

**ELECTRICAL SAFETY  
AND  
RESIDENTIAL WIRING**

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## SNAPSHOTS 2020

### Accidents in India

	2019	2020
Accidental Deaths	4,21,104	3,74,397
* Rate of Accidental Deaths	31.4	27.7

\* Rate is per lakh population

- ❖ Maximum casualties were reported in age group '30 years– below 45 years' (1,12,874 deaths, 30.1%) followed by the age group '18 years – below 30 years' (96,738 deaths, 25.8%) during 2020.

## 421,104 'accidental' deaths in India in 2019: NCRB

- The number of accidental deaths due to causes attributable to **forces of nature** -- **lightning, heat/sun stroke, exposure to cold, flood, landslides, avalanche, epidemic, torrential rains and forest fire.**
- And deaths by **unnatural** causes including **traffic accidents, drowning, accidental fire, electrocution, air crash, stampede, mines disaster, deaths during pregnancy, killed by animals, illicit liquor, snake bites and food poisoning.**

## 421,104 'accidental' deaths in India in 2019: NCRB

Of the 4,21,104 accidental deaths,

- **8,145** (1.9 per cent) were due to natural causes,
- **4,12,959** (98.1 per cent) due to other causes
- The age group of most victims was between **30** and **45** years. This group accounted for **30.9 per cent** of all unnatural deaths in 2015.

## Number and Share of Accidental Deaths due to Forces of Nature and Other Causes – 2019 & 2020

Sl. No.	Cause	2019		2020		% Variation during 2020 over 2019
		No.	% Share (w.r.t. All India)	No.	% Share (w.r.t. All India)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>A. FORCES OF NATURE</b>						
1	Avalanche	35	0.4	13	0.2	-62.9
2	Exposure to Cold	796	9.8	776	10.5	-2.5
3	Cyclone	33	0.4	37	0.5	12.1
4	Tornado	15	0.2	16	0.2	6.7
5	Tsunami	0	0.0	0	0.0	-
6	Earthquake	1	0.0	0	0.0	-100.0
7	Epidemic®	1	0.0	0	0.0	-100.0
8	Flood	948	11.6	959	13.0	1.2
9	Heat/Sun Stroke	1274	15.6	530	7.2	-58.4
10	Landslide	264	3.2	295	4.0	11.7
11	Lightning	2876	35.3	2862	38.6	-0.5
12	Torrential Rain	69	0.8	43	0.6	-37.7
13	Forest Fire	9	0.1	13	0.2	44.4
14	Causes other than above	1824	22.4	1861	25.1	2.0
<b>15</b>	<b>Total (A)</b>	<b>8145</b>	<b>100.0</b>	<b>7405</b>	<b>100.0</b>	<b>-9.1</b>

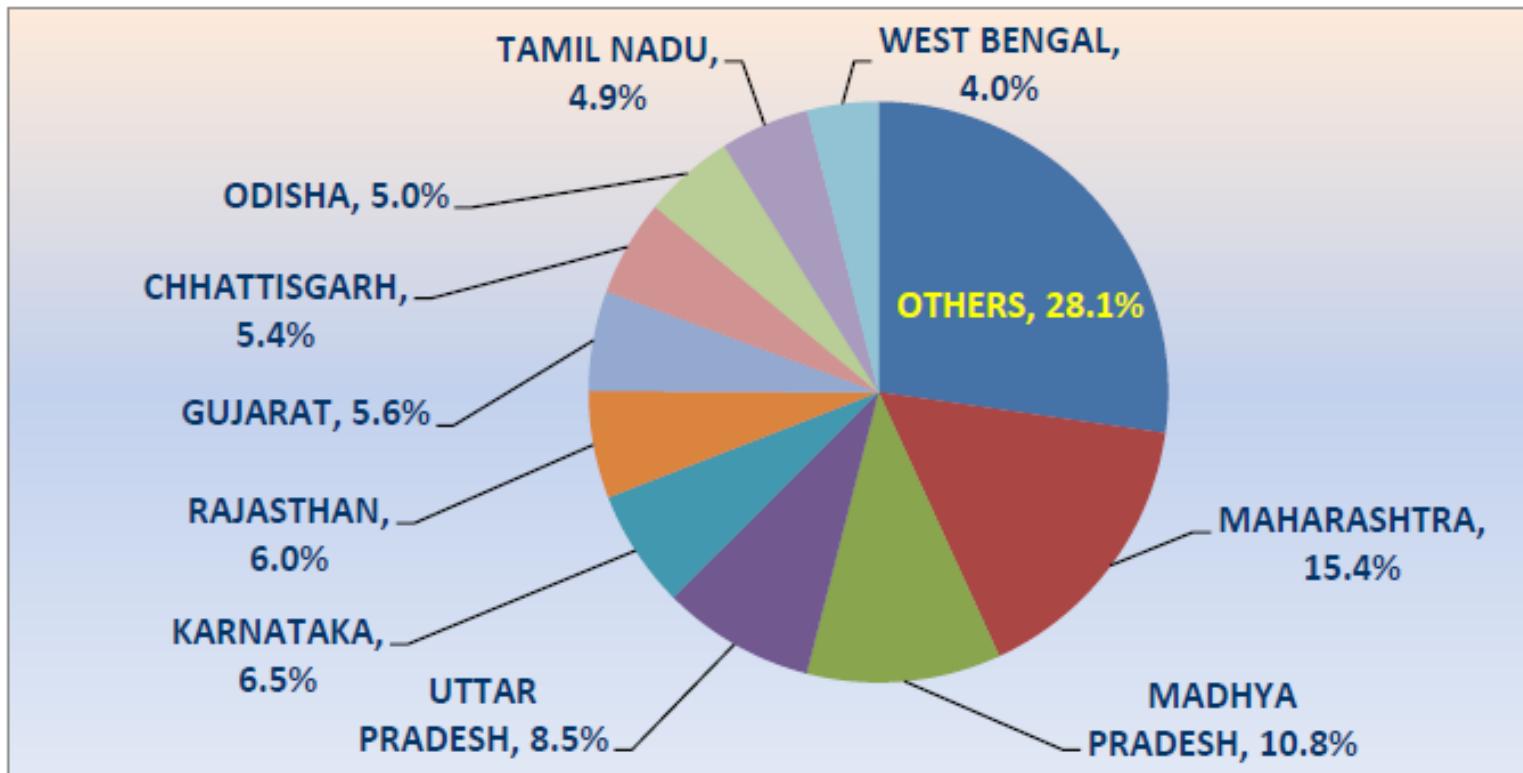
Sl. No.	Cause	2019		2020		% Variation during 2020 over 2019
		No.	% Share (w.r.t. All India)	No.	% Share (w.r.t. All India)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>B. OTHER CAUSES</b>						
1	Air-Crash	12	0.0	26	0.0	116.7
2	Ship Accidents	0	0.0	0	0.0	0.0
3	Collapse of Structure	1929	0.5	1536	0.4	-20.4
4	Drowning	32671	7.9	37238	10.1	14.0
5	Electrocution	13432	3.3	13446	3.7	0.1
6	Accidental Explosion	655	0.2	494	0.1	-24.6
7	Falls	20901	5.1	20579	5.6	-1.5
8	Factory/Machine Accidents	1001	0.2	705	0.2	-29.6
9	Accidental Fire	10915	2.6	9110	2.5	-16.5
10	Firearm	320	0.1	318	0.1	-0.6
11	Mines or Quarry Disaster	82	0.0	77	0.0	-6.1
12	Traffic Accidents	181113	43.9	146354	39.9	-19.2
13	Stampede	12	0.0	14	0.0	16.7
14	Sudden Deaths	47295	11.5	49925	13.6	5.6
15	Deaths of Women during Pregnancy	1160	0.3	1121	0.3	-3.4
16	Deaths due to Consumption of Illicit/Poisonous Liquor	1296	0.3	947	0.3	-26.9
17	Killed by Animals	1425	0.3	1305	0.4	-8.4
18	Poisoning	21196	5.1	22221	6.1	4.8
19	Suffocation	1598	0.4	2096	0.6	31.2
20	Drug Overdose	704	0.2	514	0.1	-27.0
21	Causes Not Known	58576	14.2	43869	12.0	-25.1
22	Causes other than above	16666	4.0	15097	4.1	-9.4
<b>Total (B)</b>		<b>412959</b>	<b>100.0</b>	<b>366992</b>	<b>100.0</b>	<b>-11.1</b>
<b>Grand Total (A+B)</b>		<b>421104</b>	<b>100.0</b>	<b>374397</b>	<b>100.0</b>	<b>-11.1</b>

Sl. No.	State/UT	No. of Cases	Electrocution								
			No. of Persons Injured						No. of Persons Died		
			Male	Female	Trans- gender	Total	Male	Female	Trans- gender	Total	
(1)	(2)	(3)	(100)	(101)	(102)	(103)	(104)	(105)	(106)	(107)	
<b>STATES</b>											
1	ANDHRA PRADESH	1011	4	0	0	4	904	124	1	1029	
2	ARUNACHAL PRADESH	7	0	0	0	0	7	0	0	7	
3	ASSAM	112	0	1	0	1	96	16	0	112	
4	BIHAR	745	52	11	0	63	595	127	0	722	
5	CHHATTISGARH	630	0	0	0	0	505	117	0	622	
6	GOA	14	0	0	0	0	14	0	0	14	
7	GUJARAT	708	3	0	0	3	610	108	0	718	
8	HARYANA	375	22	0	0	22	337	36	0	373	
9	HIMACHAL PRADESH	32	2	0	0	2	27	3	0	30	
10	JHARKHAND	163	1	0	0	1	144	18	0	162	
11	KARNATAKA	571	0	0	0	0	477	97	0	574	
12	KERALA	166	0	0	0	0	138	29	0	167	
13	MADHYA PRADESH	2419	7	3	0	10	1987	425	0	2412	
14	MAHARASHTRA	1486	0	0	0	0	1269	230	0	1499	
15	MANIPUR	14	1	0	0	1	12	2	0	14	

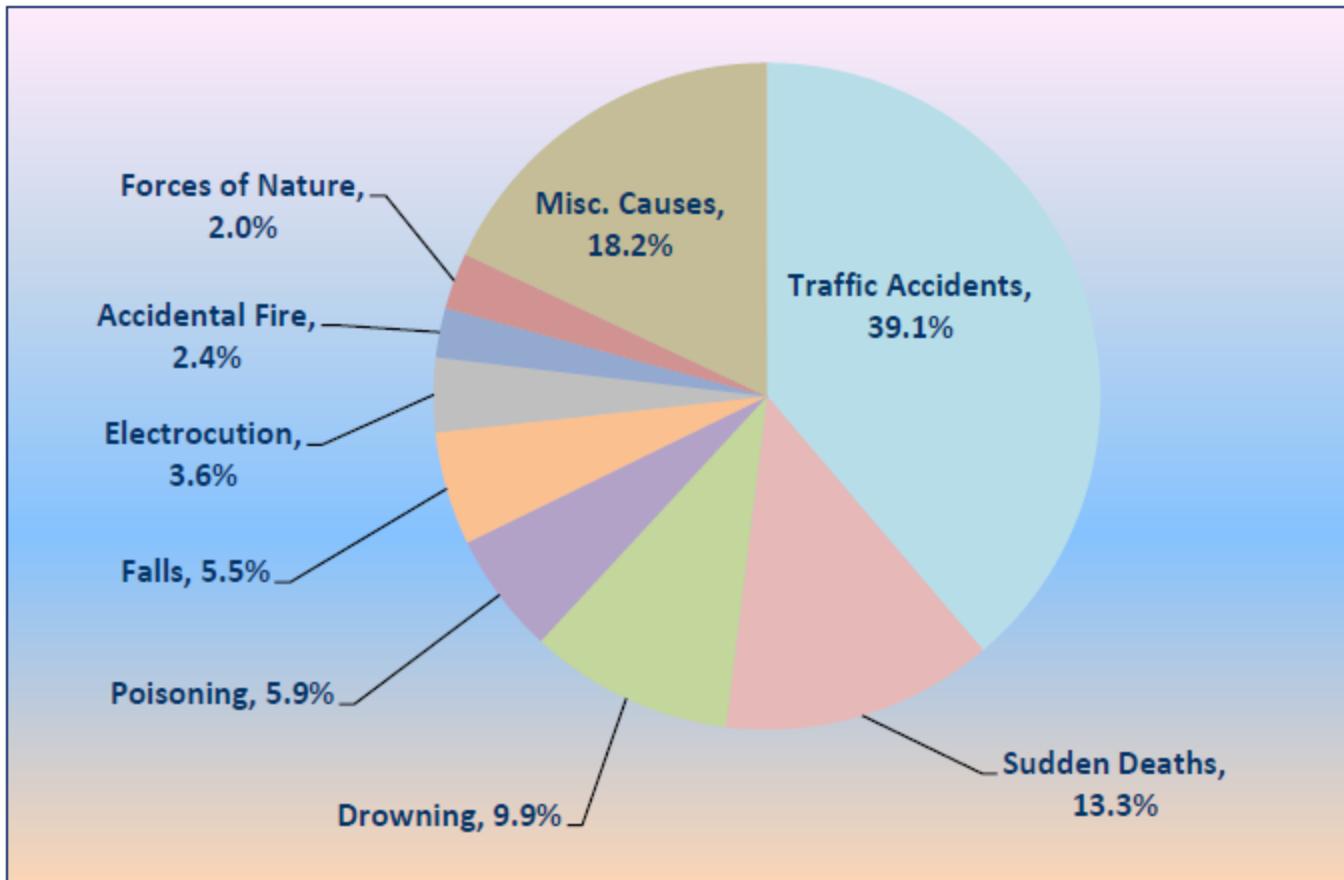
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			Male	Female	Trans- gender	Total	Male	Female	Trans- gender	Total
(1)	(2)	(3)	(100)	(101)	(102)	(103)	(104)	(105)	(106)	(107)
16	MEGHALAYA	23	0	0	0	0	21	2	0	23
17	MIZORAM	14	0	0	0	0	13	1	0	14
18	NAGALAND	5	0	0	0	0	5	0	0	5
19	ODISHA	141	0	0	0	0	112	29	0	141
20	PUNJAB	248	21	0	0	21	229	18	0	247
21	RAJASTHAN	1263	5	1	0	6	1066	203	0	1269
22	SIKKIM	0	0	0	0	0	0	0	0	0
23	TAMIL NADU	627	14	0	0	14	528	102	0	630
24	TELANGANA	830	7	6	0	13	706	124	0	830
25	TRIPURA	36	0	0	0	0	27	9	0	36
26	UTTAR PRADESH	1338	42	8	0	50	1179	168	0	1347
27	UTTARAKHAND	30	0	0	0	0	29	4	0	33
28	WEST BENGAL	318	14	4	0	18	280	37	0	317
<b>TOTAL (STATES)</b>		<b>13326</b>	<b>195</b>	<b>34</b>	<b>0</b>	<b>229</b>	<b>11317</b>	<b>2029</b>	<b>1</b>	<b>13347</b>

