Protection against electrocution

Millions of homes in India are electrically unsafe. What about yours?
Electricity for life
Keep it that way

Where would we be without electricity

The short answer is nowhere. It’s impossible to imagine a world without it. It’s the great enabler. From the time our electric alarm clocks buzz us awake in the morning to when we turn off the lights at bedtime, electricity has powered our whole day.

Don’t take electricity for granted

Yes, electricity is everywhere – like air. And like air, it’s invisible. Often you can’t actually see whether you’re protected or not. Danger may be lurking in old plug, a poorly insulated power tool, a damaged cordset, or in a kitchen appliance you handle without drying your hands.

Electricity is everywhere – in the home and the workplace, inside and outside. So is risk. Electrical hazards spare nobody. Most at risk, though, are toddlers. They like to poke their fingers into sockets and pull on cords. Do It Yourself (DIY) enthusiasts and people who work with power tools also have high risk exposure.

All it takes is a fraction of a second … and the consequences can be lethal. Don’t take electricity for granted.

The older your electrics are, the greater the risks

Heat, moisture, corrosion, wear and tear all take their toll. Fixtures age, insulation cracks. In fact your installation may not meet today’s safety standards.
Do you think your consumer unit protects your family?

In consumer units installed before 20XX, the only safety devices are circuit-breakers (or fuses if the unit’s even older). They prevent fires caused by short-circuits or cable overloads. But they don’t protect people from electric shocks.

**Short circuits**

They happen when two energised wires come into contact. A circuit-breaker trips immediately so preventing fire from breaking out.

**Overload**

This is when too much current runs through a wire – because too powerful a device is plugged in, or too many devices are plugged into a single multiway adapter block. When a wire overheats it soon damages everything around it.

One accident is one too many. But there are many more than one – even today. Figures speak for themselves. Yet most accidents can be prevented with safety arrangements that meet standards.

- In the UK someone dies every week in an electrical accident at home.  
  Electrical Safety Council
- 40% of fatalities in electrical accidents in the home are children aged under 9.  
  GRESEL (French voluntary body for research into electrical safety in the home)
- In the US, electrocutions are the fourth most common causes of industrial fatalities  
  Oklahoma State University

4000 people get serious electric shocks and 100 die every year in France.

Ministry of Ecology, Sustainable Development, Transport and Housing
Play safe – and stay safe

> **Power sockets**

Sockets account for most electric shocks and electrocutions. That’s why special safety features are now a legal requirement in all new buildings. Though it’s in old buildings where they are needed even more.

**Damaged plug and socket systems**

Wall sockets crack, break, and come loose. When that happens, live parts are exposed. And they never fail to arouse the curiosity of young children.

Just brushing against a live pin or wire can send an electric shock coursing through the body. With sometimes terrible consequences.

**Damage to flexes**

Flexes plugged into wall sockets snake all over the house. They are prone to all sorts of damage.

- In the kitchen they may be exposed to intense heat, twisting, nicks, etc.
- In the living room and bedrooms, they may be flattened, knotted, damaged by falling objects, or gnawed by pets. When a flex is damaged, danger lurks.

> **The solution**

Don’t compromise on quality. Buy a brand with a name. It’s the best guarantee of safety.

- Choose shuttered sockets.
- Ensure sockets are securely screwed into flush boxes sealed into the wall.
- Change the socket if it’s old or loose.

> **The solution**

- Get rid of any faulty or damaged flex immediately.
- Ensure all your outlets are protected by RCDs (see page 7 for details)

“A woman mowing her lawn was electrocuted because the plug and socket system it was connected to had been incorrectly wired and the house had no RCD.”

Source: http://www.esc.org.uk/public/real-life-stories
Bathrooms

Electricity and water goes hand in hand. There lies the danger. Water carries electricity efficiently. Wet skin reduces the body's resistance and it sustains serious injury in the event of a shock.

Light fittings should be encased and no electrical equipment or outlets should be within reach of the shower or bath tub.

Never use a hair dryer or electric razor when in the bath or standing in the shower.

If a device falls into water, never try to pick it up. Unplug it first.

The solution

Your electrical equipment must comply with IEC 60 364.

All metal parts must be connected to the earth part of the electrical network.

Complying with distances makes it impossible to come into contact with any electrical parts when in the bath or shower.

