Table of Contents

I. Planning
II. Lighting and Power
III. Maintenance
IV. Inspections
V. Routing and Moving
VI. Removal

A) Application of National Electrical Code Rules 2
B) Temporary Wiring Articles – NEC Handbook 3
C) Overhead/Underground-Services Installation Diagrams 3-5
D) Jobsite Trailers 6
E) Panel board Covers 6
F) Temporary Feeders and Branch Circuits 7
G) Splices 8
H) Terminations at Cabinets and Boxes 8
I) Ground-Fault Protection for Personnel 8-9
J) Branch Circuits for Receptacles and Lighting 9
K) Weatherproof Covers 8
L) Temporary Lighting Fixtures & Support 10
M) Example Installation Pictures 10-20
N) Quiz – Temporary Wiring Practices and Guidelines 21
O) Acknowledgement Form 22

Temporary Wiring Practices and Guidelines for NECA – Omaha, Nebraska have not been processed in accordance with NFPA regulations governing committee projects. The text and commentary is not the official position of the NFPA or any of its committees and shall not be considered to be a formal interpretation of the meaning or intent of any specific provision or provisions of the 2008 edition of the NFPA National Electrical Code.
I. Planning
- Plan your work. Failing to plan is essentially planning to fail. Temporary wiring requires planning. There are serious responsibilities associated with installing and maintaining temporary electrical wiring on construction sites.
- Temporary wiring must meet the requirements of the National Electrical Code (NEC) and Occupational Safety and Health Administration (OSHA).
- NEC Article 590 provides minimum requirements for installing temporary electrical power and lighting. Overcurrent protection and conductor sizing must meet the NEC requirements in Article 240 and 310 respectively and grounding and bonding must comply with Article 250. The wiring should be adequately supported and secured and protected from physical damage as practical.
- NFPA 70E provides the requirements for electrical workplace safety, this is the standard used by OSHA.

II. Lighting and Power
- We utilize GFCI protection as our Temporary Power Grounding Program.
- Use GFCI protection for all temporary lighting.
  - If temporary lighting is plugged in, use a single outlet, protected by GFI Breaker.
  - Do not hang temp lighting by the conductors. Support stringers by screw shell.
  - Replace missing or broken bulbs and bulb guards.
- Must use junction boxes for splices.
  - Provide physical protection for wiring where it is subject to abuse or where it enters a box; use connectors.

III. Maintenance
- Temporary wiring tends to get abused, sometimes severely during the course of construction. The temporary wiring should be maintained in a safe, code-compliant condition throughout the duration of the project. This aspect of temporary wiring is usually overlooked until something happens. Damaged circuits should be repaired or replaced.

IV. Inspections:
- Maintain a log of weekly GFCI testing.
- Maintain a log of weekly temporary lighting inspections.
- Maintain a log of weekly ladder inspections.
- Make sure breakers are identified in the temporary panels. Label breakers not in use as spare.
- Make sure all openings in temp panels are closed, breaker blanks, KO seals.
- If a City or County Electrical Inspection is required, we, (the electrical contractor), must request a wiring permit to install the temporary service. This wiring permit is usually separate from the building wiring permit. The local electrical City or State inspector authorizes the electric utility to connect power to the temporary service when the installation is found to comply with the provisions of the NEC®.
- Electrical inspectors tend to focus on the service and rarely look at temporary branch circuits for lighting and power – even during rough-in inspections on the building wiring.
V. Rerouting and Moving
- Where circuits for power and lighting have to be extended or re-routed to accommodate the various crafts or phases of construction, it should be done with the power disconnected and locked out. Circuit directories are a challenge to create and maintain on construction projects, but are essential and a requirement for OSHA.
- Always follow the applicable electrical safety rules when working with temporary wiring or permanent wiring installations. The hazards are essentially the same.

VI. Removal
- The NEC requires temporary wiring to be removed when the project is completed. Notice that this requirement applies to all temporary wiring and does not distinguish between accessible and inaccessible wiring. See NEC 590.3(D) for installation removal requirements.