Sl. No.	State/UT	No. of Cases	Electrocution							
			No. of Persons Injured				No. of Persons Died			
			Male (100)	Female (101)	Trans- gender (102)	Total (103)	Male (104)	Female (105)	Trans- gender (106)	Total (107)
(1)	(2)	(3)	(100)	(101)	(102)	(103)	(104)	(105)	(106)	(107)
<b>UNION TERRORIES</b>										
29	A & N ISLANDS	4	0	0	0	0	3	1	0	4
30	CHANDIGARH	1	2	0	0	2	0	0	0	0
31	D & N HAVELI AND DAMAN & DIU	15	0	0	0	0	10	5	0	15
32	DELHI (UT)	52	7	1	0	8	42	5	0	47
33	JAMMU & KASHMIR	23	6	0	0	6	19	2	0	21
34	LADAKH	0	0	0	0	0	0	0	0	0
35	LAKSHADWEEP	0	0	0	0	0	0	0	0	0
36	PUDUCHERRY	12	0	0	0	0	11	1	0	12
<b>TOTAL (UTs)</b>		107	15	1	0	16	85	14	0	99
<b>TOTAL (ALL INDIA)</b>		13433	210	35	0	245	11402	2043	1	13446

## Percentage Share of Major States in Accidental Deaths during 2020



## Percentage Share of Various Major Causes of Accidental Deaths during 2020 (Forces of Nature and Other Causes)



# KARNATAKA: 5 SCHOOL STUDENTS ELECTROCUTED IN KOPPAL

- Five high school students died of electrocution while allegedly trying to remove a flagpole erected for the independence day celebrations at their government-run hostel in Koppal as they came in contact with an overhead power line, police said.

PRESS TRUST OF INDIA  
India's Premier News Agency

NEWS on August 18<sup>th</sup> 2019

# GUJARAT: TWO STUDENTS ELECTROCUTED AHEAD OF FLAG HOISTING IN SCHOOL

- "Since the metal pole, which was supposed to be used to hoist the tricolour, was lying on the terrace of the school, the two teenaged students went upstairs to bring it to the ground. But **when they lifted the pole, it accidentally touched a live wire hanging over the terrace,**" he said.

PRESS TRUST OF INDIA  
India's Premier News Agency

**NEWS on August 15<sup>th</sup> 2019**

# MUMBAI RAINS: 3 DIE DUE TO ELECTROCUTION, 3 OTHERS INJURED IN WALL COLLAPSE

## HIGHLIGHTS

- The electrocution incident took place near RTO Office, Andheri West
- Another electrocution took place at Mahakali Caves in Goregaon East
- The wall collapsed at Senapati Bapat Marg, Kamgar Maidan in Dadar East

INDIA  
TODAY

NEWS on June 28<sup>th</sup> 2019

# LINEMAN ELECTROCUTED IN BENGALURU

- BENGALURU: In a freak accident, a 27-year-old lineman of the Bangalore Electricity Supply Company (BESCOM), was **electrocuted while repairing an electrical supply line** at Sampige road at Malleshwaram on Tuesday morning.
- Following the incident, BESCOM staff staged a protest and blamed senior officials for negligence and for not taking precautionary measures.

THE  NEW  
**INDIAN EXPRESS**

**NEWS on October 17<sup>th</sup> 2018**

# LINEMAN ELECTROCUTED IN BENGALURU

- As per our preliminary inspection, we suspect that there was a reverse flow from a generator in the area which resulted in the electrocution. The area has several commercial complexes and most of them have generator supply," said a senior official.
- **Reverse flow, or backfeeding of power,** is when the generator, used to power the building or house, is plugged into a wall outlet. When started, the generator will then energise the lines even if the main power supply is cut, putting power company workers at risk.

THE NEW  
**INDIAN EXPRESS**

**NEWS on October 17<sup>th</sup> 2018**

# LINEMAN ELECTROCUTED IN BENGALURU

## Past incidents

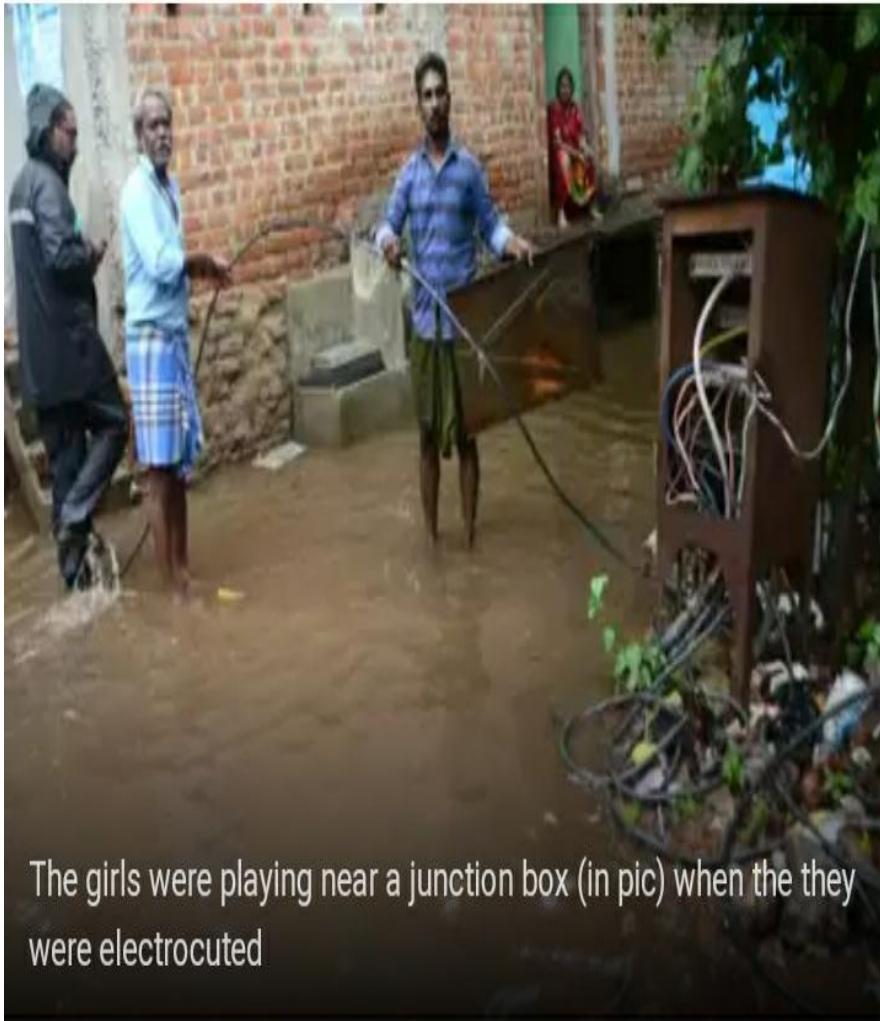
- **April 2016**

44-year-old lineman Madiwala M. Mathapathi was electrocuted while repairing an electric pole at the Yelahanka industrial area. **An IT company situated nearby switched on their generator** when Mathapathi was on the pole leading to backfeeding of power and his death .

- **July 2015**

Suresh Babu H, a 48-year-old lineman with BESCOM, was electrocuted and died when he was repairing a transformer in Frazer Town. **An apartment block is believed to have switched on their generator** leading to his death.

# TWO GIRLS ELECTROCUTED IN CHENNAI, TANGEDCO SUSPENDS FIVE OFFICIALS



The girls were playing near a junction box (in pic) when they were electrocuted

- CHENNAI: Two girls, both aged eight years, were electrocuted **when they jumped into stagnant rain water near an electricity junction box near their home** at R R Nagar in Kodungaiyur here on Wednesday afternoon.
- Another eight-year-old girl escaped as she avoided stepping into the stagnant water after seeing her friends falling into the water.

# 'SHOCKED' IN OTTERI, WOMAN DIED

- CHENNAI: A 35-year-old woman who received an electric shock while walking down a road in Otteri died of her injuries at the government hospital on Friday.
- Police suspect there was a leakage from a underground electric cable that caused the accident three days ago. Police are interrogating TNEB officials.

NEWS IN Malaimalar on August 31<sup>st</sup> 2019

## **‘Chennai Rains: Two women, teen electrocuted in Chennai’**

- At least two rain-related deaths were reported in the city on Thursday. A 40-year-old woman of Pulianthope was electrocuted when she stepped on stagnant water outside her house when she went to a nearby shop around 4 pm, while another 70-year-old woman died of electrocution in a similar manner in Otteri.***

# ELECTRICAL ACCIDENTS : STATISTICS ???

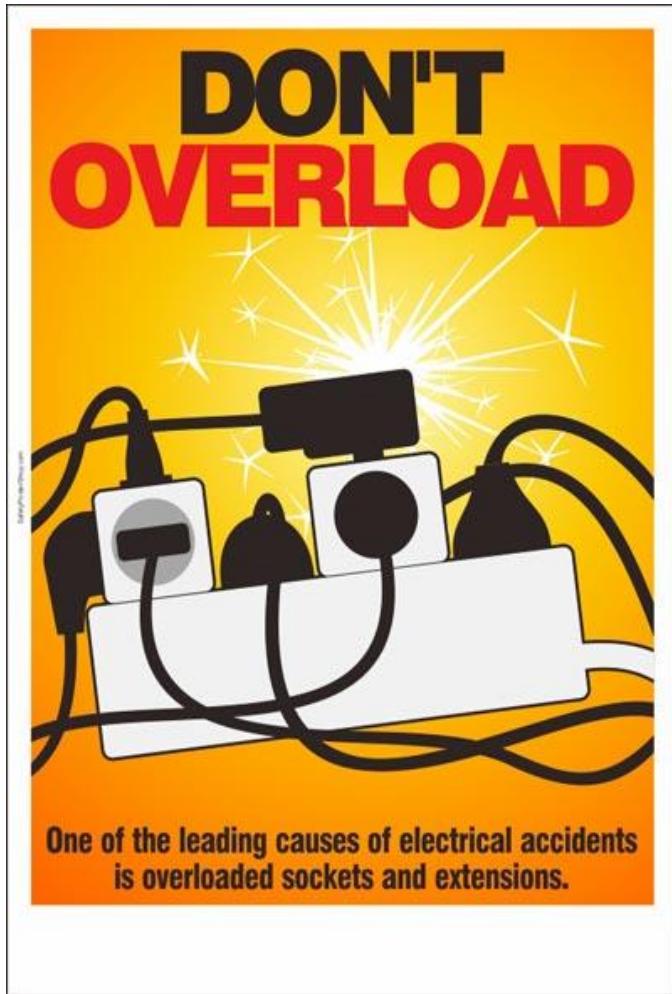
- The people who die in electrical contact accidents each year aren't statistics.
- They're family, friends, co-workers, and schoolmates. Their absence leaves a void in the lives around them that can't be filled.
- There's no substitute for having the people we care for with us.

