



THE WIRE

Published by
The Electrical Clearing House of Louisville
Established: 1912

102 Whirlaway Ct, Cox's Creek, KY 40013
502.528.9319
www.echlky.com

NOVEMBER 2021

President's Letter

Our October general membership meeting was very well attended with 48 members present. We had a lot of good discussion and member interaction regarding the bonding of CSST gas lines. We also discussed grounding and bonding concepts. I'd like to thank Dennis Steier again for helping out.

We also had some great suggestions for upcoming classes such as L.G.&E. meter bases, electric vehicles and charging stations, solar installations, and "smart" breakers. We have begun working on putting something together with these suggestions.

For our November 8th meeting, ABB is scheduled to do a presentation on overcurrent protective devices as well as short circuit current ratings on equipment. It looks like another informative topic will be presented. The best that we can determine, Kentucky is still under a State of Emergency. **Once** the state of emergency is lifted, license holders will be given 120 days to obtain their continuing education. As it is right now, if you have had two renewal dates since March 2020, you will be required to obtain 12 hours for your respective licenses. However, the Department of Housing, Building, and Construction may modify this decision. I have been told that the Department will notify the various organizations when a decision has been finalized. For more information, please call the Department at (502) 573-2002.

There is a reported renewed interest in establishing advisory committees to assist the Department of Housing, Building, and Construction. It's in the preliminary stages. I found out that the State Building Code must be adopted before the National Electrical Code can move forward. Apparently, this was a legislative move during the previous administration. Another reason why politics need to be monitored.

At the October executive committee meeting we met with our website developer. I believe we have measures in place to keep the website updated and current.

Continued on page 3

NOVEMBER 8th, 2021 Code Program Sign-in 6:30 P.M. - Program at 7:00 P.M.

ELKS LODGE # 8 - 2824 KLONDIKE LN -

Our November program is being presented by Mike Tobin, Technical Design Engineer in the Nashville District, with ABB. Mike served nine years in the US Navy's Nuclear Power program, including service on two submarines. After College, Mike started his professional career as a Product Engineer at SPD Technologies, (now part of L3), supporting Military circuit breakers and gear.

After College, Mike started his professional career as a Product Engineer at SPD Technologies, (now part of L3), supporting Military circuit breakers and gear. Mike started ABB in July 2019, after working in numerous positions within the electrical industry, during this time moved to Silicon Power Corp, where he developed the world's first MV static transfer switch, a 15kV, 15 MVA system.

Dennis will go over the Code Questions in the November Wire.

We encourage you to participate by asking questions.

Stay Informed, Work Smart & Stay Alert!

Dues Renewal

It is time to re-new your ECHL membership. Invoices were included in the September Wire. Your membership is especially important to us, especially at this time of uncertainty. We are pleased to get back to our monthly routine of providing our members with up to date training.

Denise Arnold and I have missed everyone and are looking forward to getting back to a full house and seeing you!

!!! Bring a electrical friend with you!!!

Answers to OCTOBER Code Questions

- | | |
|--------|-----------------------|
| 1. NO | 4. No |
| 2. NO | 5. Class 1 Division 1 |
| 3. YES | 6. No |

NOVEMBER Code Questions

- What size octagon box is required for 5—#12 and 4—#14 Conductors? Where would you find this answer in the 2017 NEC?

A) 1 1/4" C) 2"
B) 1 1/2" D) 2 1/8"

Section _____
- The branch circuit conductor supplying a 3/4 hp, single phase, 115v motor shall have an ampacity of at least _____? Where would you find this answer in the 2107 NEC?

A) 13.8 C) 20.5
B) 17.25 D) 16

Section _____
- What is the wire bending space at the terminal of enclosed motor controllers for a 2/0 THHN? Where would you find this answer in the 2017 NEC?

A) 5" C) 6"
B) 8" D) None of above

Section _____
- Can portable power distribution equipment not listed for outdoor use be used in an outdoor temporary installation? Where would you find this answer in the 2017 NEC?

