

# JATC NEWS

Spring 2006

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## Training Director's Report

By Jim

Winter is nearing end and the work picture is not the best at this time. The Eastern Idaho Electrical JATC has approximately ten apprentices out of work with five of them working in Wyoming. At the present our contractors are bidding a lot of work and picking up some bids. However, due to the weather, nothing has started to be taken out of the ground. It looks like another month before jobs will start moving.

Since December 1, 2005 we have completed a number of apprentices. Just a reminder to turn out an apprentice must pass the State of Idaho Journeyman Electrician test. The completing apprentices that were transferred to Journey Wireman status are: Cody Birdsall, Jason Chapman, Chad Fields, Trent Gibbs, Dan Green, Justin Guidinger, Don Higbee, Jared Lerwill, Nathan Luce, Josh Mays, Calvin Nash, Jared Payne, and Jeff Weimer. Congratulations to all of you and well done.

We will be honoring all the completing apprentices for the Class of 2006 on April 8 at the Red Lion in Pocatello at the first Annual Apprentice Banquet. This is the first year, for a number of years, that we will have a banquet for union electrical apprentices only. The JATC Committee decided to eliminate the Christmas luncheons and have one banquet for all apprentices to honor the completing apprentices annually. We will no longer be having banquets with the other crafts. We would like to see all apprentices and their spouses or partners at the banquet. Tickets will be available for Journeymen or guests of the apprentice at the JATC office. The JATC will pay for the apprentice and their spouse or partners meal. The choice of meal will be prime rib or salmon. Hope to see you at the banquet and have a great Spring.

## From the Front Desk

By Cory

### APPRENTICE INFORMATION

The end of the 2005-2006 school year is approaching fast, I would like to remind you about increases.

The pay increase schedule is as follows:

- 1000 OJT hours = increase to 50%
- 2000 OJT + 1<sup>st</sup> year complete = 55%
- 3500 OJT + 2<sup>nd</sup> year complete = 60%
- 5000 OJT + 3<sup>rd</sup> year complete = 70%
- 6500 OJT + 4<sup>th</sup> year complete = 80%
- Pass Idaho Journeyman Test = 85%

You also need to have your book balances paid in full, and your MRF penalty days must be satisfied before your increase can take effect.

If you have any questions, or if you need more information, contact the JATC Office.

## Instructor's Soap Box

By Steve

In keeping with the theme of previous newsletters, this time I will present the non-metallic type round conduits that are recognized by the NEC, with some history and the names we use in the field that make finding them in the NEC more difficult.

The oldest and most common type is called PVC in the field, but to find the article that covers its installation in the NEC we must know that it is RNC (Rigid Nonmetallic Conduit) and covered by Article 352. It was originally introduced as an underground duct for use by electrical utilities in the late 1950's. At that time it was made from high-impact polystyrene and had the physical properties and corrosion resistance that made it excellent for that use. The styrene material had the

# Instructor's Soap Box cont'd

drawback of not having good fire-resistance and by the early 1960's PVC (polyvinyl chloride) became the preferred material. Other materials used that would meet the NEC are fiber, asbestos cement, soapstone, fiberglass epoxy, and high-density polyethylene (for underground use). PVC is for aboveground use. PVC water pipes were given a number designation related to the wall thickness. Starting with the thinnest they are from 10 to 100. When PVC was presented to the electrical industry, the two sizes adopted were 40 and 80. UL first listed PVC Schedule 40 rigid nonmetallic conduit in 1962. It was first accepted by the NEC in 1968 for an underground installation only, then in 1971 the NEC expanded approved uses to include aboveground and building applications. Article 352 has been virtually unchanged since then. The most common RNM is the Schedule 40; it is rated for use with 90C conductors in sizes 1/2" through 6". Where RNM is subject to physical damage, then RNM Schedule 80 must be used. Note that Schedule 80 has less interior space and a reduction in fill will be required. All RNM conduit and fittings must be listed and joined using solvent cement.

