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## A Message From the Executive Director:



**Hello, everyone!**

I hope everyone enjoyed our fall and now, into winter!

What a year!! COVID-19, election, what else could have happened?

We're excited to announce and congratulate the board-appointed members of our new education committee! Adam Kidwell, Jeff Kirstein and Christian Opp will all represent the apprentice education member, Tim Pull will represent the master electrician member, Ivan Maas will represent the On-Campus member, Brian Fuder will represent the Off-Campus member, Brian Poykko will represent the professional electrical engineer member and Steve Mundahl will represent the journeyman electrician member.

We're anticipating meeting for an organizational meeting sometime in February if schedules allow. This committee will advise the board of

electrical education opportunities and review the subject matter. We want to thank these individuals for their willingness to help promote and be a part of the education for the electrical industry in North Dakota. Scott Halle will serve as the training administrator position on the committee and obviously I will fill the executive director position. We're looking for a positive direction from this committee to maintain the quality of electrical education in North Dakota at the high-level North Dakota is known for. The committee member terms are staggered every 3 years. The board didn't receive any applications for the power limited electrician position, who should be certified as an instructor by a vocational education department. So, if there are power limited qualified individuals out there, let me know.

Our CEU classes have been a challenge to conduct in certain locations. Some of the venues have either closed or are not hosting gatherings but Scott Halle is working diligently to still have our classes in the 8 cities we typically have

them in so please be patient and check our website for updates on this. Keep in mind the actual location and date for that city may change.

The board, also in its pursuit in "promoting" the electrical industry, has given out approximately \$135,000 in \$500 individual scholarships to ND students enrolled in an approved electrical higher education program or in an approved related training apprenticeship program this first semester!

If you have more ideas on areas we can improve, we encourage your input on electrical happenings in ND. If you have questions or comments please send an email or give me a call as I'd like to visit with you!

Check out our website often for new information: [www.ndseb.com](http://www.ndseb.com)

Email us at: [electric@nd.gov](mailto:electric@nd.gov)

I wish you enough,  
- James Schmidt

## Grounding Requirements for Separately Derived Systems

Many electrical installations involve a separately derived system, and in today's article we will discuss the grounding requirements related to these installations. A separately derived system is defined in the NEC as an electrical source, other than a service, having no direct connection to circuit conductors of any other electrical source other than those established by grounding and bonding connections. An isolation transformer is a good example of a separately derived system as there is no connection between the primary side conductors and the secondary side conductors. Another separately derived system we may commonly encounter is a transfer switch that includes switching the neutral conductor. It is very important when installing a separately derived system that we ground the system to earth and bond all non-current carrying parts and equipment to the grounding point of the separately derived system to ensure stabilize voltage to ground and establish an effective ground fault current path.

For most of us, the most common separately derived system we will encounter in the field is a transformer installation where we are stepping down the voltage system from 480/277 volts to 208/120 volts and supplying electrical equipment and receptacles. Since we are changing the voltage characteristics of the

system through induction between the primary and secondary windings, any ground reference is lost and must be reestablished by grounding and bonding the system in accordance with NEC 250.30. By following the NEC requirements, the system will be safe to operate, capable of clearing faults quickly and effectively, and free from power quality problems with a stable phase to ground voltage.

NEC 250.30 directs us to comply with 250.30(A) for a grounded system, or to comply with 250.30(B) for ungrounded systems, since most of us typically deal with grounded systems that is what this article will focus on. Also, here we are directed to comply with 250.20, 250.21, 250.22 and 250.26 which outlines which systems shall be grounded, are not required to be grounded, or are required not to be grounded, as well as which conductor shall be grounded. Where multiple power sources of the same type are connected together in parallel to supply the premises they are to be considered a single separately derived system and comply with 250.30.

An unspliced system bonding jumper must be installed at any single point on the system from the source to the first system disconnecting means or overcurrent device and shall comply with 250.28(A) - (D). The system bonding jumper can be copper, aluminum, copper clad aluminum, or

other corrosion resistant material and can be a wire, bus, screw, or similar suitable conductor. If the system bonding jumper is a screw it must have a green finish visible after installation, and the system bonding jumper must comply with the permitted methods of connection specified in 250.8. The system bonding jumper will be sized using Table 250.102(C)(1) according to the largest ungrounded conductor supplying the enclosure, or the equivalent area if there are multiple supply conductors in parallel. When the separately derived system supplies more than one enclosure, you will size the system bonding jumper in each enclosure according to the size of the largest ungrounded conductor serving each enclosure, or a single system bonding jumper can be installed in the source and sized according to the sum of the largest ungrounded conductors supplying each enclosure.

