient way to power up a job site. The better models provide enough power to supply a compressor and a couple of saws. However, they do have limitations.

- Limited output (typically 3500w to 6500w)
- Recurring cost of maintenance and fuel
- Noise



Extension-cord basics

- Keep the cord length as short as possible.
- Use 12/3 wire. Anything smaller creates resistance, which in turn can wear out tools.
- Replace cords that have broken plugs, tears in the jacket, or exposed conductors.



Surge protectors and generators go together.

When running on generator power, use an uninterruptible power supply (UPS) strip for battery chargers, phones, and other electronics. The generator will run more smoothly, and the UPS's battery backup keeps electronics powered for up to an hour in the event of a generator failure.

temporary. The hazards of electricity don't change just because it is temporary, however. I was recently on a job where another electrical contractor did a horrendous job installing the temporary power, and as a result, a fire started. After investigating the cause, I discovered the contractor had installed the wrong size breaker and failed to secure and terminate the wires properly. When installing temporary power, you must still adhere to NEC rules for wire sizing, grounding, and wiring methods.

Is a generator a good idea?

When starting a project, you need to identify the source of your power. Typically, your choices are either a generator or the utility company. (Alternative-energy sources are gaining market share, but they are not widely used yet.) Many contractors on small to medium-size jobs use portable generators to provide temporary power, which is a convenient way to get started at a job site. Most generators come with multiple receptacles that can handle a few tools. (I own a few generators for a variety of tasks. If you don't already own a generator, I highly recommend buying a Honda. Yes, they are more expensive than most, but they are well worth it. After 20 years in the construction business, I have never seen one break down, and I have never brought one in for service.)

Even the best portable generators have drawbacks, though, so I try to avoid them. With a generator, you are limited by its output. Most generators that can be moved by one or two people can output only 3500w to 6500w, which is barely sufficient to power a compressor and a circular saw at the same time. Straining your tools on a generator can lead to premature tool failure. If you plan on running a tablesaw, a compressor, a miter-saw station, and some temporary lights, most portable generators are not up to the job.

Generators also require maintenance and constant refueling. My generator can use 3 gal. of gas in a day, which costs more than \$75 a week. That doesn't include the labor for refueling and changing oil.

Generator-sourced power can create other problems, too. If you're working in a basement and the generator runs out of gas, you can be stuck in the dark trying to find your way out. Many generators also tend to make "dirty," or unstable, power, which can affect battery chargers and other sensitive electronics. Conversely, battery chargers can affect the generator. If you've ever noticed that your generator runs erratically when you plug in your battery charger, it's because the charger's constant off-on pulse messes with the generator. To fix this and to protect other sensitive electronics, get a battery-equipped uninterruptible power supply (UPS) surge protector. These devices typically cost less than \$100, which is a small price to pay to protect your phone, your chargers, and your laptops.

Another drawback of generators is that they tend to be noisy. This is especially problematic where I work. Our workday starts at 6:30 a.m., but our township will not allow contractors to start generators until 8 a.m. Some localities also have ordinances that limit a generator's decibel level, no matter what time of day.

Temporary service sometimes makes the most sense

After a month of rolling up multiple 100-ft. cords and refueling my generator, I had enough and absorbed the cost of installing a temporary service. I quickly realized that it would pay for itself after a month. If you are on a job where the builder doesn't want to cover

THE MOST IMPORTANT LESSONS FOR TEMPORARY LIGHTING

1. Spend a little more money and buy better-quality light strings. The connecting cord should be heavy-duty (12/3) and jacketed. The entire assembly should be UL-approved. Spaced on 10-ft. centers, each fixture should have a heavy-duty socket, a nailing flange, and a protective cover.

2. Use compact-fluorescent lamps instead of incandescents. They last much longer, require less power, and are less likely to break.

3. By code, stairways must be lighted. It's also a good idea to have a light above the temporary panel.

4. Keep lighting cords away from the floor, especially near stairs, and well above the standing height of workers.



the cost of a temporary service, you might consider asking the other trades to chip in. Typically, a temporary service costs from \$600 to \$1200 to install. I save the poles and equipment and move them from job to job, and typically charge my builders the permit fees and labor to dig the pole into the ground. It may seem like overkill, but I install 100 amps for most of my temporary services. Because I have such a wide variety of projects, it's easier just to make them all 100 amp and to reuse the equipment.

Safe wiring is the next step

Once the decision has been made to go with temporary service, you have to make sure to run wiring safely throughout the project and to avoid the numerous hazards created by temporary wiring installations. I have seen two small fires as a result of poorly installed temporary wiring. Electrocutation is certainly a possibility. In my experience, though, the greatest hazard resulting from poorly installed temporary wiring is tripping. I have seen dozens of people (including myself on occasion) trip and fall, and a few have ended up at the hospital with a broken wrist or a sprained ankle.

Here's how I like to set up most of my larger jobs. I start by providing two dedicated 20-amp GFCI receptacles outside with deep in-use covers. All temporary circuits must be protected with GFCI breakers or outlets. For receptacles that see infrequent use, choose those rated as weather-resistant GFCIs. Receptacles that get more use will not last as long, so it's more economical to use non-GFCI receptacles tied to GFCI breakers. To keep the receptacles dry, I prefer the deep in-use covers because they allow enough room for heavy-gauge extension cords to bend without kinking the ends.

When the framing is completed and the project is weathertight, I ask the carpenters if they need any specialty outlets for stationary tools. I start by providing a minimum of two 20-amp GFCI receptacles on each floor, one for power tools and one for temporary lighting. On smaller jobs, I run the 12/2 NM home runs for the bathroom GFCI receptacles as soon as possible, and connect them to a temporary panel in the basement. If you already have power, energize them first.

On bigger jobs, I install a subpanel close to the building's main entrance to feed the outlets on the first floor. I prefer that location because it's far more convenient to walk a few feet rather than go outside to reset a tripped breaker. I also can use less expensive indoor-rated wire to go from the subpanel to the other outlets. Plus, at the end of the day, I like being able to turn off the power and lights from the breakers in the subpanel and then lock the door behind me.

Consider data lines, too

When running temporary power, it's also a good idea to install phone or cable lines to provide Internet access. Internet access not only provides the ability to transfer data such as blueprints and invoices, but it also can provide the ability to monitor the site with IP security cameras. Many of the projects we work on require temporary motion and fire alarms to maintain insurance qualifications. If your insurance provider doesn't require either, ask if using them will decrease your rates. The difference in cost may be well worth it. The ability to transfer data should be considered part of any significant project. □

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