Conductor Installation Lab

Program: Electrician Technician

Course: EL130 Flexible Cables/Conduit Bending and Raceways

Objectives: Under the supervision of your instructor, you should be able to do the following:
After completing this lab, you will be able to:

- Prepare multiple conductors for pulling in a raceway system.
- Pull multiple conductors in a raceway system.

Lab Equipment:

- Fish tape
- Shop Vacuum

Required Tools:

- 1 – Pair of strippers
- 1 – Pair of linesmen pliers
- 1 – Fish tape with leader
- 1 – Pair of work gloves
- 1 – ½" Fish Tape Piston
- 1- Fish Tape Adapter Cone

Materials:

- 50'- #14 THHN green
- 50' - #14 THHN white
- 50' - #14 THHN black
- 50' - #14 THHN red
- 1 – Roll of black tape
- 1 – Wire rack
- 1 – Pre-set up raceway system
- 1 – Container of wire lubricant

Safety (PPE):

- Safety glasses/goggles
- Hard Hat

Resources: N/A

Required Time: 120 minutes

Shop Maintenance:

- All work will cease 20 minutes prior to the end of class.
- All work areas must be cleaned.
- Tools and equipment must be cleaned and returned to the designated areas (cage, tool room, cabinets etc.)
- Any broken or missing tools must be reported immediately.
- Tools and equipment are students' responsibility

Procedures:

Prepare multiple wires for pulling

1. Have students identify the conduit to be used by counting how many bending degrees are involved, type of boxes, conduit and fitting used for the pull.
2. Have students identify any potential problems with raceway or upcoming pull.
3. Put all four wire reels on the wire rack, making sure to have all wire ends going the same direction over the top or bottom of the reels.
4. Strip about 3" of insulation from the end of each conductor.
5. Insert each wire into the loop/leader at the end of the fish tape.
6. Bend the end of the wire back towards itself after you have fed about half of the stripped conductor through the fish tape.
7. Using the linesman pliers, gently squeeze the wires together decreasing the width of the circumference of the conductors.
8. Wrap the black tape around the folded wires overlapping about ¼ of the tape as you spiral upwards towards the fish tape, finishing about 1" above the connection on the fish tape.

Pulling the conductors through the raceway (two people needed)

1. Feed the fish tape through the raceway until you have at least a foot past the end of the box
2. Connect the conductors to the fish tape as described above.
3. Pull about 8 - 10 feet of wire off each spool so the conductors do not pull directly off the spools during the pull,
4. Add some lubricant, if needed, to both the conductor's connection and the end of the raceway where the conductors will enter.
5. With one person on one end of the raceway with the fish tape, and the second person at the end with the conductors, you can start to slowly pull until the coupling is in the conduit.
6. The team must work together. While one team member starts to pull, the other team member must both feed and pull the slack on the wires simultaneously. Both team members must work together and find a rhythm, or the conductor pull becomes much more difficult.
7. Continue pulling until about 12 to 18 inches of wire has exited the raceway system.
8. Clean any excess lubricant from the box and wires.

Time permitting:

1. The initial raceway should have 360 degrees or less bends total. Make a new raceway or alter the existing one to have more than 450 degrees of bends and try the pull again.
2. Answer the following questions:
    a. Was the pull just as easy as the first one?

i. _____

b. How do you think the pull would be if the gauge of wire was #8?
   i. _____
c. What if there were 12 wires instead of 4, how would the pull be in both raceways?
   i. _____
d. According to the NEC, how many #14-gauge wires can be in a ½" EMT conduit?
   i. _____
e. What is the NEC code section for Question?
   i. _____