A. Application of National Electrical Code Rules

Temporary wiring and installations are covered in article 590 of the 2008 National Electrical Code or NEC®.

| Chapter 1 - General                      | Applies generally to all electrical installations |
| Chapter 2 - Wiring and Protection       |                                                   |
| Chapter 3 - Wiring Methods and Materials|                                                   |
| Chapter 4 - Equipment for General Use   |                                                   |
| Chapter 5 - Special Occupancies         | Supplements or modifies Chapters 1 through 4    |
| Chapter 6 - Special Equipment           |                                                   |
| Chapter 7 - Special Conditions          |                                                   |
| Chapter 8 - Communications Systems      | Chapter 8 is not subject to the requirements of Chapters 1 through 7 except where the requirements are specifically referenced in Chapter 8 |
| Chapter 9 - Tables                      | Applicable as referenced                         |
| Annex A through Annex D                 | Informational only, not mandatory                |

Fig. c - Code Arrangement for Application of Rules

Chapters 1 through 4 generally apply to all electrical installations. Chapters 5, 6, and 7 either supplement or modify Chapters 1 through 4. In some cases, the rules in Temporary Wiring modify the requirements of Chapters 1 through 4. The appropriate location for Temporary Wiring is outside Chapters 1 through 4 – Article 590.
Temporary Wiring Practices and Guidelines

The most important single thing to keep in mind about all of this is that if it isn’t specifically modified by Article 590, the rules in Chapters 1 through 4 have full force and effect. For example there is nothing in Article 590 that modifies any of the grounding rules in Article 250, so all of Article 250 applies to temporary wiring. We see this statement in Section 590.2(A): See Below

B. Temporary Wiring Articles - NEC Handbook

Article 590.2(A) Other Articles. Except as specifically modified in this article, all other requirements of this Code for permanent wiring shall apply to temporary wiring installation.

Article 590.2(B) Approval. Temporary wiring methods shall be acceptable only if approved based on the conditions of use and any special requirements of the temporary installation.

Article 590.3(A) During the Period of Construction. Temporary electric power and installations shall be permitted during the period of construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities.

Article 590.3(B) 90 Days. Temporary electric power and lighting installations shall be permitted for a period not to exceed 90 days for Holiday decorative lighting and similar.

Article 590.3(C) Emergencies and Tests. Temporary electric power and lighting installations shall be permitted during emergencies and for tests, experiments, and development work.

Article 590.3(D) Removal. Temporary wiring shall be removed immediately upon completion of construction or purpose for which the wiring was installed.

Article 590.4(A) General. Services shall be installed in conformance with Parts 1 through VIII of article 230, as applicable.

Article 240 Overcurrent Protection
Article 250 Grounding and Bonding
Article 310 Conductors for General Wiring

C. Services

Services shall be installed in conformance with Article 230. This is the statement made in Section 590.4A. No exceptions or modifications allowed. A service is a service is a service. The same hazards exist on a temporary electrical service as a permanent electrical service.

Overhead conductor clearances, equipment ratings, grounding electrodes, location, and protection from physical damage are some of the service installation concerns.
Typical Overhead Temporary Service

Conductors other than service conductors are not permitted to be installed in the same service raceway. Section 230.7

Overhead service conductors must maintain minimum vertical clearance of 10 feet (3.0 m) from surfaces from which they might be reached and 18 feet (5.5 m) over areas subject to truck traffic. Section 230.24(B)

Conduit Hub (threaded boss) Section 250.92(B) and 230.53

Panelboard enclosure must be suitable for the environment. If installed outdoors, either a NEMA 3 or 3R must be used, unless a weather resistant structure is utilized.

Any electrode permitted by Section 250.52

Fig. d - Typical Overhead Temporary Service

The connection between the meter enclosure and the service panelboard, as depicted in the drawing, is the recommended method of connection. The conduit hub, when fitted with an ‘O’ ring is raintight, and when listed for bonding service equipment will bond the interconnecting nipple as required by Section 250.92(A).
Note: Some inspectors and utilities will not permit connection of the grounding electrode conductor in the metering equipment. *It is individual company policy that the connection shall be made at any accessible point from the load end of the service drop or service lateral to and including the terminal or bus to which the grounded service conductor is connected at the service disconnecting means. An additional benefit of this method is that it is more readily accessible for the inspector.*

250.24(A) (1) General. The grounding electrode conductor connection shall be made at any accessible point from the load end of the service drop or service lateral to and including the terminal or bus to which the grounded service conductor is connected at the service disconnecting means. **Despite the language of 250.24(A) (1), you must follow local rulings.**
D. Jobsite Trailers

Jobsite trailers aren’t mentioned in Article 590; they’re discussed in Mobile Homes, Manufactured Homes, and Mobile Home Parks – Article 550.