For a transformer installation, typically the source of the separately derived system and the first disconnecting means are installed in different enclosures, a supply side bonding jumper shall be installed from the source enclosure to the first disconnecting means enclosure. A common mistake here is sizing a wire type supply side bonding jumper using the wrong table, you must use Table 250.102(C)(1) - not 250.122, which is for equipment grounding conductors and will often result in a conductor that is undersized for the application. A similar process is used for determining the size of the grounded conductor when the system bonding jumper is not located at the source. Following the requirements of 250.30(A)(3) and using Table 250.102(C)(1), be sure if using parallel conductors that the grounded conductor is installed in each raceway and the conductors cannot be smaller than 1/0.

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The separately derived system must be connected to the building or structure grounding electrode system to reestablish a reference to ground for the system and the requirements are found in 250.30(A)(4) through (8). Size the grounding electrode conductor for a single separately derived system according to Table 250.66 for the derived ungrounded conductors, and the connection must be made at the same point on the separately derived system that the system bonding jumper is connected. Where multiple separately derived systems are installed a common grounding electrode conductor may be installed to serve the systems sized according to the requirements of 250.30(A)(6), or individual grounding electrode conductors can be installed to each enclosure as for a single system. Structural steel and metal water piping shall be connected to the grounded conductor of the separately derived system following the requirements in 250.104(D).

We have reviewed some of the main points regarding separately derived systems and how the code requires them to be grounded, but there are many different situations you will encounter in the field and we can't cover all of the requirements and exceptions in the space we have available here. Be sure to review the requirements in NEC Article 250 Grounding and Bonding to find the specific information you need to properly install the system you are working on. It is very important that these systems are properly installed for safe and efficient operation. ☺

**My son kept chewing on electrical cords, so I had to ground him.**

**He's doing better currently and conducting himself properly.**



## News & Notes from NDSEB

**ADDITIONAL NDSEB CONTINUING EDUCATION CLASSES.** NDSEB added two extra CEU classes to our roster. Although the one for February 11, 2021 in Grand Forks is now full, the one for February 4, 2021 in Bismarck at the Ramada Inn is still open for registration at the time of this newsletter. See our website for registration.

**ELECTRICAL EXAMS.** Due to COVID-19, the testing sites are requiring social distancing and wearing a face covering/mask. The exams now will be held Mondays and Tuesdays until further notice which will accommodate up to 14 persons each exam day. IF you're feeling the least bit ill, stay home. We're trying to keep a safe environment for test takers and staff.

The exams on the 2020 NEC & ND Wiring Standards codes will begin January 2021. See our website for dates. After your application is approved, call our office to sign up for a day that fits your schedule.

**2020 NEC EFFECTIVE JANUARY 1, 2021.** The Laws, Rules and Wiring Standards of North Dakota and the 2020 National Electrical Code (NEC) is effective January 1, 2021. There was one 2020 NEC exemption added to the ND Wiring Standards which is 230.67 Surge Suppression. This will be optional and not required.

Be sure to read through the new 2020 Laws, Rules and Wiring Standards of North Dakota to collect all the changes to the 2017 codes.

**ANNUAL LICENSE RENEWALS COMING SOON.** Licensed electricians must renew their license every year and the time is approaching for the next renewal. Online renewal at [www.ndseb.com](http://www.ndseb.com) starts January 1, 2021 as Journeyman licenses expire on March 31, 2021 and Master / Class B licenses expire on April 30, 2021. N.D. Laws, Rules & Wiring Standards 24.1-03-01-01(5) states effective November 1, 2020, annual renewals must be submitted electronically through the board's website.

A postcard reminder will be mailed out to all active Journeyman the first week of February, 2021 and active Master / Class Bs the first week of March, 2021. It is always a good idea not to wait until

the last minute. In order to renew your license, you must have eight hours (four of which must be code-related) of continuing education credits available. Please refer to the set of numbers in front of your name label on the postcard. These numbers represent code and non-code hours that this office has recorded and is available (example: 6/2 = 6 code and 2 non-code).

**CONTRACTOR ORIENTATIONS.** Contractor orientations have been going very well. We are seeing an increase of Master electricians electing to engage in an electrical contracting business in North Dakota. Orientations consist of an administrative rule and informational session (which currently are being conducted telephonically) that will provide the electrician, as well as an owner-representative of the business, with valuable information and to help understand what the NDSEB expects from a contractor.

As a reference: **NDCC 43-09-20 Installations made with master electrician, class B electrician, or power limited electrician - Requirement for liability insurance.**

1. A contract, agreement, or undertaking with another for the installation of electrical wiring or power limited wiring or the installation of electrical or power limited system parts of other apparatus may not be entered by anyone other than a master electrician or power limited electrician. A class B electrician may not enter a contract, undertaking, or agreement for the installation of electrical wiring, except for:

- Farmstead electrical wiring; or
- Residential electrical wiring in one or two family dwellings located in a city with a population of two thousand five hundred or fewer.