# NO OF ACCIDENTS-LOCATION

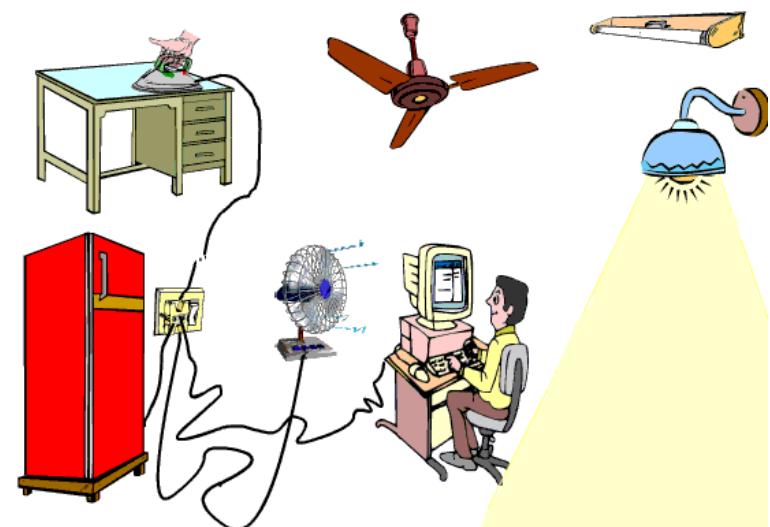
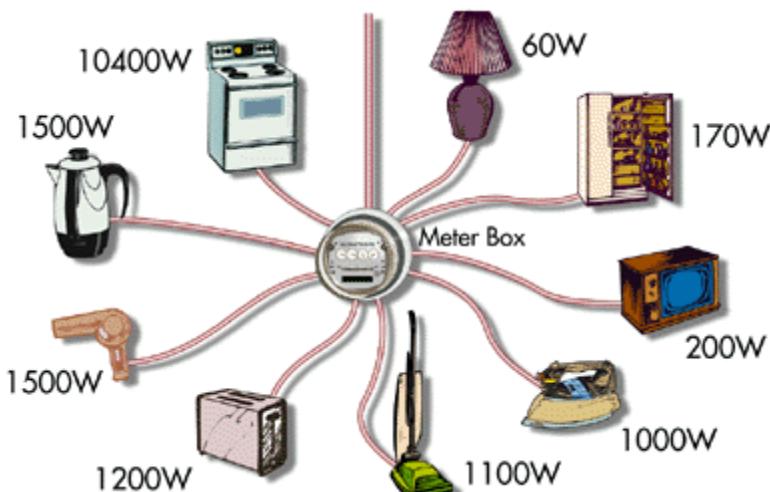
Sl. No.	LOCATION	NO. OF ACCIDENTS									
		1999 - 2000	2000 - 2001	2001 - 2002	2002 - 2003	2003 - 2004	2006 - 2007	2007 - 2008	2008 - 2009	2009 - 2010	Total
1	<i>Generating Station</i>	0	3	0	0	2	0	5	1	2	13
2	<i>T &amp; D lines - 11KV &amp; above</i>	129	151	139	69	142	111	144	143	163	1191
3	<i>T &amp; D lines - below 11KV</i>	97	103	213	88	158	189	269	261	222	1600
4	<i>Industrial Installations - Govt./semi Govt.</i>	13	16	8	43	0	1	18	1	17	117
5	<i>Industrial Installations – Private</i>	7	5	9	105	21	1	2	9	16	175
6	<i>Other Installations - Govt./ Semi Govt.</i>	17	27	6	1	7	4	0	2	1	65
7	<i>Other Installations –Private</i>	54	37	58	39	68	43	0	0	25	324
	<b>TOTAL</b>	317	342	433	345	398	349	438	417	446	3485

**ELECTROCUTION KILLS ABOUT 30 INDIANS EVERYDAY**

# CAUSES OF ACCIDENTS



# What is Overloading?



# Capacity Issue: Overloaded Electrical Outlets



Overloading the capacity of your electrical system creates safety risks that could lead to electrical injury.

Here, the use of several plug adaptors at a single outlet may overload the circuit which serves the outlet. Is this a frequent practice in your home?

# Is this a problem?



**Remember...**

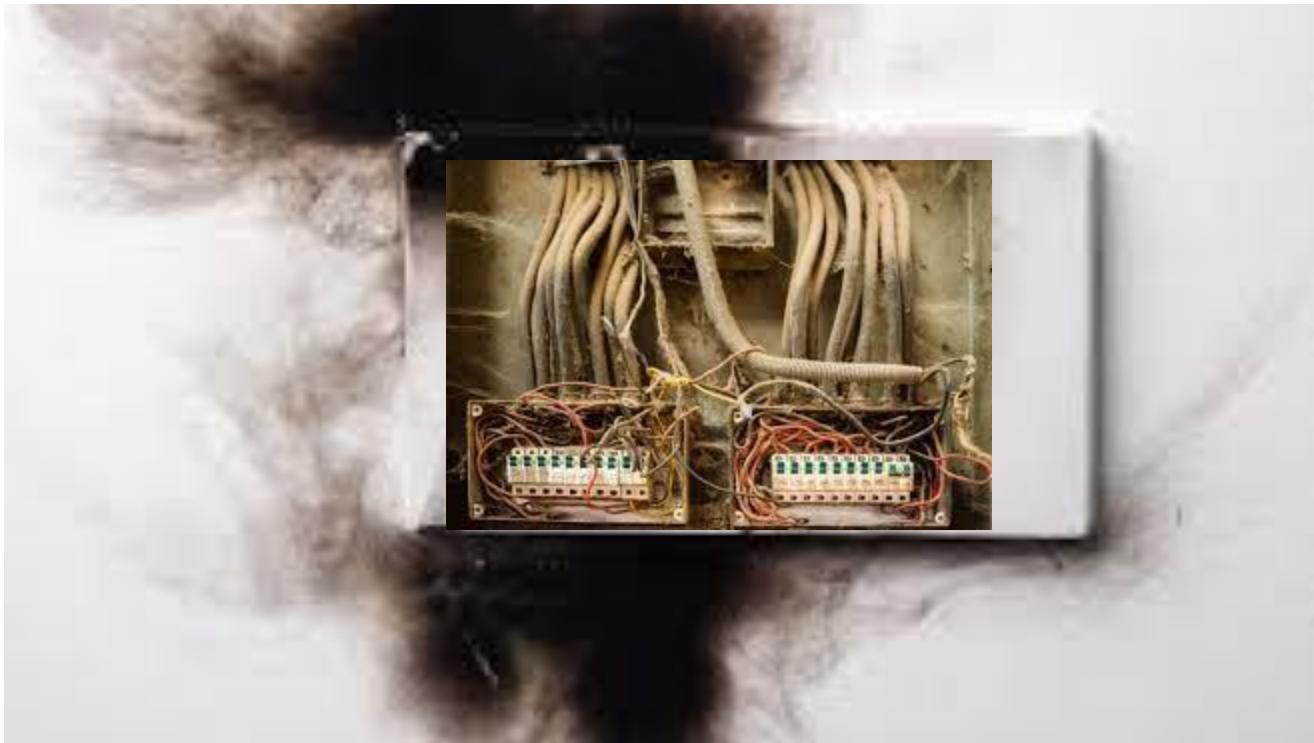
**Water and Electricity Don't Mix**



# CAUSES OF ACCIDENTS

- **Defective appliances / apparatus / tools**
- **Inadequate / lack of maintenance**
- **Sub-standard construction**
- **Violation / neglect of safety measures/lack of supervision**
- **Accidental contact with live electric wire/equipment**

# CAUSES OF ACCIDENTS



# CAUSES OF ACCIDENTS



# Common unsafe conditions in the equipment

- Frayed wires and cable
- Loose joints of wires
- Overloading of the equipment
- Bypassed safety devices
- Over-rated fuses
- Motors that have got jammed
- Water inside the equipment
- Exposed live parts
- Dead animals inside

# Hazards of Electricity

- **Shock** – Most common and can cause electrocution or muscle contraction leading to secondary injury which includes falls
- **Fires** – Enough heat or sparks can ignite combustible materials
- **Explosions** – Electrical spark can ignite vapors in the air
- **Arc Flash** - can cause burns ranging from 14,000 degrees f. to 35,000 degrees f
- **Arc Blast** – In a short circuit event copper can expand 67,000 times. The expansion causes a pressure wave. Air also expands adding to the pressure wave

# CAUSES OF ACCIDENTS

- Snapping of Conductor
- Improper isolation of supply , not availing of proper line clearance,
- Unauthorised Work taken by Non Departmental persons
- Mechanical accidents due to slipping from pole
- Not adhering to safety instructions
- Inadequate clearance
- Illegal fencing

# ELECTRICAL SAFETY

- Look for overhead power lines and buried power line indicators
- Stay at least 10 feet away from overhead power lines and assume they are energized

# ELECTRICAL SAFETY

- Use factory-assembled cord sets and only extension cords that are 3-wire type
- Use ground-fault circuit interrupters (GFCIs) on all 230-volt, single-phase, 15- and 20-ampere receptacles.

# ELECTRICAL SAFETY

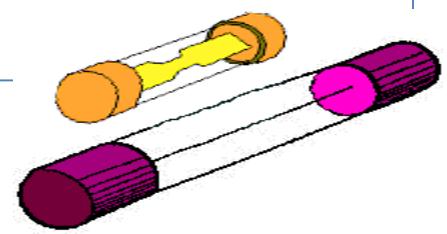
- Extension and power cords shall be **protected from sharp edges and potential pinch points**
- **Temporary lights** must be protected by cage guards
- Extension cords must have a strain relief device to prevent **excessive pull from being transmitted** to the terminal screws
- **Electrical tape cannot** be used to repair nicks in extension and power cords
- **Circuits must be locked** and tagged out prior to employees working on them

# ELECTRICAL SAFETY

- Wet or damp conditions
  - If electrical equipment has gotten wet, have a qualified electrician inspect it before energizing
  - If working in **damp locations**, inspect electric cords and equipment to ensure that they are in good condition and **free of defects**, and **use a ground-fault circuit interrupter (GFCI)**
  - Never operate electrical equipment while you are standing in water

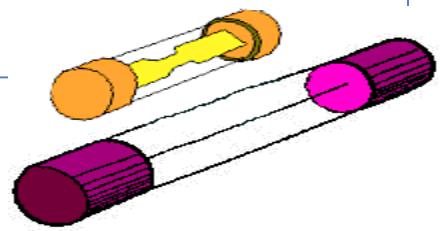
# What is Fuse ?

- Fuse is a piece of wire of a material with a very low melting point. When a high current flows through the circuit due to overloading or a short circuit the wires gets heated and melts. As a result, the circuit is broken and current stops flowing.
- It must be remembered that fuse wire is always connected to the LIVE wire.
- Properties Of Reliable Fuse :-
- Fuse must be of correct value. For example, In a 15A circuit, the fuse wire used is thick and of 15A rating.



# What is Short Circuit ?

- Sometimes, the live and neutral wires come in direct contact due to defective or damaged wiring. When this happens, the resistance of the circuit becomes almost zero and a very large current flows through it. This is known as Short Circuit.



# Overloading Precaution?

- Don't use more power things than the capacity of the source.
- Always use good material like Fuse, MCB, Electric Wire, Plugs etc.