The next nonmetallic raceway is known in the field as "smurf tube". It gets this dubious name from the fact that it is manufactured in various colors which when installed can be used to identify different circuits in an electrical installation. The NEC Article 362 "Electrical Nonmetallic Tubing" covers this raceway and has a few more restrictions than other raceways that are commonly used. ENT is a pliable corrugated circular raceway and though it was not introduced in the USA until the late 1970's, it had been used successfully in a lightweight form in European countries since the 1950's. It was generally embedded in plaster there. The common colors that manufactures make are blue (hence the field name), red, and yellow. It, of course, doesn't require any bending tools and is made in sizes 1/2" to 2". Disadvantages arise from the facts that it is not sunlight resistant and not permitted for outside use, and that the material it is made from can be toxic and

can produce excessive amounts of smoke in combustion. Therefore several provisions of Article 362 address the construction of ENT and the concern over its use where combustion could occur. Trade sizes 1/2" through 1" are permitted as a listed, manufactured, prewired assembly. This new permitted use will allow any number and combination of conductors that comply with fill requirements of the NEC to be installed at the factory. It is thought, however, that the primary use will be for the 2 and 3 wire branch circuits, and will be available in coils and reels to compete with Type MC and Type AC cables.

The next conduit on the list would be quite often referred to in the field as "plastic sealite flex" and generally that's what it is, and it looks like sealite only it doesn't have that metal flex on the inside. The NEC recognizes it as Liquidtight Flexible Nonmetallic Conduit (LFNC) and assigned Article 356 to it. This product was developed in the late 1970's for industrial equipment that needed flexibility and liquid tight properties. When the NEC included it in 1981, it was added as Part B to Article 350 and limited to industrial use only. In 1987 the industrial use limitation was dropped and they added outdoor use if listed. The 1990 NEC added direct burial to the approved uses for listed LFNC. Several varieties have been introduced over the years. The first one looked like and was called "hose" as it consisted of an inner and outer layer of neoprene with a nylon reinforcing web between the layers. The 1984 NEC recognized a second-generation LFNC which had a smooth wall of flexible PVC with a rigid PVC integral reinforcement rod. That was followed in 1990 by a nylon corrugated shape without any integral reinforcements. When Chapter 3 of the NEC underwent the major reorganizing a few cycles ago Article 356 was born for LFNC and it defines these three types in 356.2(A), (B), and (C). The most common one is Type LFNC-B and it is the only one of the three that is generally allowed to be used in lengths longer than 6 feet. Like ENT it is permitted to have conductors installed at the factory (prewired) in sizes 1/2" to 1", but unlike ENT it is sunlight resistant and manufactured in sizes 3/8" through 4".

Several code cycles ago, a new article was added to the NEC that I don't know how many members have run across. This new article was to cover a special type of raceway that was being installed with the conductors already contained within the raceway. It is Article 354 "Nonmetallic Underground Conduit with Conductors" (NUCC). This is a factory assembly of conductors or cables contained in a smooth wall circular nonmetallic raceway. Usually NUCC is installed from large reels that permit it to be wound without damage or distortion to the raceway assembly. The conductors that are prewired inside have to be of a type for use in wet locations since the NEC limits the use in 354.10 to four specific applications. NUCC can be installed in sizes 1/2" through 4" for direct burial applications, where incased in concrete, in cinder fill, or in underground locations that have severe corrosive influences, but it can not be used in exposed locations or inside buildings (NEC 354.12)

This last nonmetallic conduit was just recognized in the 2005 NEC. New Article 353 is for High Density Polyethylene Conduit (HDPE) which is resistant to moisture and chemical atmospheres. I'm guessing that this could be the type of raceway that the above NUCC is using to enclose the conductors because HPDE has four very similar approved uses and also can't be use inside buildings or exposed. This was already a listed product so it was a shoe-in for approval. Like NUCC above, it is in sizes 1/2" through 4". The only variations from NUCC are that HDPE can be manufactured and shipped on reels in continuous lengths or in discrete lengths like PVC. It is different from other types of nonmetallic conduits in that HDPE is designed for joining by threaded couplings, drive on couplings, or butt fusing process. Instructions can be supplied by the usual solvent- type manufacturers in which they describe the methods and precautions to be followed.

Well that's all of them. I guess in the future I'll give some info on the surface type raceways that we use and where they are in the codebook.

# Did You Know? / Code Corner

Taken from IAEI News,  
January/February 2006 Ed, pgs 88 & 89

### Question:

Can Type NM-B nonmetallic-sheathed cable that was immersed in water during a flood be re-used?