YES NO

Section _____
- Can THWN conductors be install in a conduit in an elevator shaft? Where would you find this answer in the 2017 NEC?

YES NO

Section _____
- Can a metal cable tray be used as an equipment ground? Where would you find this answer in the 2017 NEC?

YES NO

Section _____

Code Corner

Article 250
Grounding and Bonding
Submitted by Dennis Steier

The topic of grounding and bonding was discussed at length at our monthly meeting regarding CSST and that the needs to bond it to the grounding system. That inspired me to go into Article 250 in this month's Code Corner.

First, let look at the definitions from Article 100 **Bonded**: *Connected to establish electrical continuity and conductivity.* **Grounded**: *Connected (connecting) to ground or to a conductive body that extends the ground connection.* You can see that there is a definite difference between them.

In the electrical industry, there are several conductors related to grounding and bonding that we refer to and use on a daily basis. The proper sizing of these grounding and bonding conductors are a critical part of a proper installation of an electrical system.

In the *National Electric Code* there are three main tables you will use to size grounding and bonding conductors. The first is **TABLE 250.66: Grounding Electrode Conductors for Alternating Current Systems**. Then you have **Table 250.102(C) (1): Grounded Conductor, Main Bonding Jumper, System Bonding Jumper for and Supply Side Bonding Jumper for Alternating Current Systems**. The third table you need is **Table 250.12: Minimum Size Equipment Grounding Conductors for Grounding Raceway and Equipment**.

There is a lot of sometime confusion between Bonding and Grounding and hopefully by utilizing the three tables and knowing the difference between the terms, it will help you choose the proper size conductor for your particular installation.

Submitted by Dennis Steier

President's Letter Cont'd

Hope you will be able to attend the November 8th meeting. It starts at 7:00 pm with sign-ins beginning at 6:30 pm. The location is at the Elks Lodge 2824 Klondike Lane.

As Always Stay Safe and Work Safe
Steve Willinghurst
ECHL President

LG&E NEWS

Rigid Riser Standards

It has been brought to our attention that some electricians are concerned about LG&E's stance on 200-amp entrance rigid risers needing to be 2-1/2" on service upgrades. This standard has been in place since 2010. Some locators have not enforced it in the past however it has been decided that we will no longer allow it going forward. We are allowing a grace period, in some cases, to allow the pipe to stay "as is" at the discretion of the locator as we move forward with this requirement. Please note that we are doing so to protect the customer and company from damage due to weight of cable and other possible load safety concerns. Keep this in mind even though the inspector can approve a smaller size. Please note, if a channel iron is present, a 2-1/2 inch is not required.

Submitted by Henry Ford

Supporting our Industry

**** Electrical Equipment Needed ****

ECHL is committed to supporting the electrical industry and the training required to further the trade. In doing so, we ask for your old equipment / inventory to use for training.

ECHL contractors and or suppliers - if you are cleaning out your old inventory and have material (electrical equipment) that is taking up space in your warehouse the Iroquois High School Electrical Program is seeking material that can be used for teaching students about electrical products they may encounter in the field. Educating our future apprentices is the goal.

Old or new! Glenn will take it all. Contact Glenn Piffer by email Glenn at glenn.pifer@jefferson.kyschools.us or at 502-500-0668 to arrange for delivery or pick up.

Thanks for your support!

Top Three Code Violations Louisville Metro Inspections

NOVEMBER 2021

These violations are costing you time and money.

1. Non-conductive coatings on equipment to be grounded shall be removed to ensure good electrical continuity.

NEC Article # 250.12

2. Main bonding jumpers and system bonding jumpers shall not be smaller than specified in Table 250.102(1)

NEC Article # 250.28(D)

3. A grounding Electrode conductor connecting a rod, pipe, or plate electrode shall not be required to be larger than #6 copper wire.

NEC Article # 250.53()

Please review the NEC articles above. Each of these articles are associated with a violation. Please keep in mind to follow through with the current approved CODE..

Being Turned down on a project, you lose money and time required to return to the job site for repairs to correct the violation.