# NO OF ACCIDENTS-CAUSES

Sl. No.	REASON / CAUSE	NUMBER OF ACCIDENTS									
		1999 - 2000	2000 - 2001	2001 - 2002	2002 - 2003	2003 - 2004	2006 - 2007	2007 - 2008	2008 - 2009	2009 - 2010	Total
1	<i>Snapping of Conductors</i>	131	103	138	55	100	72	101	76	93	869
2	<i>Accidental Contact with live electrical wire / equipment</i>	74	77	63	74	116	123	182	149	177	1035
3	<i>Violation / Neglect of Safety measures / Lack of Supervision</i>	48	112	131	82	81	90	46	67	90	747
4	<i>Defective Appliances / Apparatus / Tools</i>	19	14	24	16	23	13	44	39	45	237
5	<i>Inadequate /Lack of Maintenance</i>	20	12	22	11	16	12	3	5	20	121
6	<i>Unauthorized work</i>	4	15	34	11	28	12	19	23	8	154
7	<i>Any other reasons</i>	21	9	21	96	34	27	43	58	13	322
	<b>TOTAL</b>	317	342	433	345	398	349	438	417	446	3485

Table 2 Major causes for the accidents

# MAJOR CAUSES: Non-standard erection

- *Almost 35% of the electrical accidents occur due to the practice of non-standard erection.*
- *This boy had to undergo amputation of his both hands after an electrical accident in which he came into contact with a plinth mounted transformer which was erected in a non-standard manner at the road side without proper fencing and the live HV supply parts were accessible to the public and hence the accident*

# MAJOR CAUSES: Poor –maintenance

- *Twenty percent of the electrical accidents occur out of the factor poor-maintenance.*
- *The reasons for inadequate or lack of maintenance are best known to the utilities / owners of installations. However, we are aware that lack of maintenance not only causes accidents but also results in prolonged interruption of supply affecting thereby revenue generation.*
- *The cost spent on maintenance is easily compensated by the additional revenue and goodwill of the consumers.*

## **MAJOR CAUSES: Human error**

- *The major area to be concentrated in the **electrical safety** is human error, since 45% of the accidents occur due to this factor. Also such accidents are similar in nature and occur at different places at different times.*

## **Physiological Effect of Electric Current on Human Body**

500 mA		Immediate cardiac arrest resulting in death
70-100 mA		Cardiac fibrillation; the heart begins to vibrate and no longer beats at a steady rate. This situation is dangerous since it is irreversible
20-30 mA		Muscle contraction can cause respiratory paralysis
10 mA		Muscle contraction: the person remains “stuck” to the conductor
1-10 mA		Prickling sensations

As per Indian Electricity Rules 1956 at all installations with load above 5 KW use of RCCB is compulsory

# Controlling Electrical Hazards

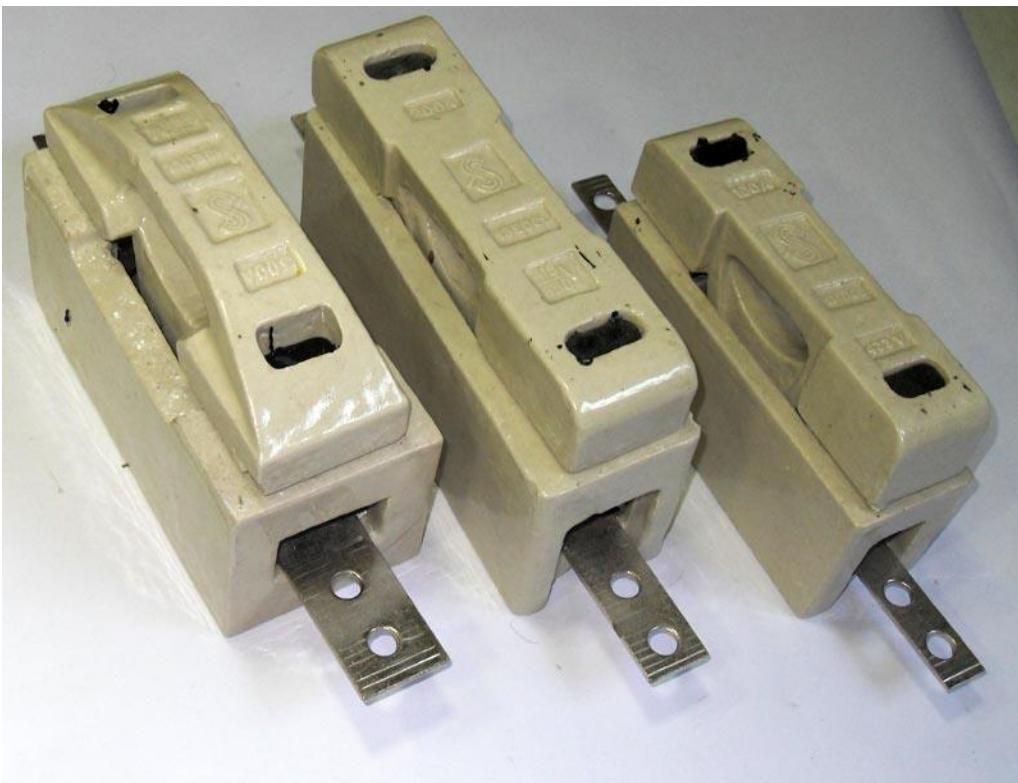
- ✓ Electrical Isolation
- ✓ Equipment Grounding
- ✓ Circuit Interruption
- ✓ Safe Work Practices

# ELECTRICAL SAFETY DEVICES

- Fuse
- Miniature Circuit Breaker (MCB)
- Earth Leakage Circuit Breaker (ELCB)

# ELECTRICAL SAFETY DEVICES

## FUSES



# ELECTRICAL SAFETY DEVICES

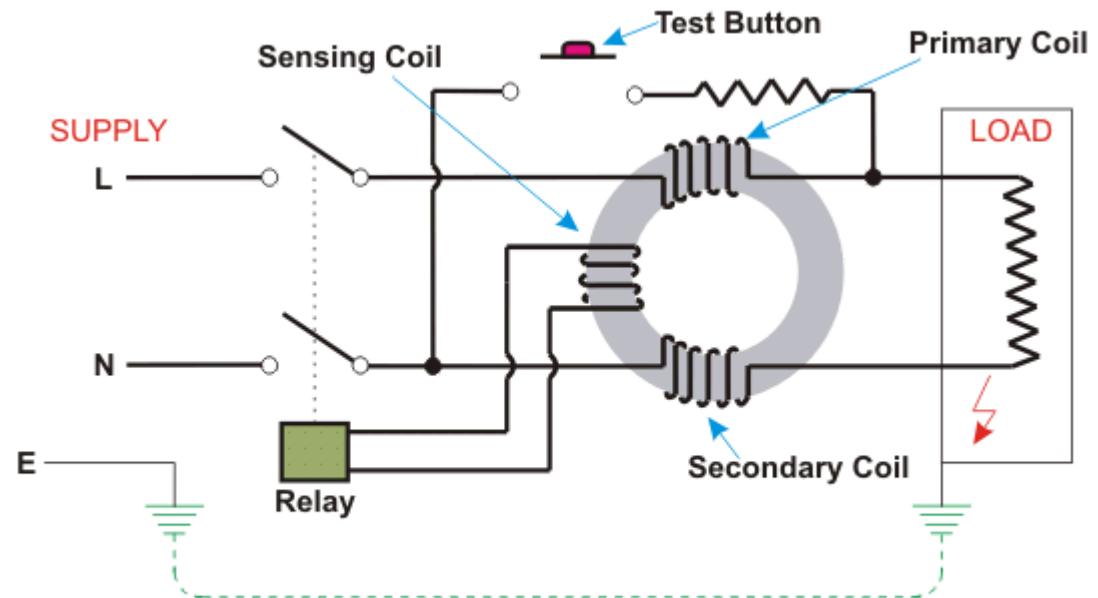
MCB



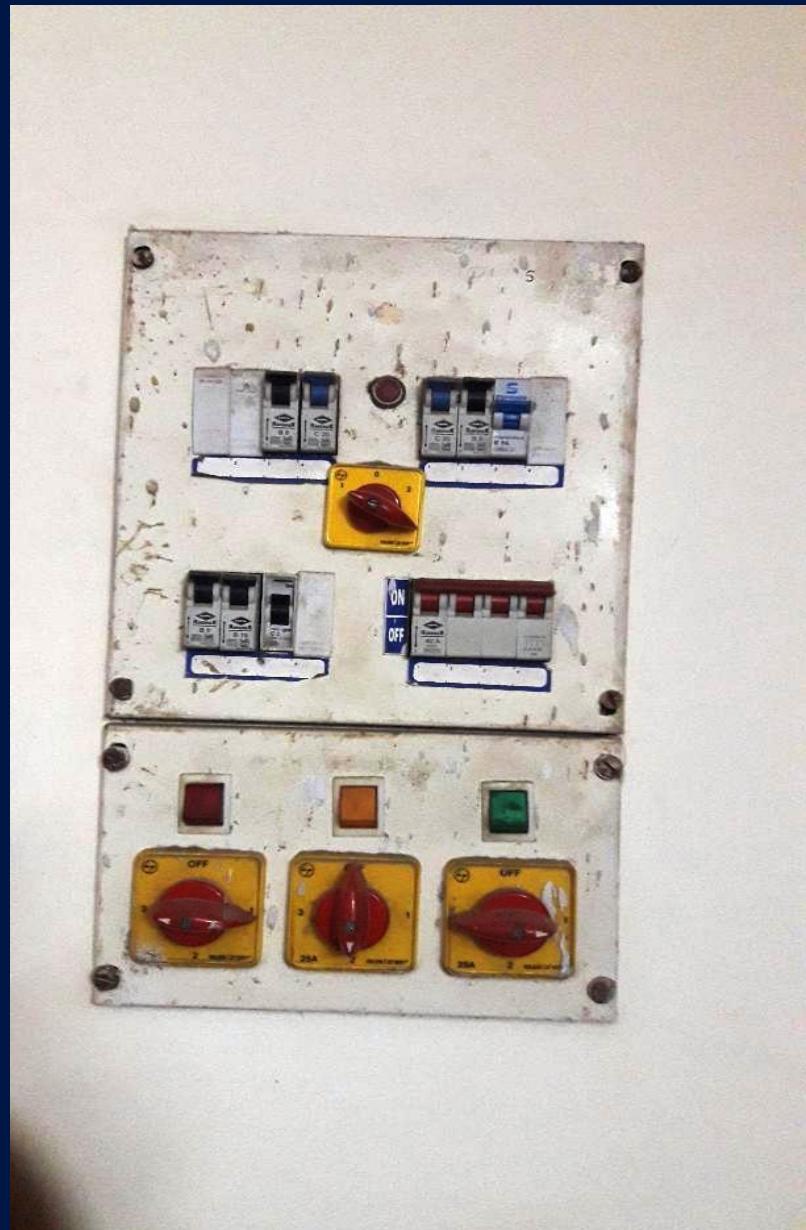
**How to Read MCB Nameplate Rating Printed on It**