Upon becoming a master, class B, or power limited electrician (through exam, reciprocity or status change) and wanting to engage in contracting, there are steps that will need to be followed. These steps can be found on our website under Licensing, Electrical Contractor Guidelines & Requirements at:

[www.ndseb.com/licensing/electrical-contractor-guidelines-requirements/](http://www.ndseb.com/licensing/electrical-contractor-guidelines-requirements/)

If you have any questions or comments, please do not hesitate to contact us.

## A Word from the Director of Inspections

**Happy New Year! I hope everyone had a great Holiday Season and a Merry Christmas!**

We have heard there is some confusion around the country regarding Adjustable Trip Circuit Breakers and the affect these adjustments can have on wire sizing and arc energy reduction requirements found in NEC 240. It can be confusing if you do not read NEC 240.6 and NEC 240.87 in their entirety so I thought if these 2 sections of article 240 were on the same page, it might clear things up a little?

**Adjustable Trip Circuit Breakers:**  
**240.6(B)** If you have an external

means of adjustment, the RATING of the breaker shall be the maximum setting possible, and your conductors shall be sized off the maximum setting:

**240.6(C)** If you have adjustable trip setting that have restricted access, you may size your conductors to this setting if the restriction meets 1 of the 4 requirements:

- 1) Located behind removable and sealable covers over the adjusting means.
- 2) Located behind bolted equipment enclosure doors.
- 3) Located behind locked doors accessible only to qualified personnel.
- 4) Password protected, with password accessible only to qualified personnel.

**240.87 Arc Energy Reduction:** Where the highest continuous current trip setting for which the actual overcurrent device installed in a circuit breaker is rated **or can be adjusted** to 1200 A or higher, 240.87(A)(B) and (C) shall apply. This means even if the requirements in 240.6(C) are met and you size your conductors to the adjusted setting, ARC Energy Reduction is still required regardless of the plug rating or LTPU setting because it **COULD** be adjusted later to 1200A.

**240.87(C)** requires performance testing for the arc energy reduction protection system when the equipment is first installed on site.

With the adoption of the 2020 NEC on Jan 1, 2021, Arc Energy Reduction and Testing will also be required for fuses rated 1200 amps and higher: **NEC 240.67**

I hope this helps make things a little clearer when dealing with Adjustable Trip Breakers, conductor sizing and Arc energy Reduction.

Thanks and have a great 2021!

*Doug Grinde*

**UPDATED FORMS** The ND State Electrical Board is in the process of updating our forms. This is a work in progress so please visit our website, [www.ndseb.com](http://www.ndseb.com), under Forms, regularly to make sure you have the latest version of a form you plan on submitting.

### 5 - YEARS MARK MODEROW SERVICE AWARD PRESENTED

Mark started with the Board on January 12, 2015 as District 3 Electrical Inspector. Congratulations to Mark! We appreciate your years of service and dedication.

## Making A Connection: NDSEB Board Member Paul Durbin

Originally from Devils Lake, ND, Paul Durbin received his electrical engineering degree from the University of North Dakota. He has worked for Xcel Energy for 28 years in various capacities including design and engineering, major account management, and field construction, operations, and maintenance supervision. He currently serves as Field Operations Supervisor and works out of their Grand Forks office. He represents the Investor Owned Utilities on the NDSEB and was appointed in the spring of 2018.

**What is your favorite part of serving on the Board?** *Promoting safety and encouraging young people to check out the career possibilities in the electrical trades are some things I enjoy most about Board service.*

**What's the hardest part of serving on the Board?** *It's never an easy job to enforce the rules, regulations, and laws when it directly affects a tradesman's livelihood. It's a responsibility we as Board members have and we need to do it thoughtfully.*

**What's the biggest challenge you see facing the Board currently?** *The current pandemic has given us a fair amount of trouble. The Board has met virtually, but recently in person with*

*proper PPE and social distancing. Our staff has worked extremely hard and been creative to maintain business operations and keep up on field inspections. The pandemic also required changing how continuing education classes are delivered to preserve a safe and quality learning environment.*



**What are your hobbies?** *I am an avid Fighting Sioux hockey fan and have been since my college days. Home games and traveling for many road games is my winter entertainment. Hockey was always something big in my family. During the summer my career takes up most of my time*

**Do you have any advice for new electricians in the state?** *There are so many quality opportunities in the skilled trades, and many of the technologies people are expecting in their homes and businesses can only be safely delivered by skilled wiremen. Take advantage of options to learn and train at every level of your careers. And above all else keep you, your coworkers and your customers safety at the center of everything you do. ☺*