**Section 550.4(A). Mobile Home not intended as a Dwelling Unit** – for example, contractor’s onsite offices, etc. – shall not be required to meet all of the provisions of Article 550 pertaining to the number and capacity of circuits. But if supplied from a 120-volt or 120/240-volt ac power supply, they are required to meet all of the other applicable requirements of Article 550.

**Section 550.32 (A). Mobile Home Service Equipment.** The service equipment for the mobile home (job-site trailer) must be located adjacent to the mobile home and not mounted on the mobile home (job-site trailer). It must be located in sight from and not more than 30 feet (9.0 m) from the exterior wall of the mobile home. Service equipment is permitted to be located elsewhere on the premises provided a disconnecting means suitable for use as service equipment is located in sight from and not more than 30 feet from the mobile home.

**Section 550.10(1)** The feeder to the job-site trailer is required to consist of four continuous, insulated color-coded conductors, one of which is required to be an equipment-grounding conductor.

E. Panelboard Covers

It isn’t hard to keep the cover on a temporary power panelboard. The real challenge is keeping covers on permanent panelboards during construction. Branch circuits are continuously being pulled in and terminated, and permanent panels inevitably supply temporary lighting and receptacle outlet circuits.

**Cardboard or Wood isn’t the solution!**

- **312.10(C) Nonmetallic Cabinets.** Nonmetallic cabinets shall be UL listed.
- **110.3(B) Installation and Use.** Listed or labeled equipment shall be installed and used in accordance with any instructions included in the listing or labeling.

When utilizing permanent panelboards, the permanent dead front and permanent panel cover must be used.
F. Temporary Feeders and Branch Circuits

Use of individual conductors for temporary lighting was banned after a case where a fatal accident occurred in Harrisburg, Pennsylvania when a worker on a scaffold was killed when one of the metal studs he was removing cut into a single conductor which energized the metal stud.

Temporary feeders are permitted to be cable assemblies, (including Type NM and NMC cables) multiconductor cords, or single-conductor cords – Section 590.4(B).

- **590.4(B) Feeders.** Overcurrent protection shall be provided in accordance with 240.4, 240.5, 240.100, and 240.101. For the purpose of this section, Type NM and Type NMC cables shall be permitted to be used in any dwelling, building, or structure without any height limitation or limitation by building construction type and without concealment within, floors, or ceilings.

Flexible cords used as feeders must be identified for hard or extra-hard usage according to Table 400.4. Individual conductors, as described in Table 310.13, are not permitted as open conductors but must be part of a cable assembly or used in a raceway system.

- **590.4(C) Branch Circuits.** All branch circuits shall originate in an approved power outlet or panelboard. Conductors shall be permitted within cable assemblies or within multiconductor cord or cable of a type identified in Table 400.4 for hard usage or extra-hard usage.

- **590.4(J) Support.** Cable assemblies and flexible cords and cables shall be supported in place at intervals that ensure that they will be protected from physical damage. Support shall be in the form of staples, cable ties, straps, or similar type fittings installed so as not to cause damage.

Romex is not permitted to be in direct contact with building steel. When necessary, PVC sleeves or tie wrap cradles are to be used to prevent direct contact between the Romex and the building steel.

- **1926.405(g) (1) (iii) Prohibited Uses.** Unless necessary for a use permitted in paragraph (g) (1)(i) of this section, flexible cords and cables shall not be used:

- **1926.405(g)(1)(iii)(D) Where attached to building surfaces:**
G. Splices

- **590.4(G) Splices.** On construction sites, a box shall not be required for splices or junction connections when the circuit conductors are multiconductor cord or cable assemblies, provided that the equipment grounding continuity is maintained with or without the box.

  **Best Practice is to utilize a junction box with proper connectors and box support.**

- **110.14(B) Splices.** Conductors shall be spliced or joined with splicing devices identified for the use. All splices and joints and the free ends of conductors shall be covered with an insulation equivalent to that of the conductors or with an insulating device identified for the purpose. Wire connectors or splicing means installed on conductors or direct burial shall be listed for such use.