### Answer:

Type NM-B nonmetallic-sheathed cable (commonly called "Romex" in the industry) is Listed by Underwriters Laboratories Inc. for used in accordance with the *National Electrical Code* under the product category "Nonmetallic-sheathed Cable (PWWX)." Guide information for this category can be found in UL's Online Certifications Directory at [www.ul.com/database](http://www.ul.com/database) and on page 84 of UL's 2005 General Information for Electrical Equipment Directory (White Book).

In the mid-1980's, the outer jacketed of this cable changed from an impregnated, braided covering to polyvinyl chloride (PVC), and the internal conductor insulation went from a 60°C to a 90°C rating. This newer cable is typically referred to as Type NM-B.

Section 334.10(A)(1) of the *NEC* indicates that Type NM cable shall be permitted for use in "normally dry locations." Article 100 of the *NEC* defines a dry location as:

**Location, Dry.** A location not normally subject to dampness or wetness. A location classified as dry may be temporarily subject to dampness or wetness, as in the case of a building under construction.

The older, braided jacketed version of this cable has less resistance to water ingress than the new, PVC jacketed version, and if subject to immersion, such as from flooding, the suitability for continued use is unknown. Any cable of this type that has been subjected to flooding should be replaced without question.

In general, cables with PVC insulation and jacket can withstand immersion in clean water for a *short period* of time without being damaged as long as the

ends are not immersed. For example, a building may be subject to rainfall while under construction, and water may come in contact with the outer jacket of nonmetallic-sheathed cable. This is not prohibited by the *NEC*. The UL Standard for Safety for Nonmetallic-Sheathed Cables, ANSI/UL 719, requires Dielectric Voltage-Withstand Tests after 24-hour water immersion of cable samples (with ends in free air). If the ends of the cable are immersed for any period of time, however, the internal paper wrapping around the bare equipment grounding conductor will absorb and transfer the water into the cable assembly. The water may then start degrading the insulation or possibly corrode the conductors. If the cable comes into contact with contaminated water, the contaminants may also act on the insulation or conductors. Over time, failures can occur.

In a flooding situation, there is no way of knowing how long the cables were immersed in water, or what types of potentially corrosive substances may have been in the water that flooded the cables. As was widely reported after Hurricane Katrina, raw sewage and chemicals were known to be in the floodwaters afflicting the Gulf Coast region of the United States. Nonmetallic-sheathed cable has not been investigated by UL for this type of exposure. Therefore, it is not possible for UL to state that cable in a particular installation is acceptable for continued use after having been subjected to the flooding.

The safest approach is to replace any nonmetallic-sheathed cable that was immersed in water for any period of time during the flooding.

# 2006 Completion Banquet

You are invited to attend the 2005/2006 Annual Apprentice Completion Ceremony for the Eastern Idaho Electrical JATC. The banquet will be held on Saturday, April 8, 2006 at the Red Lion Hotel in Pocatello, Idaho. There will be a no-host social hour from 6:00 p.m. to 7:00 p.m. Dinner will be served at 7:00 p.m. Tickets are available through the JATC Training Office for \$25.00 each. Requests for tickets must be received before March 31, 2006. For dinner you have your choice of Prime Rib with a Baked Potato or Baked Atlantic Salmon with Rice. Both entrees will include: a Fresh Garden Salad, Rolls and Butter, Beverage (soft drink or juice), and Chef's choice of dessert.

This year's completing apprentices are:

Colby Averett	Jerry Baird
Stacy Beard	Cody Birdsall
Seth Byington	Jason Chapman
Chad Fields	Trent Gibbs
Brett Gillins	Daniel Green
Travis Gruver	Justin Guidinger
Tyson Hayes	Don Higbee
Shane Howell	Darrin Kerbs
Jared Lerwill	Aaron Mayer
Joshua Mays	Jordan Moser
Calvin Nash	Jared Payne
Travis Taylor	Clint Waters
Jeff Weimer	Kenneth Williams.

If you would like to purchase tickets for this event, contact the JATC Office at (208) 232-4300. We hope you will join us in recognizing and applauding the accomplishments of our completing apprentices!!

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