

The logo features the NECA acronym with a stylized wave and stars above it, followed by the text "North Florida Chapter" and "CONNECTION" in large, bold, white capital letters. The background is a dark blue with a glowing circuit board pattern.

NECA North Florida Chapter CONNECTION

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Upcoming Course Offerings

Identifying, Develop, and Retain High Potential Leaders

Leadership development is once again on the forefront of executive's thoughts as growth returns and the aging work force continues to leave the industry at an alarming rate. Realizing that leadership development efforts take years, this program presents a framework to identify those high potential leaders and to develop them using methods scaled down from the top companies in the world, so that they fit for any size of contractor.

March 9, 2021. 9 a.m. - 11 a.m.

Register here! <https://attendee.gototraining.com/r/7521487878350261761>

Advanced Estimating of Electrical Construction

Developed to discuss all phases of the estimating process, this course covers all phases of preparing a competitive bid. Key topics include identifying desirable bid opportunities, analyzing the company's capabilities to insure profitable results, the estimator's role at various stages of the project, writing an effective scope letter and identifying often hidden costs in the bid documents. Following this course, participants will be able to discuss the steps necessary to prepare a competitive bid, along with identifying often hidden costs in

the bid documents. As well as how to describe how a company's capabilities can be analyzed to ensure profits, and discuss cash flow and bonding and relevant contract terms. They will be able to identify price adjustment techniques, overhead, and profit. And finally, they will be able to list the documents required to estimate a construction project.

This class will be held in-house at the NECA office

April 12-13th, 2021. 8 a.m. - 4 p.m.

Recruit to Retire- How to Hire, Train, Retain, and Retire Key Employees

In this time of critical workforce shortage, it is imperative that we develop the skills necessary to attract and keep the best candidates. Once hired, however, the challenge is just beginning. Embarking on a path to determine how to retain the stars of our industry from their time of hiring to their time of retirement is becoming not only a plus, but a must. In this session, we will discuss hiring the right candidates, the onboarding and training process, engaging the employees in their own development and success, the mapping of career paths, and the retaining power of incentive compensation and deferred compensation packages.

May 11th, 2021. 9 a.m. - 12 p.m.

Technology and Transparency pt. II- Linking Technology to Performance

In this generation of construction, we capture more data than ever. That said, how accurate is the data you are capturing and , if it is not, what causes the problem? What do we do with that information once compiled and how is it started?

June 8th, 2021. 9 a.m. - 11 a.m.

Building Blocks of Best in Class Contractors

During this session, we will discuss the foundational pieces of best in class contractors that allow organizations to grown profitably while deploying the proper tools to minimize the risk associated with growth. Attendees will learn the basics of strategy development, business development, leadership development, business process re-engineering, project execution, prefabrication, and technology strategy providing a holistic view of the elements of "best in class" contractors. The "Building Blocks" model will be reviewed in detail and will be build upon throughout the entire program.

July 13th, 2021. 9 a.m. - 12 p.m.

Change Order Management pt. I

Effective change order management can dramatically reduce a subcontractor's view point and provides participants with hands on training in recognizing, scoping, pricing, and negotiating change orders. This course culminates in a mock negotiation where participants can immediately practice the skills that they have learned.

August 10th, 2021. 9 a.m. - 12 p.m.

Managing Yourself for Ultimate Personal Productivity

We all have the same 24 hours in a day. Why is it that some people can accomplish a lot while other struggle to make it through their in-box? It is impossible to manage time but you can develop self-management skills to make you more focused and productive. This interactive and reflective session will identify the time wasters that prevent you from reaching your potential and provide you with 10 tips on how to maximize productivity.

September 14th, 2021. 9 a.m. - 11 a.m.

Change Order Management pt. II

In this session, the group will discuss contract risk management and preservation of rights in order to increase the chances of financial recovery during project execution. Since the most valued information for contract conflict resolution come from those closest to the work, the basics of preparing that documentation and effectively translating the information will be discussed. The group will gain understanding and review examples of risky contract clauses, the process if claims management, the legalities of change order control, and preparation for lawsuits.

November 9th, 2021. 9 a.m. - 12 p.m.