Splices must be made in such a way as to prevent any strain on wire connectors. Best Practices will use boxes with box connectors to prevent the strain on wiring.

H. Terminations at Cabinets and Boxes

- **590.4(I) Termination(s) at Devices.** Flexible cords and cables entering enclosures containing devices for termination must be secured to the box with fittings designed for the purpose.

Entering an enclosure with flexible cord or cable through an open knockout without a connector is a sure invitation for a citation.

I. Ground-Fault Protection

**590.6 Ground-Fault Protection for Personnel.** Ground fault protection for personnel for all temporary wiring installations shall be provided to comply with 590.6(A) and (B).

(A) **Receptacle Outlets.** Temporary receptacle installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, shall comply with requirements of 590.6(A)(1) through (A)(3).

OSHA Construction Standard 1926.404 Wiring design and protection, also provides some important guidelines to temporary power.

**1926.404(b)(1)(ii) Ground-fault circuit interrupters** All 120-volt, single-phase 15- and 20-ampere receptacle outlets on construction sites, which are not a part of the permanent wiring of the building or structure and which are in use by employees, shall have approved ground-fault circuit interrupters for personnel protection.
(B) Use of Other Outlets. For Temporary wiring installations, receptacles other used to supply temporary power to equipment used by personnel during construction shall have ground-fault circuit-interrupter protection or assured equipment grounding program.

Outlets that are 220-volt are to be GFCI protected and are generally not provided unless specified in the contract.

J. Branch Circuits for Receptacles and Lighting
- 590.4(D)(1) All Receptacles. -- Receptacles on construction sites shall not be installed on branch circuits that supply temporary lighting.
- 590.4(F) Lamp Protection. All lamps for general illumination shall be protected from accidental contact or breakage by suitable luminaire or lamp holder with a guard.
- 590.4(J) Support. Cable assemblies and flexible cords and cables shall be supported in place at intervals that ensure that they will be protected from physical damage. Support shall be in the form of staples, cable ties, straps, or similar type fittings installed so as not to cause damage.

The intent is to require separate circuits for lighting and receptacle loads to prevent the activation of a fuse, circuit breaker, or ground-fault circuit interrupter, due to fault or equipment overload, from de-energizing the lighting circuit.

K. Weatherproof Covers
This style of weatherproof cover is now required in outdoor wet locations.
- 406.9(B) Wet Locations. 15 and 20 ampere receptacles installed in a wet location shall have an enclosure that is weatherproof whether or not the attachment plug cap is inserted.

Generally this style of cover will not stand much abuse – it won’t survive intact on construction sites. There are metal covers, in this style, that are considerably more durable, but they are more expensive.

406.9(B) Exception: 15 and 20 ampere receptacles installed in a wet location and subject to routine high-pressure spray washing shall be permitted to have an enclosure that is weatherproof when the attachment plug is removed.

This style of cover is permitted in damp locations and other indoor wet locations where the product plugged in will be attended while in use, and where wash down with high pressure spray washer is done.
L. Temporary Lighting (Fixtures)

- \textbf{1926.505(a)(2)(ii)(E)} All lamps for general illumination shall be protected from accidental contact or breakage. Metal-cage sockets shall be grounded.

Temporary lighting must be a factory assembly.

Support

- \textbf{1926.505(a)(2)(ii)(F)} Temporary lights shall not be suspended by their electric cords unless cords and lights are designed for this means of suspension.

Unsupported fixtures are an open invitation for a citation.
Hooked through Sprinkler brace

Plugged into GFI receptacle mounted on ceiling
Stapled loose so doesn’t contact steel beam

Stapled around steel beam; a little too close
Transformer attached to temp power skid.
Light Switch for temp lighting. GFI breaker protected.
Labeled Panel: Danger High Voltage, Do Not Enter.

English and Spanish as may be required.
Strain Relief for additional temp power cord.

PVC sleeved wiring for temp wiring in exposed areas.
Temporary power attached to building steel. Not Good.

Small movable temp power
Temp power secured and marked along the exterior of building.

Caution – Warning Tape
Temp wiring secured up out of the way.