# ELECTRICAL SAFETY DEVICES

ELCB



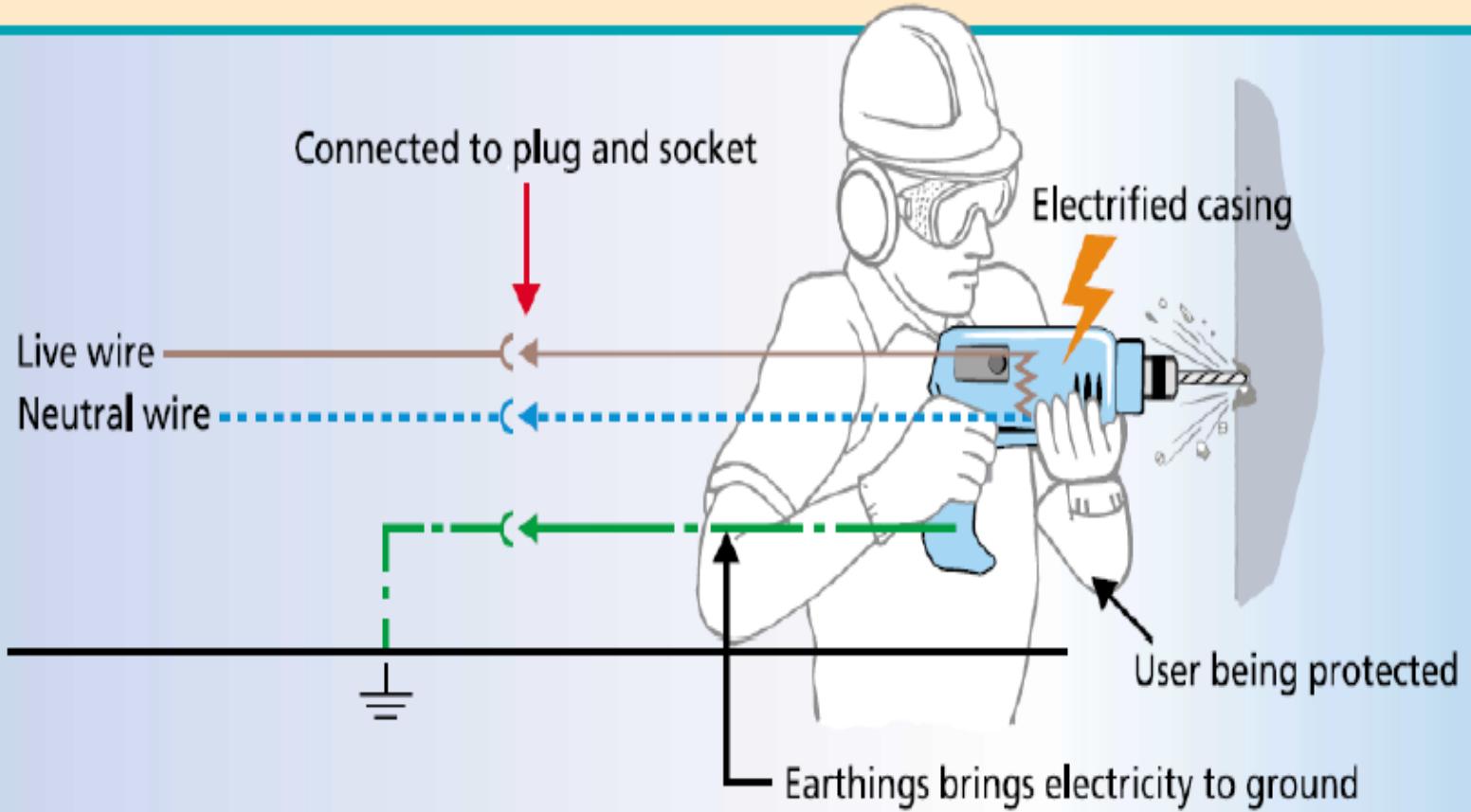
Working Principle of Residual Current Circuit Breaker



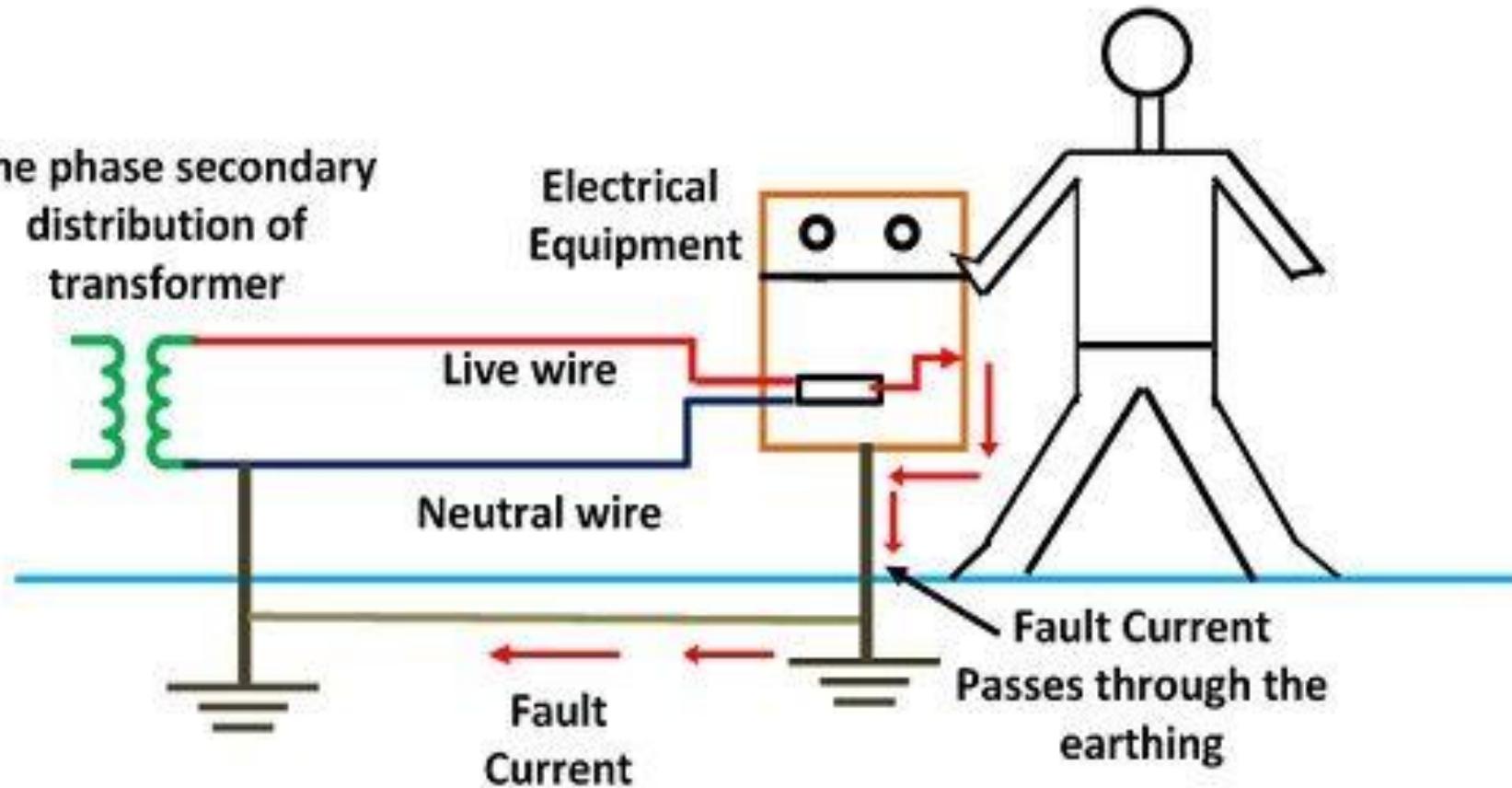
# EARTHING

- Earthing provides a low resistance way of discharging electricity to the ground in case of current leakage.
- The current passes through the “earth” wire and is prevented from entering the human body and causing injury.

# EARTHING



One phase secondary distribution of transformer



Electrical System With Earthing

Circuit Globe

# MINIMUM CLEARANCES

**Table-9: Minimum clearances to be maintained for OH Lines passing above / adjacent to any building(Regulation 58 of CEA Regulations, 2010 )**

Type of OH Lines	Vertical clearance	Horizontal clearance
Voltage not exceeding 650 V	2.5 metres	1.2 metre
Voltage exceeding 650 V but upto and including 11kV	3.7 metres	1.2 metre
Voltage exceeding 11kV but upto and including 33kV	3.7 metres	2.0 metres
Voltage exceeding 33kV	3.7m + 0.3m for every additional 33kV or part thereof	2.0m + 0.3m for every additional 33kV or part thereof

# MINIMUM CLEARANCES

**Table 10: Minimum clearance to be provided above ground of the lowest bare conductors ( Regulation 60 and 61 of CEA Regulations, 2010)**

	Voltage not exceeding 650 V	Voltage exceeding 650 V but not exceeding 33kV	Voltage exceeding 650 V but not exceeding 33kV
Across the street	5.8 metres	6.1 metres	6.1 metres
Along the street	5.5 metres	5.8 metres	6.1 metres
At places other than street	4.6 metres	5.2 metres	5.2M + 0.3M for every 33KV or part thereof.

# **GENERAL SAFETY PRACTICES**

- Do not go near the Distribution transformers**
- Do not touch low lying or snapped conductor**
- Do not lean against electric poles**
- Do not stand beneath overhead lines while heavy winds are blowing**

# GENERAL SAFETY PRACTICES

- **Unauthorized persons shall not attempt replacement of transformer fuses**
- **Other than utility employees shall not try to replace street lights or set right service wires**
- **Inform nearest utility office if loose or hanging wires are noticed**

# GENERAL SAFETY PRACTICES

- ❑ Before replacing a lamp or handling a fan, make sure that the supply is switched off.
- ❑ Place Safety Tagging or other warning boards on main switch before commencing work.
- ❑ Before working on any circuit or apparatus, make sure that the controlling switches are open and locked.

# GENERAL SAFETY PRACTICES

- **Do not connect single pole switch or fuse in a neutral circuit, but always connect in the live or phase wire.**
- **Do not touch an electrical circuit when your hands are wet, bleeding from a cut.**
- **Do not wear loose clothing, metal watch straps, bangles or finger rings while working on appliances**

# SAFETY ITEMS FOR EMPLOYEES

Discharge Rod



Insulated Ladder



Safety Gloves



Helmet



Safety Dress

Safety Shoes



CE

# TO AVERT ELECTRICAL ACCIDENTS

- Educating the Public on the Criteria of maintaining minimum clearance between the building and the OH lines as per the CEA safety regulations at the time of according building plan approval and the matter may have to be taken up with Local planning authority to curtail accidents and to create awareness among public to control loss of life due to electrical accident.

# TO AVERT ELECTRICAL ACCIDENTS

- Check **earth rod periodically** to ensure their tightness of bolts of the copper plates and to ensure it is free of corrosion.
- Other **safety appliances** of the staff are to be checked periodically
- Officer should **confirm the healthiness**. Defective ones must be replaced then and there.

# EMERGENCY TELEPHONE NUMBERS

- Police: 100
- Fire Brigade: 101
- Ambulance: 102
- Power System & Trading: 9818100644, 9818100332, 9818100438, 66115118
- NDPL Centralized Security Control Room: 65463646, 65463647
- Safety Officer: 9910492499
- Fire Officer: 9910492500
- CMO: 9818100571
- List of Dispensaries: Shalimar Bagh:65155058, Ashok Vihar: 65155045,
- Rohini: 65155046, Narela: 65155047, Mukherjee Nagar: 65355047
- Mobile Dispensary: 9811006019

# Hazard 1: Overhead Power Lines

- Overhead powered and energized electrical lines have high voltages which can cause major burns and electrocution to workers. Remember to maintain a minimum distance of 10 feet from overhead power lines and nearby equipment. **Conduct site surveys to ensure that nothing is stored under overhead power lines.**
- Also, **safety barriers and signs must be installed to warn nearby non-electrical workers** of the hazards present in the area.

# Hazard 2: Damaged Tools and Equipment

- **Exposure to damaged electrical tools and equipment can be very dangerous.** Do not fix anything unless you are qualified to do so. Thoroughly check for cracks, cuts or abrasions on cables, wires and cords. In case of any defects, have them repaired or replaced.
- **Lock Out Tag Out (LOTO) procedures** should be performed at all times before commencing electrical maintenance and repairs. LOTO procedures are there to protect all workers on a worksite.

## Hazard 3: Inadequate Wiring and Overloaded Circuits

- Using wires with inappropriate size for the current can cause overheating and fires to occur. **Use the correct wire suitable for the operation** and the electrical load to work on.
- Use the **correct extension cord designed for heavy duty** use. Also, do not overload an outlet and use proper circuit breakers. Perform regular fire risk assessments to identify areas at risk of bad wiring and circuits.

# Hazard 4: Exposed Electrical Parts

- Examples of exposed electrical parts include **temporary lighting**, open power distribution units, and detached insulation parts on electrical cords. These hazards can cause potential shocks and burns. Secure these items with **proper guarding mechanisms** and always check for any exposed parts to be repaired immediately.

