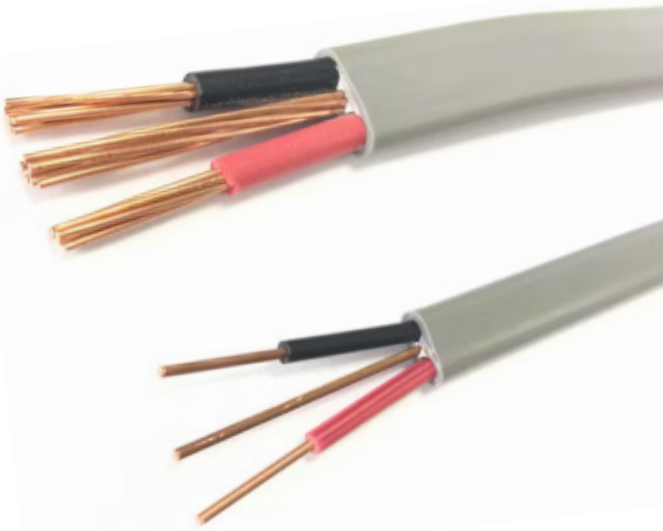
DOMESTIC APPLIANCE MAINTENANCE

Lesson 8: Teacher's guide

Electrical wires



A· Electrical Wires

B· Competencies

Main competencies:

1. Safely handle simple tools, electrical components, and potentially hazardous materials.
2. Use basic tools safely for maintenance and repairs of domestic appliances.

Sub competencies:

1. Demonstrate proper handling of basic tools (e.g., screwdrivers, pliers).
2. Handle electrical components with care to avoid damage or injury.
3. Handle tools safely to avoid injury or damage to components.
4. Select appropriate tools for the task.

C· Learning outcomes

By the end of this lesson, students should be able to show an understanding of:

1. the different types of electrical wires in terms of single core, twin core with flat white PVC (Polyvinyl Chloride) sheathing and ECC (Earth Continuity conductors).
2. the importance of different colour-coded electrical wires.
3. the importance of having different thicknesses of electrical wires.
4. the differences between stranded (soft) wire and single solid wire.

D· Resources and materials

Set of items (per group) for students working in groups of 4 or 5:

a) Single core wires of different thicknesses (1.5 , 2.5 and 4) with three different colours (brown, blue and yellow or green) from each thickness.

b) Twin core wire with PVC white sheathing 1

c) ECC wire 2.5

d) Trunking of different sizes (20 x10 mm and 25 x 20 mm)

e) Metal buckle metal clips

For activity (materials needed per group):

- Screwdrivers (slotted and cross slot)
- One automatic stripper per group
- Three single core wires (brown, blue and green or yellow)
- One twin core wire 1 (Note: a short length of white PVC sheathing should be removed leaving a short length of the coloured wires and visible).
- ECC wire 2.5 (with a short length of white PVC sheathing removed).
- Block connector of 20 ampere

For worksheet (for each student):

- Single core wires of different thicknesses (1.5 , 2.5 and 4) with three different colours (brown, blue and yellow green) from each thickness. The length of each wire should be around 2 cm.
- Clear stick tape
- Paper glue

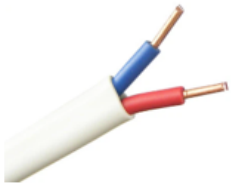
E. Implementation guidelines

Introduction

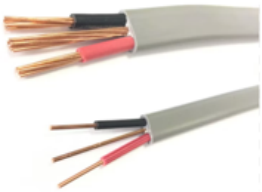
- Begin with a brief discussion on common electrical wires used in Mauritius

1. Differentiate between single core, twin core with flat white PVC sheathing and ECC (Earth Continuity Conductors) wires.

Single core

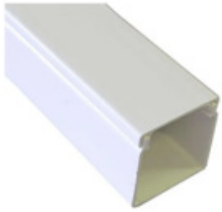


Twin core with white PVC sheathing



ECC Wires of different sizes

Note: Single core wires are usually placed in trunkings whereas wires in PVC sheathing are directly fixed on the wall using metal buckle cable clips.