Technology Trends that Drive Success

By 2020, Internet-connected devices from 400 million today to 50 billion and smart phones will have the capability of storing and accessing as much information as IBM's supercomputers. Technology will be even more critical in gaining new customers and recruiting key employees as everyone (employees, clients and competitors) will have hand-held access to the biggest, smartest, fastest computers in existence today and the workforce you hire has never lived without technology. Successful contractors understand the positive impact that technology has on business processes, the ability to respond to change, cost savings, efficiency and the bottom line.

December 14th, 2021 9 a.m. - 11 a.m.



Registration is now open for NECA's virtual leadership conference, to be held this April 13-14th. MECA Now 2021 is harnessing cutting edge technology and nationally known keynote speakers to deliver the two-day executive leadership conference focused on your professional and person growth. There will be 32 classes broken down into four tracks that offer you the opportunity to concentrate your learning in one segment, or to pick and choose across the disciplines. Using a familiar interactive platform, attendees will have the ability to network amongst themselves, with Premier Partners, and NECA staff.

Key note speakers include:

- **Marcus Lemonis** from CNBC's "The Profit"
- **Steve Pemberton**, Chief People Officer at Workhuman
- **Lisa Sun**, founder CEO of Gravitas
- **Steve Rowe**, infamous host of Dirty Jobs.

NECA Now 2021 schedule:

Tuesday, April 13th:

10 a.m. - 11 a.m.: Opening Plenary Session with Marcus Lemonis
11:15 a.m. - 11:55 a.m.: Breakout Sessions
12:10 p.m. - 12:30 p.m.: NECA Talks
2:10 p.m. - 3:10 p.m.: Breakout Sessions
3:25 p.m. - 3:45 p.m.: NECA Talks
4:00 p.m. - 4:15 p.m.: NECA Update
4:15 p.m. - 5:00 p.m.: Plenary Session with Steve Pemberton
5:00 p.m. - 6:00 p.m.: Networking Happy Hour

Wednesday, April 14th:

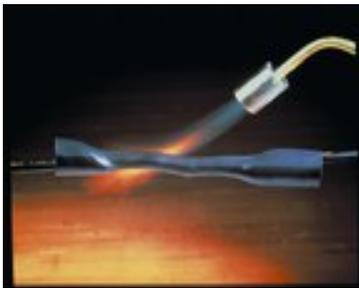
10 a.m. - 11 a.m.: Breakout Session
11:15 a.m. - 12:00 p.m.: Plenary Session with Lisa Sun
12:15 p.m. - 12:35 p.m.: NECA Talks
2:15 p.m. - 2:55 p.m.: Breakout Sessions
3:10 p.m. - 3:30 p.m.: NECA Talks
4:00 p.m. - 4:15 p.m.: NECA Update
4:00 p.m. - 4:45 p.m.: Closing Plenary Session with Mike Rowe
4:45 p.m. - 6:00 p.m.: Closing Reception

For updates and registration information, visit [the NECA Now 2021 page!](#)

For any issues with registration, please contact Chyanne at the NECA office and we will assist you in the registration process.
chyanned@nflneca.org

Heat Shrink vs Cold Shrink

Brought to you by 3M



Initially, Heat Shrink may provide a good environmental seal obtained with the adhesive and mastics included in the MV termination or joint. However, over time the cable can expand and contract due to temperature changes. During a rise in temperature, a heat shrink material may be able to expand at the same time. But, if the cable contracts due to temperature decreases, either because it returns to its initial temperature or it drops below its initial temperature, a rigid heat shrink material may not shrink with the cable, therefore leaving a void between the cable and the cable accessory. This void can allow moisture and contamination from dust, chemicals, etc to get into the cable accessory, which may accelerate the likelihood of failure. Long

term expansion and contraction of the cable could create cracks and splits in a rigid shrink installation.

-Rachel Salisbury, 3M Application Engineer

Cold Shrink Technology is designed to make cable insulating, termination and abandonment as simple as possible. The secret of 3M Cold Shrink Technology lies inside of it, in form of a plastic coil. After the Cold Shrink Tube has been placed over the joint or cable end, this inner spiral is pulled out. The insulating tube then contracts to its pre-stretched size and shrinks into the cable, exerting constant radial pressure for the lifetime of the joint or termination. Overall, Cold Shrink products saves time and money. Cold shrink is much quicker to install and does not require a permit like Heat Shrinking does.

Want to learn more about how Cold Shrink Materials could save your next project?