# Hazard 5: Improper Grounding

- The most common electrical violation is improper grounding of equipment. Proper grounding can eliminate unwanted voltage and reduce the risk of electrocution. **Never remove the metallic ground pin as it is responsible for returning unwanted voltage to the ground.**

# Hazard 6: Damaged Insulation

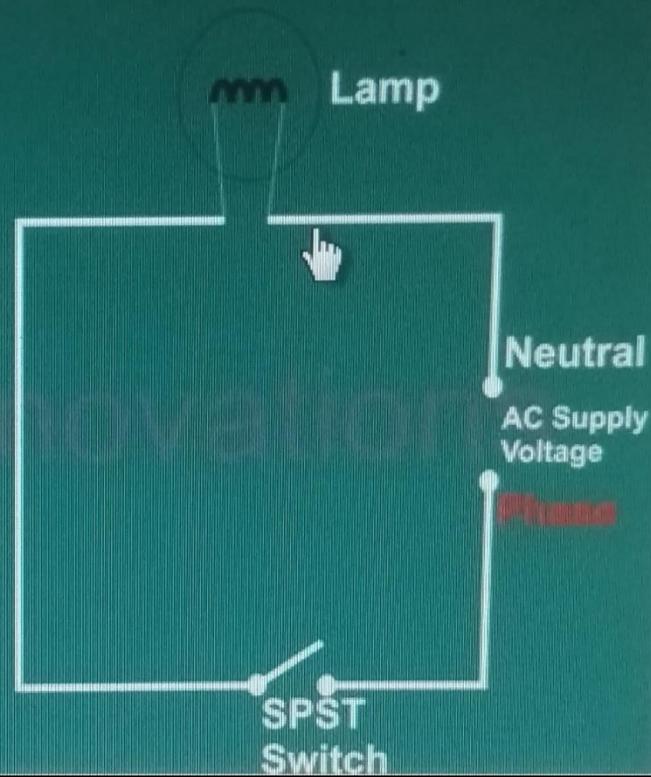
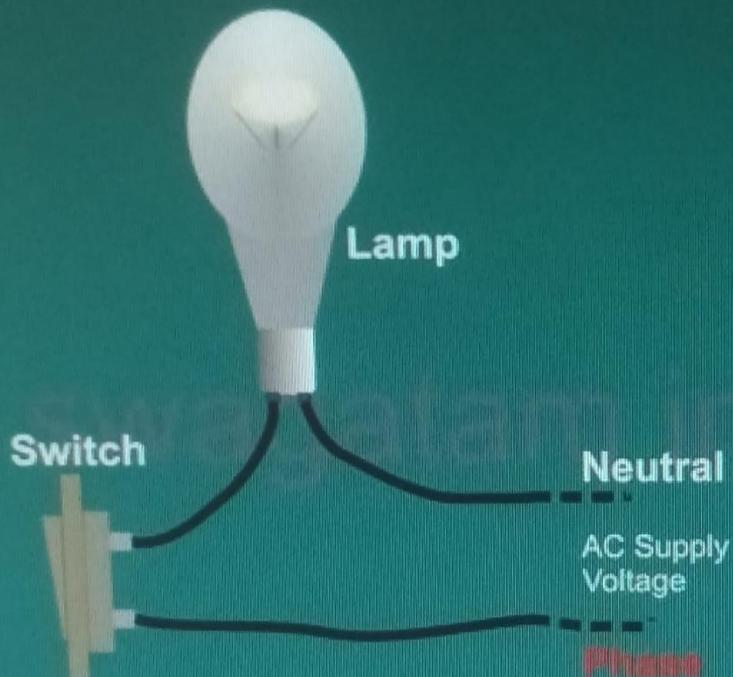
- Defective or inadequate insulation is a hazard. Be aware of damaged insulation and report it immediately. **Turn off all power sources before replacing damaged insulation** and never attempt to cover them with electrical tape.

# Hazard 7: Wet Conditions

- Never operate electrical equipment in wet locations. **Water greatly increases the risk of electrocution especially if the equipment has damaged insulation.** Have a qualified electrician inspect electrical equipment that has gotten wet before energizing it.

# WIRING FOR LAMP

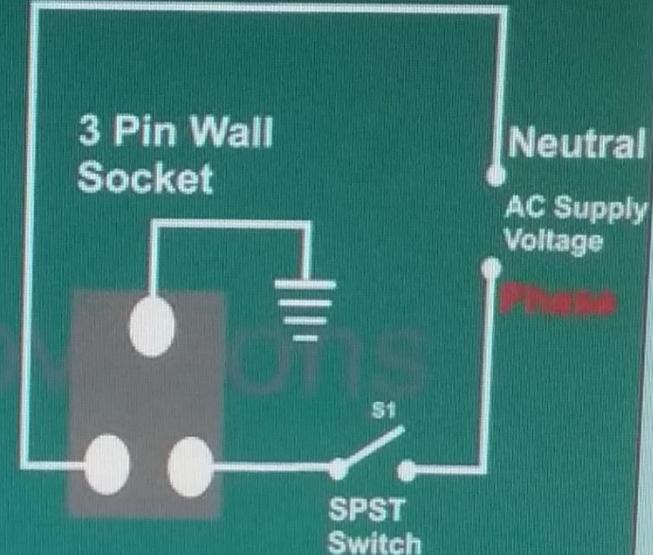
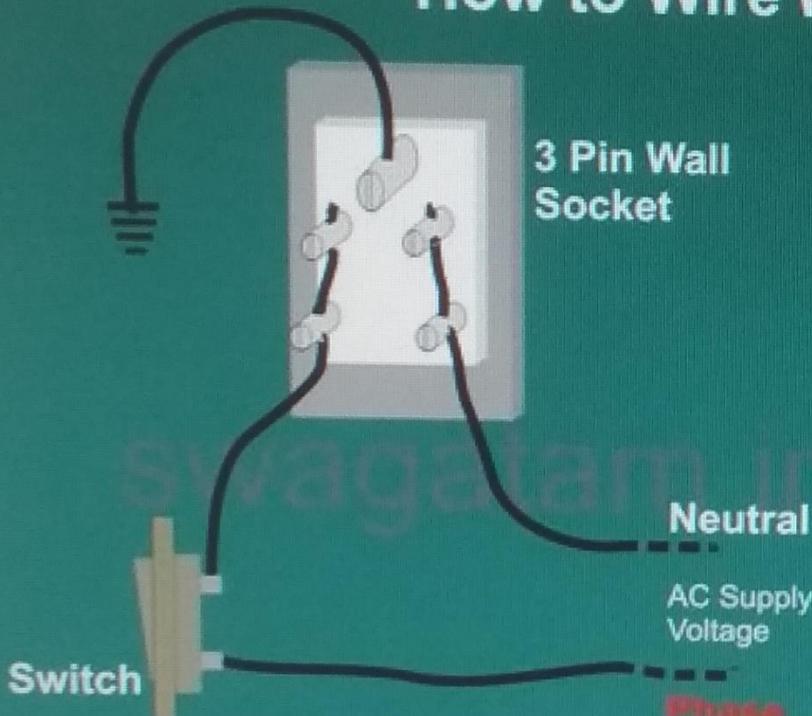
How to Wire a Lamp and a Switch to an Electric Supply



The Above Image is for Depiction Purpose Only  
Do Not Imitate.

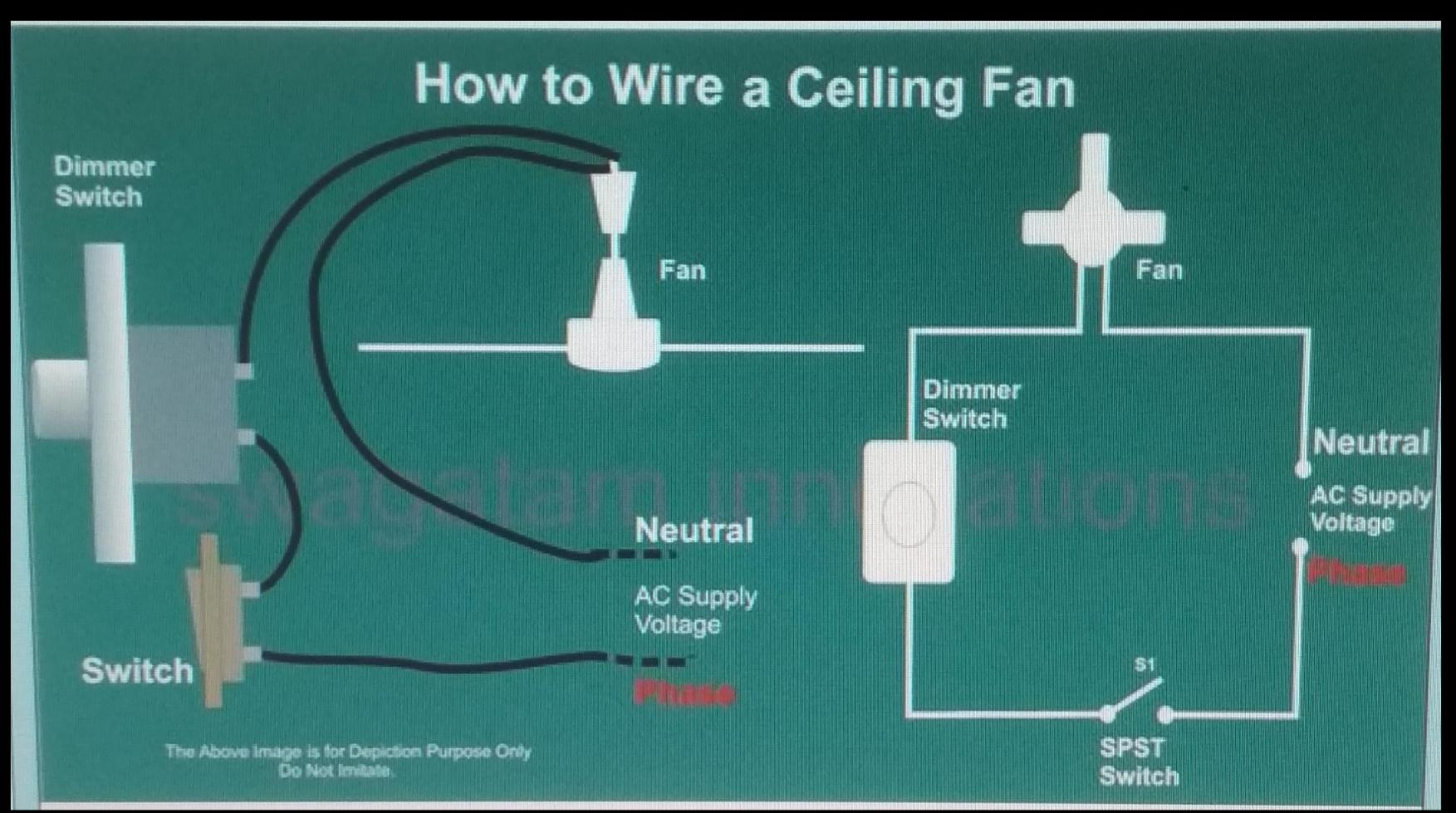
# WIRING FOR WALL SOCKETS

## How to Wire Wall Sockets



The Above Image is for Depiction Purpose Only  
Do Not Imitate.

# WIRING FOR CEILING FAN



# SWITCHES IN SERIES

How to Wire Switches in Series

The diagram illustrates the wiring of two Single Pole Single Throw (SPST) switches in series to control a lamp. On the left, a photograph shows a lamp connected to a power outlet, with the word "Switches" pointing to the two physical switches. On the right, a schematic diagram shows the internal wiring. The circuit starts at the "Phase" line, which is labeled "AC Supply Voltage". This line goes to the first switch, labeled "S1". After S1, the line continues to the second switch, labeled "S2". Both S1 and S2 are shown with their normally open contacts in series. The line then splits into two parallel branches to power a "Lamp". One branch goes through the bulb, and the other branch returns to the "Neutral" line, which is also labeled "AC Supply Voltage". A note at the bottom states: "The Above Image is for Depiction Purpose Only Do Not Imitate."

Lamp

Switches

Lamp

Neutral

AC Supply Voltage

Phase

The Above Image is for Depiction Purpose Only  
Do Not Imitate.