Volume 0:
> No electrical part at all.

Volume 1:
> Maximum reach from the bath or shower
> Transformer isolated sockets (“razor” type)
> Class II insulated lighting and heaters.

Volume 2:
> Maximum reach from the bath or shower
> Transformer isolated sockets (“razor” type)
> Class II insulated lighting and heaters.

Volume 3:
> All devices, either protected by 30 mA rated RCD.
> Or SELV* supply (maximum 50 volts).

* SELV: safety extra low voltage
Lighting: minor repairs, major risk

Changing bulbs, fixing loose wires, and making other minor repairs to lamps actually account for a high share of electrical accidents in the home.

The solution

Always turn off the lighting circuit in the consumer unit before any repair. Turning off at the wall switch isn’t enough. What if someone comes in and switches it back on?

If wall or ceiling-mounted lights have metal parts, make sure their earth pin is connected to the earth wire.

RCD-protected lighting circuits will, however, be your surest safety guarantee.

Machines and domestic appliances

Refrigerators, washing machines, air conditioning units, and even lighting can be hazardous. If an internal wire works loose or loses just a scrap of its insulating sheath, it energies the metal housing. The slightest touch can result in a nasty shock or worse.

The solution

Any appliance with metal housing must be grounded by:
- earth wires all connected together
- ground pins in plugs and sockets.

Earthing ensures that a protective device trips as soon as a live electrical part touches a metal housing.

Make sure:
- all your socket outlet are equipped with an earth pin
- all directly connected stationary equipment (kitchen appliances, water boiler, AC units…) are firmly connected to the earth wire of your electrical network.

Word of warning: A socket isn’t safe just because it has a ground pin. Ask your electrician to check all your sockets and all the metal parts in your bathroom are properly grounded.
RCDs for failsafe protection against electrocution

Because you can’t always see damaged insulation or loose wires, new regulations require homes to be fitted with RCDs.

Residual current devices (RCDs) are highly sensitive devices that trip immediately when an electric shock situation is detected.

If anybody gets an electric shock it stops the electricity flow. It would be particularly effective in old buildings with ageing installations, where modern regulations don’t apply.

Does your electrical installation have a residual current device?

1. Does your consumer unit have devices with a grey pushbutton.
   - Yes?
     - Press the grey button. The RCD will trip immediately.
   - No?
     - You’re not protected against electrocution. Contact an electrician for an upgrade.

2. When the RCD has tripped, check the protected parts of your home:
   - Take a light and plug it into each power socket of your home. If none works, you’re RCD-protected. If any socket still works, you’re still not fully protected from electric shocks.
   - Be careful to check all the sockets, lights and appliances in your bathroom. Nothing should work.
   - If any tested circuit still works, you’re not fully protected from electric shocks. Ask your electrician to upgrade your installation in line with current safety regulations.

3. Flick up the black switch on the RCDs to turn the power back on.

Compulsory standard

Wiring regulation (IEC.60 364) makes it compulsory to install 30 mA rated RCDs on circuits supplying:
- all power sockets
- all devices in bathrooms and other wet locations.
How does electricity affect the human body?

Severity of Injuries is closely related to intensity of current

Research worldwide shows that the intensity of current flowing through the body determines the extent and severity of an electric shock.

40 to 50 mA
Injuries become serious when currents exceed 40 to 50 mA during one second.

150 mA
Theoretically, a 150 mA current flows through the body when a person touches a 230 V energised conductor under dry conditions.
In reality, however, current intensity ranges between 5 and 500 mA.
A number of factors account for the variation:
• Skin humidity: water or sweat dramatically increase skin’s conductivity and, therefore, current intensity and its impact on vital organs
• Ground connection through the feet – a barefoot person will sustain greater current than one wearing rubber sole shoes
• Skin surface area in contact with the live part.
Current intensity also slightly differs from one person to another, depending upon their age and other physiological factors.

300 mA
The current that flows through the body in case of electric shock in a bathroom, causing severe injury to the heart, lungs, and muscles...
Trust your electrician to make your home safe

Safety is serious business – and it can be very technical, too. Only qualified electricians can make your home safe and protect your family from the risk of electrocution. So, whether your home is a modern building or – in fact, especially – if it’s an old one, call an approved electrical contractor.

Schneider Electric: the guarantee of a world leader’s expertise

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