

University of Technology, Jamaica  
School of Engineering

Engineering Workshop Technology  
(ELE 1005)

Noel A. Sinclair

**Email:** [nosinclair@utech.edu.jm](mailto:nosinclair@utech.edu.jm)

**Ext:** 2240

# Electrical Conductors

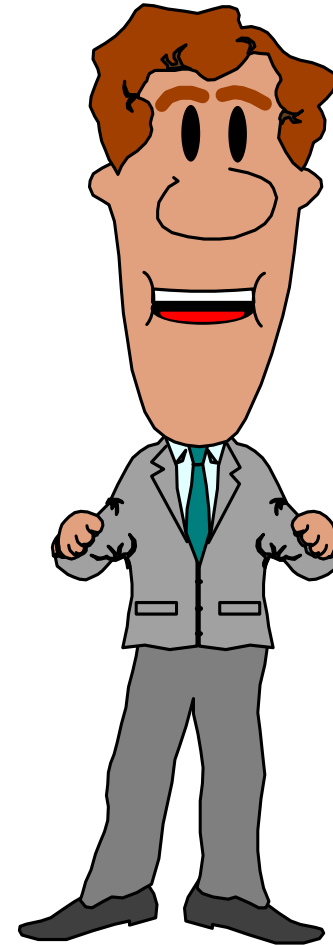
Performance Objectives:

Student should be able to:

1. Describe the basic types of electrical conductors.
2. Explain how electrical conductors are classified.
3. Explain the purpose of wire insulation.
4. Describe electrical cables.

# Electrical Conductor

- **Critical Thinking:**
- What is an Electrical Conductor?
- Anything that transmits electricity.



# Warning

- **Interest Approach:**
- Electricity is always looking for a conductor!



# Common Electrical Conductors

- Silver-- Best
- Copper -- 2nd
- Gold-- 3rd
- Aluminum-- 4th
- Tungsten-- Poor

# Silver

- Precious metal
- High cost
- Not practical for wire
- Corrosive problems (such as silver tarnishes)



The Silver Nugget which was reputedly the largest silver nugget ever mined came out in three pieces from the Smuggler or the Molly Gibson mines—ironically after silver prices had crashed in 1893.

# Copper

- Used in many wiring applications
- Reasonable cost
- Flexible
- Easy to make into wire
- Good corrosion resistance



# Gold

- Precious Metal
- Very expensive
- Does not corrode
- Seldom used as a wire
- Used to plate (coat) connectors in electronic devices





# Aluminum

- Abundant metal
- Reasonable cost
- Flexible
- Light weight
- Corrosion problems / reacts with other metals

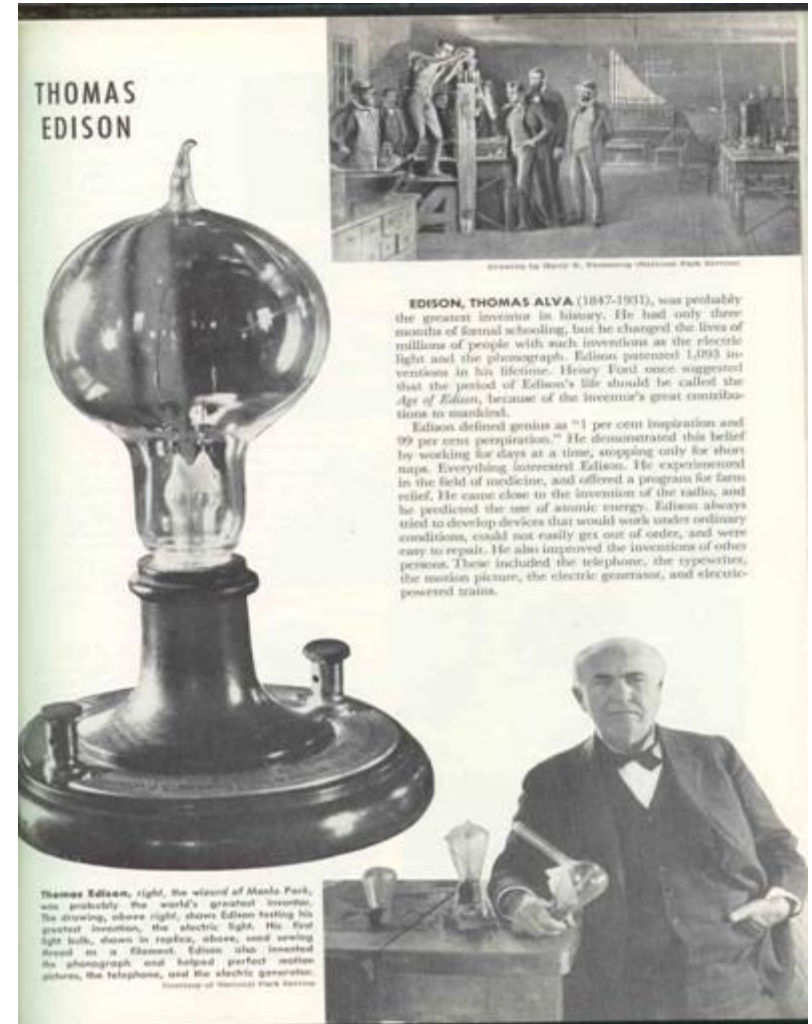


# Aluminum (continued)

- Used in large wire sizes - power lines and service entrance cable
- Pound for pound aluminum is a better conductor than copper.

# Tungsten

- Rare metal
- Used to make light-bulb filaments
- High melting point
- Poor conductor
- Electrodes for TIG Welding



# Wire Sizing

- **Sizing conductors according to load**
- Need to know the desired voltage drop
- Need to know the load in amps on the circuit
- Need to know the length of circuit in feet
- Need to know the **Voltage** of the circuit
- Use the wire sizing tables to determine what size conductor to use.

# Colour Code for Wires

- Individual wires are colour coded to identify their function.

# Wire Insulation

- Prevents electricity from jumping from one conductor to another (prevents short circuits)
- Most wires are insulated with plastic vinyl
- Individual wires have color coded insulation

# Types of Insulation

- h.o.f.r Heat resisting, oil resisting and flame retardant
- p.c.p Polychloropropene compound
- p.v.c Polyvinyl Chloride Compound
- m.i.m.s mineral insulated metal sheathed
- t.p.s Tough plastic sheathed
- t.r.s Tough rubber sheathed
- x.l.p Cross linked polyethylene

# Electrical Cables

- An arrangement of conductor covered by insulation is called a cable
- A multi-core cable is two or more cables enclosed in a metal, rubber, or plastic sheath for mechanical protection.
- The sheath protects the wire from damage.
- Metal conduit also protects wires, but is not considered a cable.



# Electrical Conductors

## Summary

- Many materials have the ability to conduct electricity.
- Wire size is important for proper and safe electrical conduction.
- The color code on wires is used to identify the wire's purpose.

# Electrical Conductors

- The insulation on a wire prevents electricity from jumping from one conductor to another.
- Electrical cables are use extensively in agricultural, industrial, business and residential applications.

Thank you  
for Listening