[Visit 3M online for more information!](#)

IBEW Meets with new Administration on Apprenticeship

IBEW International President Lonnie Stephenson made this statement following his meeting with President Joe Biden and other labor leaders.

"Today's meeting with President Biden was enormously productive in addressing how the labor

movement can work with the administration in putting Americans back to work and creating good-paying union jobs.

Biden reaffirmed his commitment to a pro-union, worker first agenda by reversing the previous administration's executive order creating Industry Recognized Apprenticeship Programs. IRAP's undermined training and safety across multiple industries and encouraged employers to lower apprentice's wages and benefits.

They were a direct threat to world-class training programs like the IBEW's and we applaud President Biden's decision to rescind them.

He also announced his support for Rep. Bobby Scott's National Apprenticeship Act of 2011, which will expand apprenticeship and pre-apprenticeship programs.

Finally, Biden announced that he would ask the Department of Labor to reinstate the National Advisory Committee on Apprenticeships. Building out economy back better requires unions, employers, educational and policy leaders to come together to expand apprenticeship opportunities for working Americans, and the committee is a vital forum for that. High-quality union apprenticeship programs are crucial to not only training and the next generation of skilled workers but helping rebuild America's middle class.

Additionally, today's nomination of Communications Workers of America Special Counsel Jennifer Abruzzo to serve as National Labor Relations Board general counsel is another step towards expanding workers' rights and protecting collective bargaining. The IBEW looks forward to continuing to work with the administration as we open the doors of opportunity for all working people and build an economy that works for everyone."

-Mark Brueggenjohann, IBEW Media Center

Codes and Standards Report

Grounding & Bonding Temporary Generators and Electrical Distribution Systems

Summary- Electricians often have an "Anything Goes; It's Temporary" attitude about grounding and bonding, when dealing with the installation of temporary electrical systems and generators on construction sites, individual facilities, special event venues, and disaster support sites. Electricity doesn't distinguish between permanent or temporary installations. That's why proper installation practices and workmanship apply to both. The main purpose of grounding and bonding is safety, yet the terms grounding and bonding, and grounded and their respective purpose are frequently misunderstood and misused in the field. This is especially true for portable and vehicle, including trailer-mounted generators. This short article discusses the purpose of system grounding, grounding requirements and separately derived systems.

System Grounding

The purpose of system grounding is to intentionally connect one system conductor as the "ground conductor" which is typically a neutral of an electrical system to earth in a manner that controls voltage with respect to the earth within predictable limits. The equipment grounding conductor(s) (EGC) are also connected to earth by the same grounding electrode conductor so the potential on the EGC is maintained the same as the grounded (neutral) conductor. The connection of the grounded (neutral) conductor to the EGC provides for the "effective ground-fault current path" to the source such as a generator. Grounding (connecting) to earth through an approved grounding electrode or grounding electrode system [example: ground rod(s)] as described in the 2017 *National Electrical Code (NEC)* Section 250.52(A)(1) through (A) (8) serves an important function within the electrical system.

The electrical system is intentionally grounded (connected) to earth in a specific manner to limit the voltage imposed by direct or indirect lightning strikes, line surges, or unintentional contact with higher voltage sources. The earth connection is also utilized to stabilize the voltage to earth during normal operations [250.4(A)(1)]. Earth to ground potential is usually considered zero or near zero. When there is a potential difference in charges between two points in an electrical circuit expressed in volts, current flow in the circuit will occur. Connecting to earth and creating a zero reference or zero potential difference eliminates touch potential between conductive surfaces and the earth in theory but is still based on the contact resistance of the earth connection.

The earth is not intended to be used as an effective ground-fault current path for fault detection and/or as a means of operating the overcurrent protection device (circuit breaker or fuse) to clear faults. The earth is conductive to a certain extent, but because of soil resistivity, it should never be considered as an effective path for ground-fault current. [250.4(A)(5)]. If a ground-fault should occur, the current will return

to the supply source on any available path with the majority going through that path of least resistance, which is the purpose of intentionally creating a low impedance path back to source through equipment grounding and bonding. Proper bonding of equipment intentionally creates an effective path for ground-fault current to travel back to the source to operate the overcurrent protective device (OCPD) effectively.

Grounding & Bonding Definitions

The following definitions are defined terms found in Article 100 of the 2017 edition of the NEC.