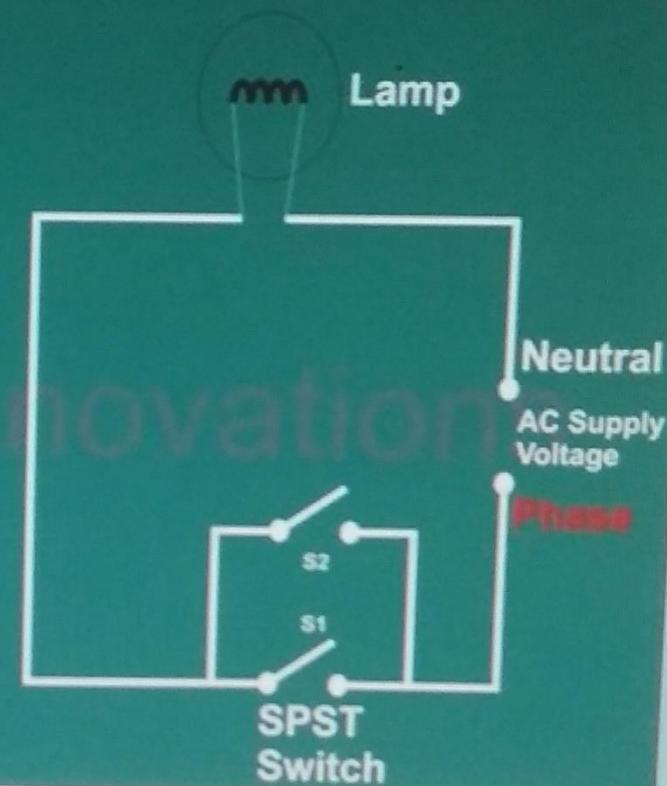
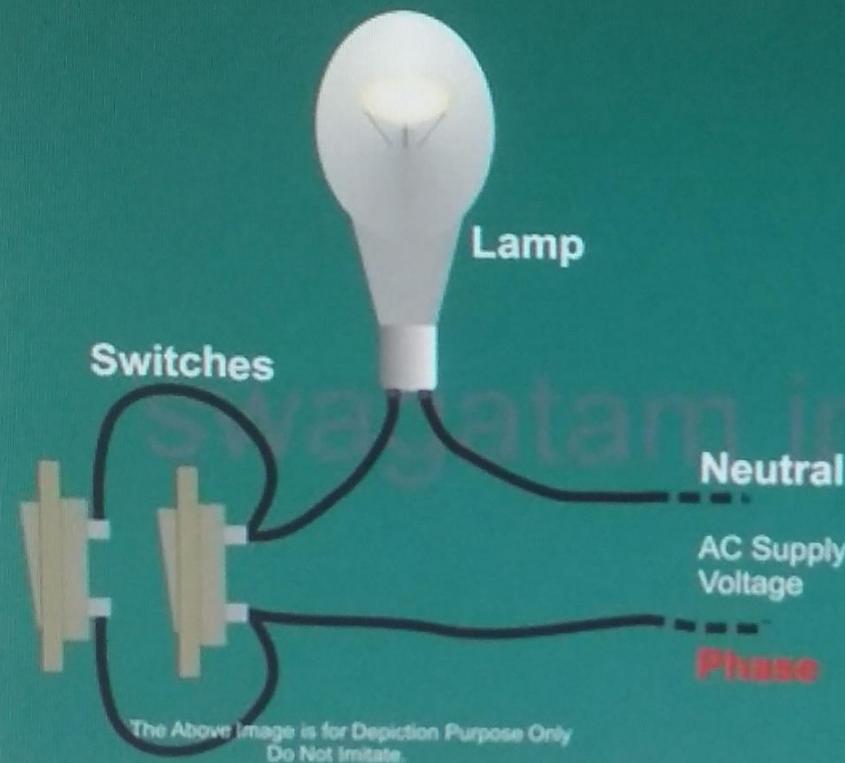
S2

S1

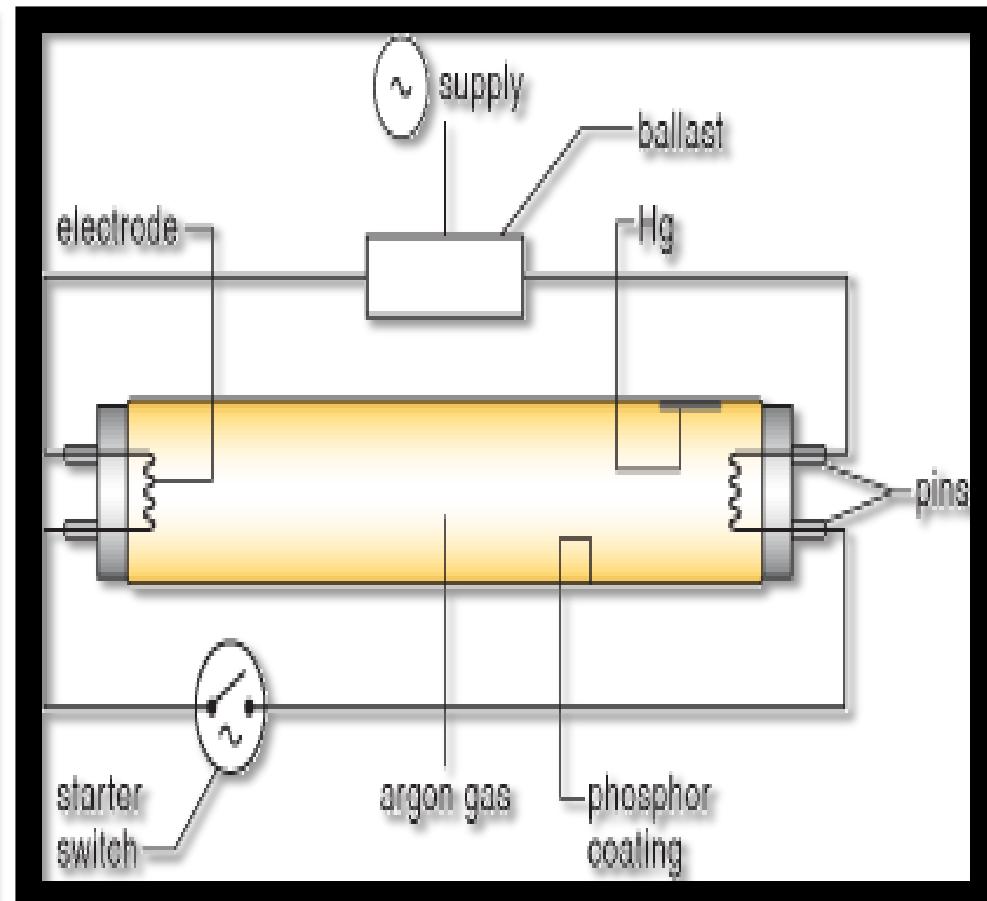
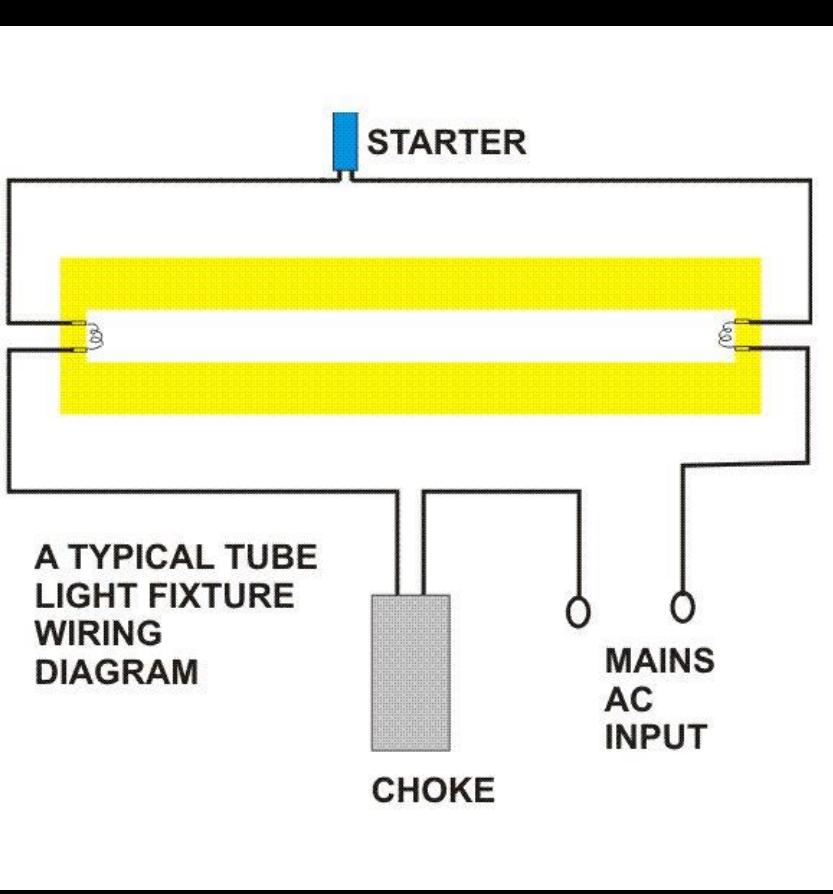
SPST  
Switch

