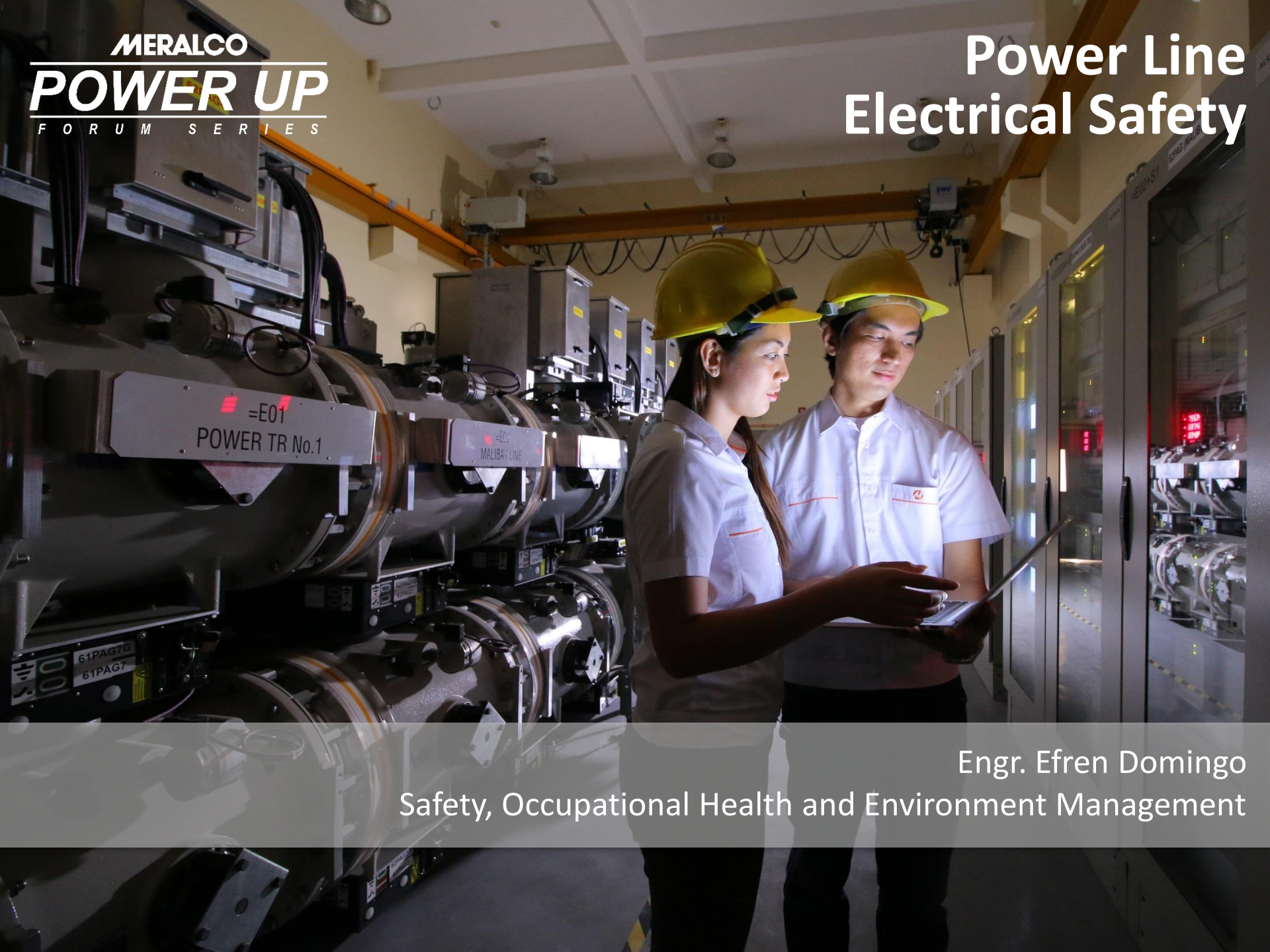




Engr. Efren Domingo
Safety, Occupational Health and Environment Management



POWER LINE ELECTRICAL SAFETY

Engr. Efren V. Domingo

Head - Safety, Occ. Health & Environment