Bonded (bonding) is "connected to establish electrical continuity and conductivity." This is accomplished when the joining of metallic parts together forms an electrically conductive path with the capacity to carry the anticipated fault current. Bonding is used to establish the conductive path for all electrically conductive materials and metal surfaces of a structure, studio equipment, lighting (520.81), tent frames (525.30), stage trusses and equipment not normally intended to be energized. Bonding is effectively interconnecting all conductive materials and surfaces together. In temporary applications, this is normally accomplished through the equipment grounding conductor (EGC), which is sized to provide a low impedance path back to the source to carry the anticipated ground fault current and to avoid any appreciable potential difference between the parts [250.4(A)(3)]. Bonding provides a near-zero reference touch potential between conductive parts if a ground fault should occur.

Ground. The earth." Note: The earth is not considered an effective ground-fault path per 250.4(A)(5)

Neutral Conductor is "the conductor connected to the neutral point of a system that is intended to carry current under normal conditions." Examples of a neutral point would be a center connection on a single phase, 3-wire generator or the common point on a three phase, 4-wire, wye connected generator.

System Bonding Jumper is "the connection between the grounded circuit conductor and the supply-side bonding jumper, or the equipment grounding conductor, or both, at a separately derived system." The system bonding jumper provides electrical conductivity between the grounded (neutral) conductor and the equipment grounding conductor. The system bonding jumper is sized per table 250.102(V)(1) and is based on the largest ungrounded phase conductor. Pay close attention to the notes listed at the bottom of the table. In portable or trailer-mounted generators, the system bonding jumper is typically located in the generator housing at the output lug panel (N-G terminals and to frame). The generator must be marked to indicate of the neutral is bonded or not per section 445.11 [see Article 445, Generators].

Equipment Grounding Conductor (EGC) serves a vital role in electrical systems, to simply characterize its performance, it provides bonding, grounding and serves as an effective ground-fault current path. The EGC is used to connect the non-current carrying metal parts of the system together with the system grounded connector, the grounding electrode conductor, or both. The EGC provides a low impedance path to source for fault current to flow to facilitate the operation of the OCPD, should be a ground-fault occur. [See 250.4(A)(3) and 100 definition, "Informational Note 1: it is recognized that the equipment grounding conductor also performs bonding." Types of acceptable EGC can be found in 250.118. The EGC is size per 250.112 and based on the size of OCPD.

In temporary and portable electrical distribution system continuity assurance of the equipment grounding conductors is critical. Each time the portable system is installed, the continuity of the equipment grounding conductor must be verified per 525.32 (see Article 525, *Carnivals, Cruises, Fairs, and Similar Events*).

NEC Article 250 Part III explains the grounding electrode system and the grounding electrode conductor (GEC).

Grounding Electrode is "a conducting object through which a direct connection to earth is established". The grounding electrode can be a metal underground water pipe, concrete encased electrode (rebar or copper conductor), ground ring, ground plate, and ground rod see 250.52(A). The most common grounding electrodes installed for temporary generators are grounding rods.

Grounding Electrode Conductor is "A conductor used to connect the system grounded conductor or the equipment to a grounding electrode or to a point on the grounding electrode system." The grounding electrode conductor is used to connect the system grounded conductor or the equipment to a grounding electrode. The grounding electrode conductor is sized in accordance with 250.66.

Effective Ground-Fault Current Path is "An intentionally constructed, low-impedance electrical conductive path designed and intended to carry current under ground-fault conditions from the point of a ground fault on a wiring system to the electrical supply source and that facilitates the operation of the overcurrent protective device or ground-fault detectors." The effective ground fault current path is the intentionally constructed, low-impedance electrically conductive path designed to carry ground-fault current from the point of fault, back to the source to open the circuit OCPD to clear the fault before extensive damage occurs [250.4(A)(5)].

In temporary applications, when a generator is used as the sole source of power, it is important to understand the term **Solidly Grounded System**. A generator grounded (neutral) conductor to the ground (earth) without inserting any resistors or impedance devices between the system and ground is

considered "Solidly Grounded"

Note: Special consideration must be given to supplying power to temporary and/or portable concession trailers, stages, or tent structures. Bonding is required for metal raceways, metal enclosure for temporary electrical panel, metal frames, and metal parts of portable structures, trailers, and trucks per 525.30. This includes tent frames. Tents are considered portable structures Section 525.1 [see Article 525 entitled *Carnivals, Circuses, Fairs, and Similar Events*]. Per Section 525.31, all equipment to be grounded shall be connected to an equipment grounding conductor of a type specified by 250.118.