We hope this will help save you time and money on inspection fees by reviewing the articles and making sure you have not violated the code before calling for the initial inspection.

Submitted by:

Arnold Hornback
Assistant Chief Electrical Inspector
Louisville Metro Dept of Codes and Regulations

PARDON THE INTERRUPTION: Replacing Circuit Breakers or Fuses in Existing Homes

Take care when replacing circuit breakers and fuses in existing services and panelboards at single-, two- and multifamily homes. Older single- and two-family homes with 100A to 200A, 120/240V single-phase services were usually guaranteed by the local electric utility companies to have maximum available fault currents of 10,000A rms (root means square or average) with 14,000A asymmetrical. The utility companies use either pole- or pad-mounted transformers that have enough impedance to limit the fault current to a maximum of 10,000A.

Multifamily apartments and single-family homes with services larger than 200A usually have higher available fault currents and require different designs to limit the fault currents at the service and downstream at panelboards within apartments and at multiple panelboards for large homes.

Understanding the applications of circuit breakers and fuses at dwellings helps the electrical contractor and service electricians understand the limitations of new and replacement overcurrent devices, such as circuit breakers and fuses, and the interrupting ratings of these devices. Circuit breakers and fuses are intended to interrupt fault current at the level of fault current that is delivered to the line terminals of the overcurrent device. Each overcurrent device will normally have an interrupting rating shown on the circuit breaker or fuse. Every circuit breaker having an interrupting rating other than 5,000A must have that rating marked on the breaker. In other words, if there isn't an interrupting rating on the circuit breaker, then the circuit breaker is only rated at 5,000A and cannot be installed in a panelboard with more than 5,000A of fault current. Fuses will be marked with the interrupting rating whenever the rating is higher than 10,000A. Where the available fault current delivered to the service or the panelboard is in excess of the interrupting rating of the fuse or circuit breaker and a fault occurs, massive damage can occur, causing the fuse or circuit breaker to blow apart.

As I travel around the country lecturing on the National Electrical Code, I hear about utility companies that are installing transformers for single-family homes with 100A–200A service sizes with available fault currents exceeding 10,000A and, in some cases, up to 22,000A

Pardon the Interruption: Cont'd

and higher fault current. Where higher fault current values are encountered, a few methods can be used to reduce the available fault current so as not to exceed the interrupting ratings of the existing circuit breakers and fuses. One solution is to use circuit breakers designed and tested as a series-rated system. For example, a series-rated system may have a 22,000A rating on the service main circuit breaker that has been tested to provide protection for downstream 10,000A branch circuit breakers in the panelboard. When a fault occurs below the branch circuit breaker, the fault current on the line side of the main circuit breaker will cause the main to start to open. As the main breaker starts to open, the impedance in the arc internal to the 22,000A interrupting-rated breaker will restrict the amount of fault current downstream to no more than the 10,000A rating of the branch circuit breaker. Series rated combinations are tested as a system and the service equipment and downstream panelboards must be field marked to indicate that they are special systems. Any replacement breakers must be series rated by the manufacturer of the main breaker and the downstream devices. These series-rated systems are commonly found at apartment complexes and larger residential services where proper replacement of series rated breakers is critical to the safe operation of the electrical system. Another method of reducing the available fault current downstream of the main service is to install current-limiting fuses or circuit breakers at the service main to ensure that the fault current at the downstream branch circuit devices will not exceed the interrupting rating of these downstream devices. Current-limiting fuses or circuit breakers are defined in the NEC as “a device that, when interrupting current in its current-limiting range, reduces the current flowing in the faulted circuit to a magnitude substantially less than that obtainable in the same circuit if the device was replaced with a solid conductor having comparable impedance.”

In other words, a current-limiting device must have enough fault current going through the device in a fault to react and clear a fault within the first half cycle of the fault. The service equipment or panelboard must be marked to indicate that any replacement fuse or circuit breaker must be of the same type of current limitation. Take care that proper overcurrent devices are installed for the original and replacements for maximum safety of the system.

Source: Mike C. Ode, Electrical Contractor Magazine – Published Nov-2020