Trunking

Metal buckle cable clips

2. Show students color-coded wire samples: brown (live), blue (neutral), and green/yellow (earth).

Explain the purpose of each colour:

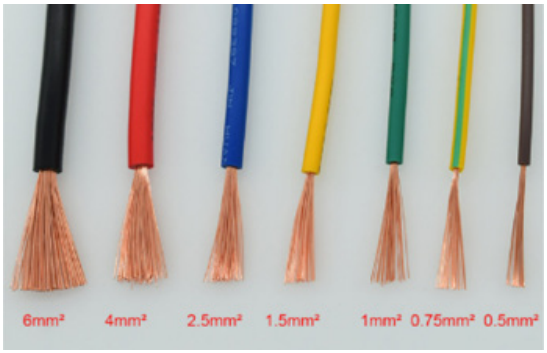
- brown (Red)carries current from the power source.
- blue (Black)completes the circuit by returning current to the source.
- green/yellow provides grounding to prevent electric shocks.

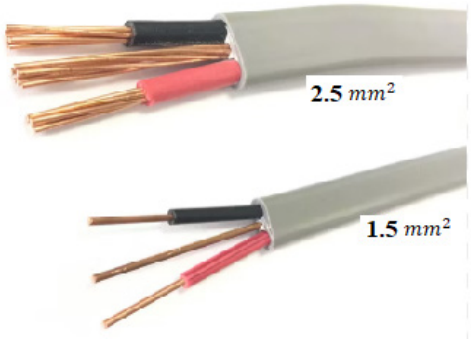
Standard colours

Other colours which are used

3. Discuss the importance of the thicknesses of electrical wires. Provide samples of thick and thin wires. Let students touch and observe them closely.

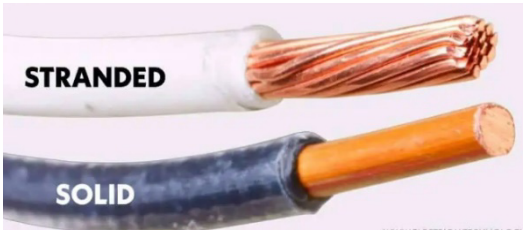
    - Thick wires are used for high-power appliances like heaters or stoves because they can carry more current without overheating.
    - Thin wires are used for low-power devices like lamps or phone chargers.





Note: the 1 and 1.5 wires are usually used for lights (depending on the number of lights in the circuit).
The 2.5 wires are used in sockets and are used to connect medium load appliances like kettles and air-conditioners.

4. Differentiate between multi-stranded (soft wire) and solid wire.



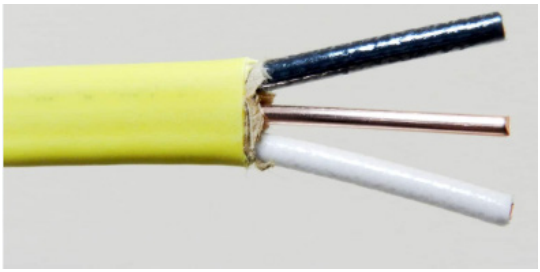
Note: Multi-stranded wires are tailored for applications which demand high levels of flexibility (in trunkings, pipes or conduit) whereas solid wires are known for their strength and are used for permanent installations (for example, inside walls or ceilings).

Activity: Stripping and connecting electrical wires

Instructions:

1. Students will work in groups of 4 or 5 depending on class size.
2. Provide each group with three types of wires.
    - Three single core wires (Brown/Red, Blue/Black and Yellow Green)
    - One twin core wire 1 (Note: a short length of its white PVC sheathing should be removed leaving a short length of the coloured wires out to be stripped.)

    - ECC wire 2.5 (with a short length of white PVC sheathing removed leaving wires out to be stripped.)



3. Students are required to use an automatic stripper to strip off the coloured insulator from the different wires provided under the supervision of the teacher.

Using an automatic stripper to strip a wire

4. Use appropriate screwdrivers to connect two pairs of stripped single core wires (brown/red and blue/black) of 1.5 by using a block connector (of rating 20 Ampere). The screw should be well tightened.

Safety Aspect:

- Safe use of automatic stripper.
- Importance of using trunkings for single core wires.
- Importance of block connector for connecting wires. Block connectors are made up of PVC which is a good insulator.

Block connectors made up of PVC

- Discuss the importance of electrical safety during wires installations. Reiterate the need to switch off the main supply before maintenance.

Conclusion

Recap the key points:

- The three main colour coding for Live, Neutral and Earth.
- The importance of the different thicknesses of wires.
- The importance of using block connectors for connecting wires.
- Always switch off the main supply before any doing any electrical repair at home.

F. Assessment(in worksheet)

G. Extension activity

Encourage student to name other types of wires such as a power cord for different domestic appliances.