Don't forget the 12-foot rule per Section 525.11. Where multiple power sources or separately derived systems or both supply power to portable structures (tents) and are separated by less than 3.7 M (12 ft), the equipment grounding conductors of all power sources that serve the structure shall be bonded together at the portable structures. Prime example: one generator supplying 120/208-volt low voltage distribution to the tent, and another generator is running at 40 volts supplying power to HVAC equipment for the tent within the same proximity.

Grounding Electrode System & Grounding Electrode Conductor

Pay attention to Sections 250.52, 250.53, and 250.66; these sections intertwine with each other and can be misinterpreted.

Example 1: Grounding electrode conductor is sized per table 250.66 except as permitted in 250.66(A) through (C). If the grounding electrode connects to a rod, pipe, or plate and does not extend to other types of electrodes, then the grounding electrode conductor does not have to be larger than a 6 AWG copper wire 250.66(A).

Example 2: 250.53(A)(2) a single rod, pipe, or plate electrode shall be supplemented by an additional electrode of a type specified in 250.52(A)(2) through (A)(8) which basically means when a generator is considered separately derived, and a ground rod is required then you have to install two or more. One must read the exception listed at the bottom of 250.53(A)(2): "Exception: If a single rod, pipe, or plate electrode has a resistance to earth of 25 ohms or less, the supplemental electrode shall not be required." If a supplemental rod is required, they shall not be less than 6 feet apart [250.53 (A) (3)]. Note: One conductor terminates on each ground clamp unless the clamp is listed for multiple conductors 110.12(a). See figure 2 for an example of a generator connected to earth using rod electrodes. Note that ground rods are to be runny driven to achieve the 2.44 m (8 ft.) contact with the earth. From reference to Figure 1, we can assume the installer has installed two 8 ft, 6 in. ground rod(s). The end of the ground rod does not need to be left above grade for inspector to view. See 250.53(g).

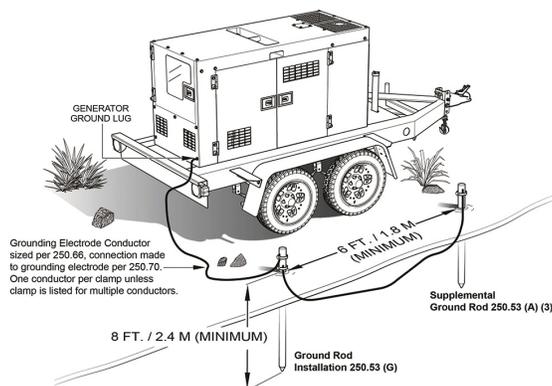


Figure 1. Illustration of a Generator Earth Grounded using Ground Rods. Courtesy of Multiquip, Inc.

Separately Derived System

Separately Derived System is "an electrical source, other than a service, with no direct connection(s) to circuit conductors of any other electrical source other than those established by grounding and bonding connections."

If a generator is the sole source of power for a temporary power distribution system, then by definition, it is a separately derived system. If a temporary generator is used as an alternate source of power to a building service, then how the grounded neutral conductor is connected will determine if the generator is a separately derived or not. If the transfer switch is designed to switch the neutral conductor (4-pole switch in a 3-phase, 4-wire system) in addition to the phase conductors, it would make the generator a separately derived system and must be grounded per 250.30. The generator is required to be field marked to indicate whether or not the neutral is bonded per 445.11. See Article 445, Generators.

Many temporary generators installed to supply power to a building service through a pre-existing transfer switch during disasters are not normally considered a separately derived system. The electrician must

verify how the neutral conductor is connected in the transfer switch and service panel prior to the installation of a temporary generator.

If the neutral conductor is not switched in the transfer switch (3-pole switch, 4-wire system) and it is not connected directly to the service neutral grounded conductor, then the generator is not a separately derived system, and the requirements of 250.30 will not apply.

Grounding Portable and Vehicle Mounted Generators

Per 250.34(A) and (B), portable vehicle-mounted generators are not required to be connected to earth as long as the neutral point is connected to the EGC and the frame generator, and the generator only supplies equipment, or receptacles installed on the generator (frame serves as grounding reference).