# SWITCHES IN PARALLEL

## How to Wire Switches in Parallel

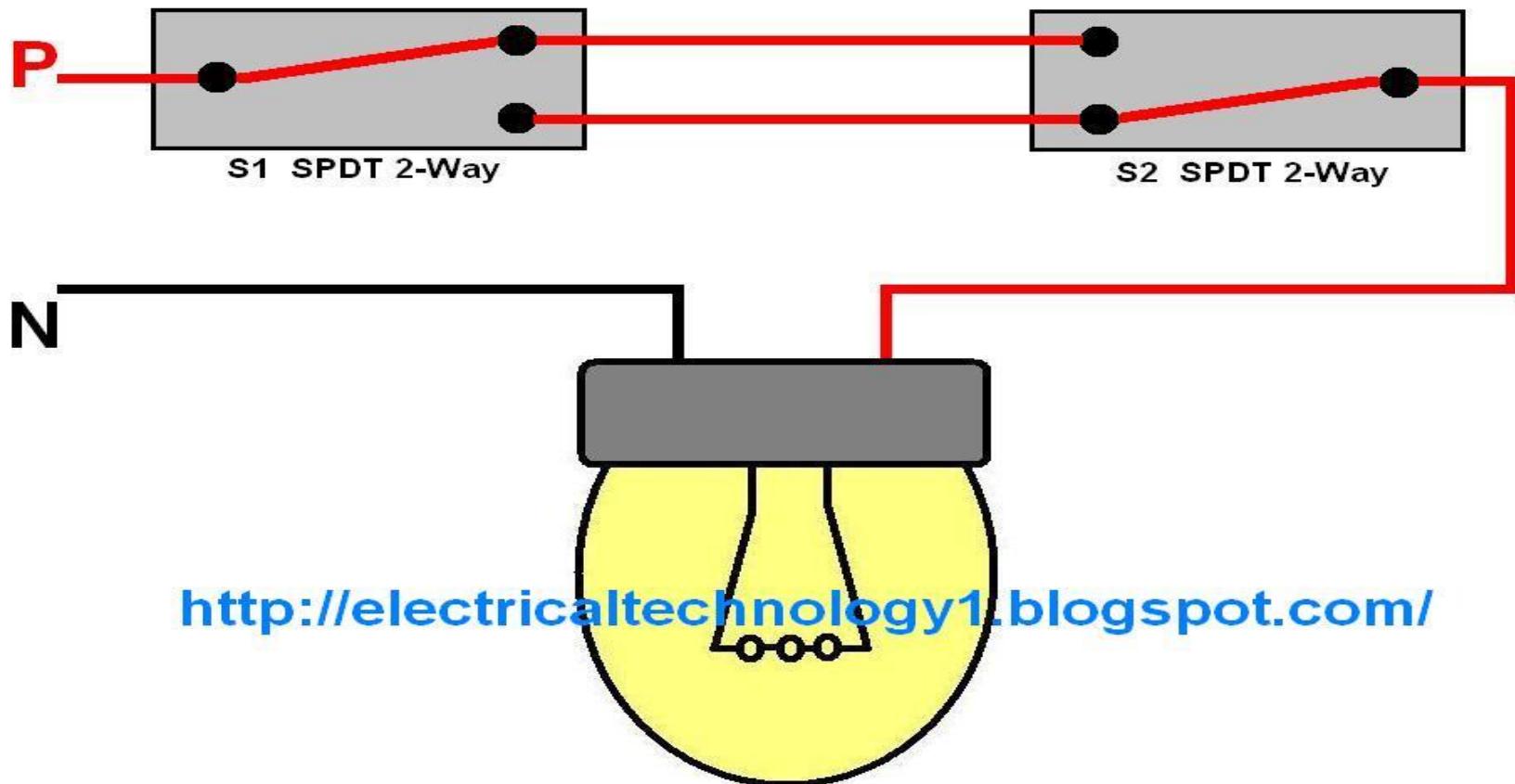


# TUBE LIGHT WIRING

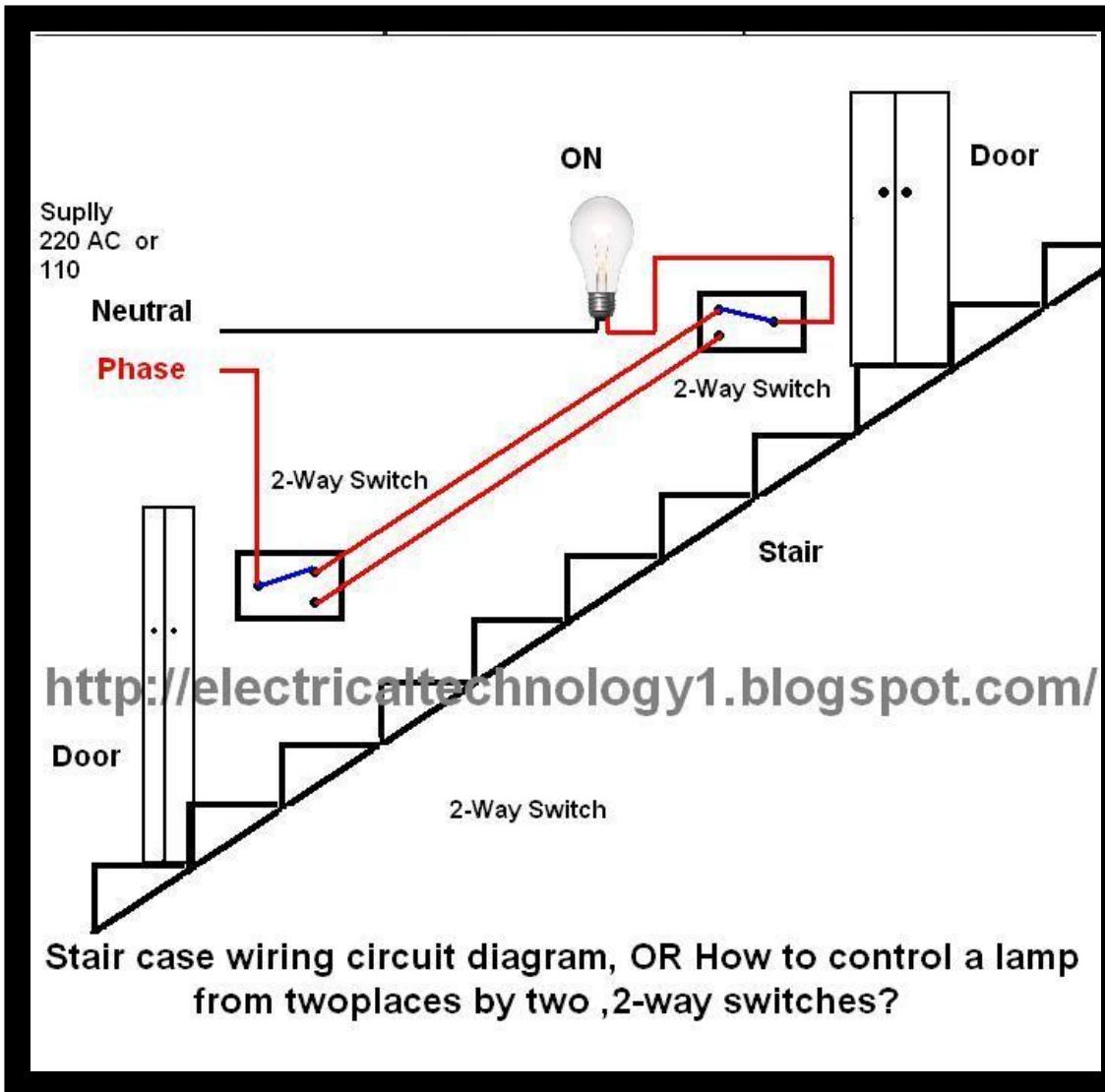


# STAIRCASE WIRING

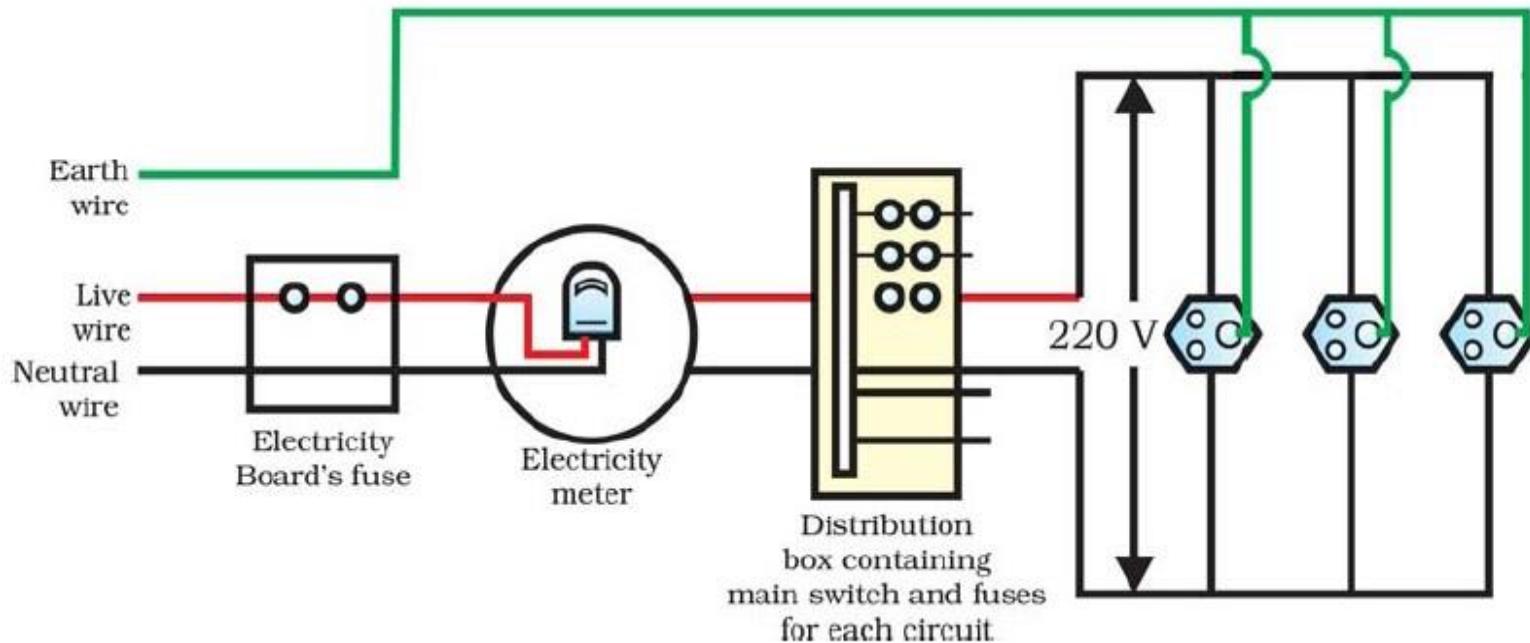
Stair case wiring circuit diagram, OR How to control a lamp from two different places by two ,2-way switches?



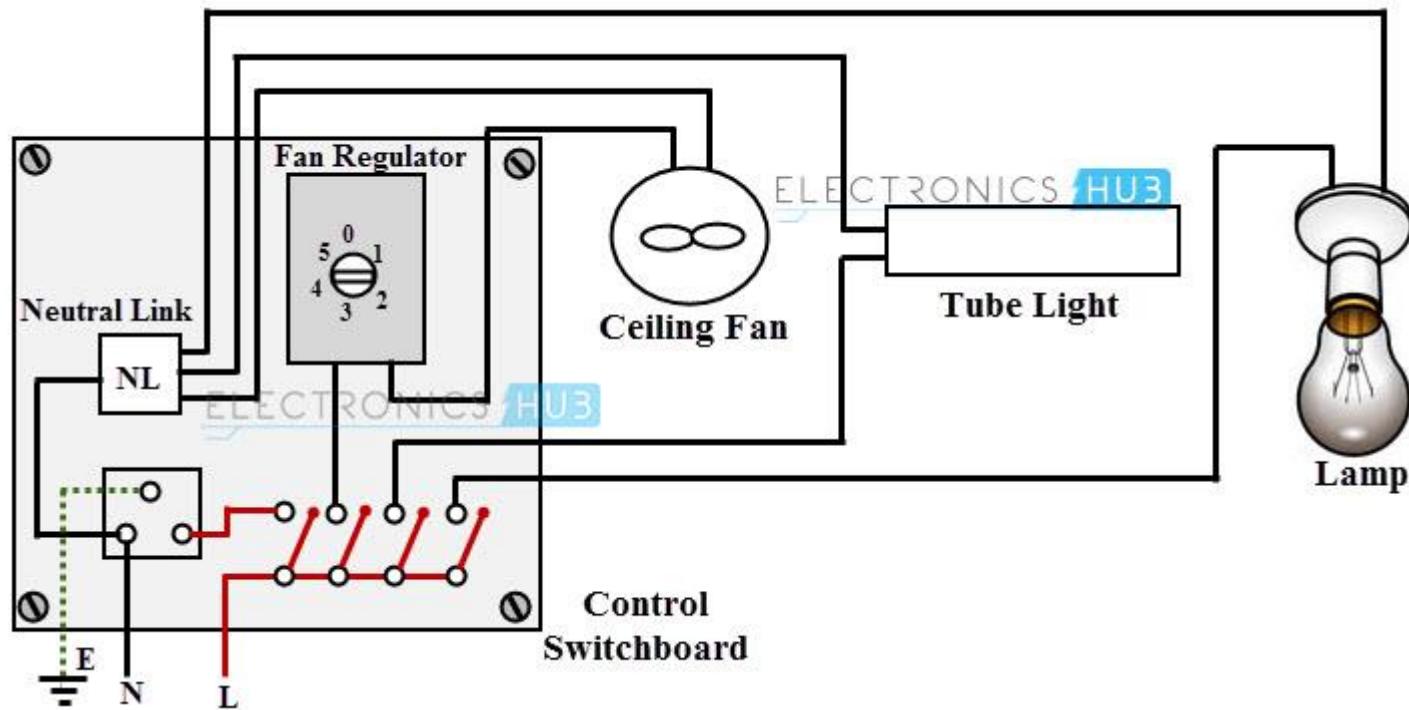
# STAIRCASE WIRING



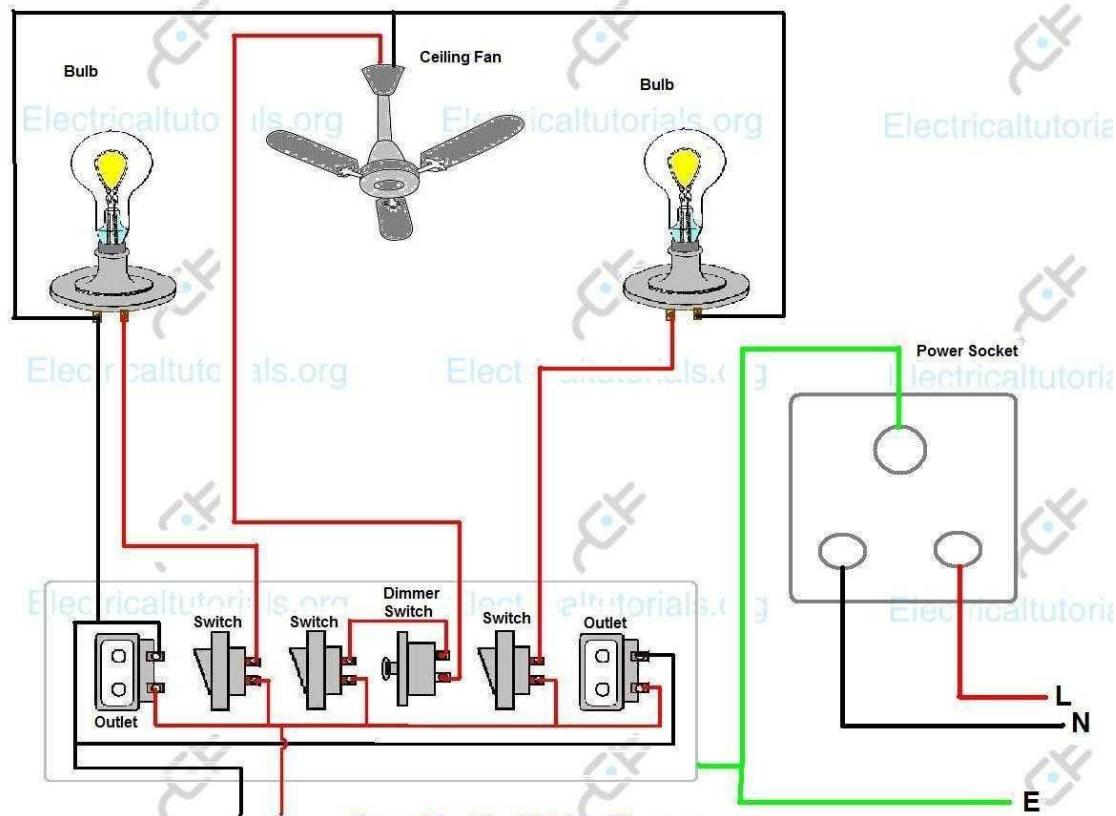
# Domestic Electric Circuit



# Domestic Electric Circuit



# Domestic Electric Circuit



Room Electrical Wiring Diagram

Design By Sikandar Haidar

From [Electricalonline4u.com](http://Electricalonline4u.com) and [Electricaltutorials.org](http://Electricaltutorials.org)

**THANK YOU**