If the conductors to temporary electrical panels were hardwired into the generator lugs, then it would not meet the requirement of 250.34. and the generator would be required to be grounded to the earth in accordance with 250.30. The authority having jurisdiction (AHJ) [which could be the electrical inspector, building official, fire chief, facility engineer- see definition of AHJ in Article 100] can still require a single and supplemental ground-rod(s) to be driven at the generator. Please consult your local AHJ before the start of the project to determine if system or equipment grounding connection to earth is required,



Figure 2. Power supplied by receptacles mounted on a generator. Courtesy of Multiquip, Inc.

taken from the IAEI article by Steven Gibson.

JATC Apprenticeship Report

Jacksonville JATC

To the members of the North Florida Chapter of N.E.C.A. -

February has been a busy month at the Electrical Training Alliance of Jacksonville. Journeyworker training ramped up with OSHA 30, OSHA 10, NFPA-70E, EPS Level 1, and a cable splicing class. More OSHA 10 classes are scheduled for March, as well as a class on Motor Controls. If you know if anyone needing to refresh their OSHA 10 certification, or who may be interested in professional development, please have them call the school for scheduling times and more information. Classes fill up fast and seating is limited.

Improvements to our facility are continuing to move forward. Recently we have had new monitors installed in both the auditorium and in the office area and conference room. With the transition to an increasing amount of distance meetings vis Zoom, this addition has better enabled us to attend and sponsor meetings that were previously held in person prior to the Covid outbreak. Along with the monitor

installation, a low motor control lab was also added upstairs adjacent to the BICSI Lab. This motor control lab will enable students to install and troubleshoot motor control circuits safely, without exposing them to the hazards working with high voltages pose.

The school is continuing to maintain its position below state and national levels for Covid cases in educational environments. Students who have tested positive for Covid-19 have had minimal effect on school operations and there have been no outbreaks here on campus. We are continuing to follow state and CDC guidelines, as well as maintaining our amplified weekly cleaning schedule.

Aptitude testing has continued for qualifying applicants. To date we have had 62 qualify for testing and 33 of these are presently qualified for interviews. There are more applicants scheduled in the upcoming weeks for aptitude testing and more applications are coming in on a weekly basis. If you know anyone who is interested in beginning a career in the electrical trade, please have them all our school or visit our website, www.etajax.org for more information.

As always, we are here to answer any questions you may have. Feel free to contact us if we can help with anything. On behalf of the Trustees of the Apprenticeship Committee, thank you for your continued support!

Daniel Van Sickle
Apprenticeship and Training Director

Daniel McEachern
Assistant Training Director

Electri Research Report

Estimating With and Pricing of Prefabrication

Prefabrication is any activity or work moved away from the final point of installation to be performed in a controlled, hence safer, and more productive off-site environment. Pre-fab reduced the number of manipulations for final completion and installation on-site. Yet, today, fewer than 5 of electrical construction companies are using pre-fabrication.

Contractors need a practical way to track and quantify the benefits of prefab. Business owners, estimators, and project managers need both confidence and knowledge about the cost-saving potentials of prefab so they can account for prefabrication when bidding potential work.

ELECTRI International commissioned MCA Inc. to conduct a deep-dive study of pre-fab to help the EC industry focus on risk mitigation, higher predictability of cost, quality of work, and profits. In addition to specific recommendations, the researchers produced an Excel-based Prefabrication Calculator to help contractors translate the total savings into an equal composite rate as a practical method for "pricing" estimates with prefab.

[Learn more about Estimating With and Pricing of Prefabrication Here!](#)

Looking Forward

- **March 9th, 2021-** *ID, Develop, and Retain High Potential Leaders CEU*
- **April 12th - 13th, 2021-** *Advanced Estimating of Electrical Construction CEU*
- **May 11th, 2021-** *Recruit to Retire CEU*
- **June 8th, 2021-** *Tech and Transparency pt. II CEU*
- **July 13th, 2021-** *Best in Class Contractors CEU*
- **August 19th, 2021-** *Change Order Management pt. I CEU*

- **September 14th, 2021-** *Managing Yourself for Personal Productivity CEU*
 - **November 8th, 2021-** *Change Order Management pt. II CEU*
 - **December 14th, 2021-** *Tech Trends Drive Success CEU*
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