Management

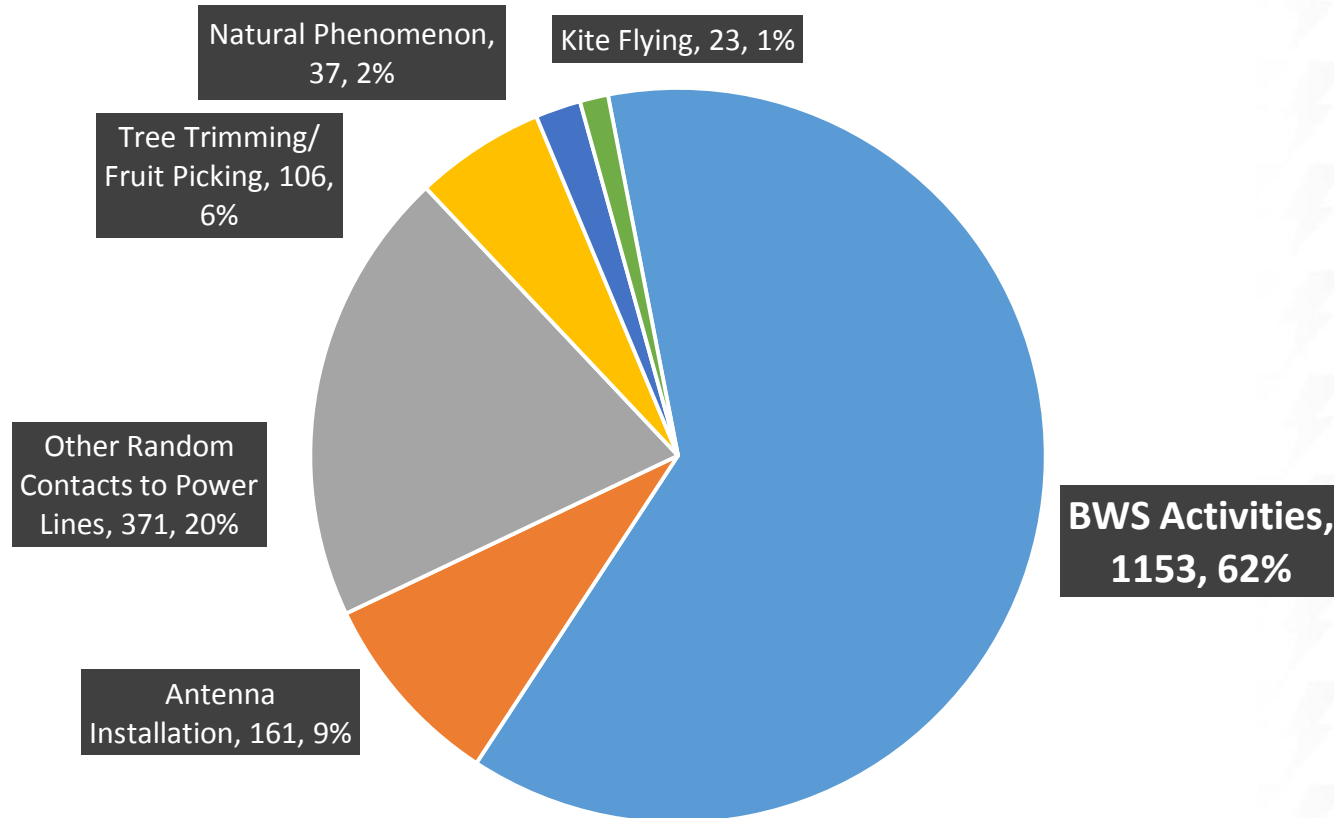
Outline

- **Public Safety Statistics**
- **Causes & Analysis**
- **Power Line Designs**
- **Elec. Shocks – How it can harm?**
- **Effects to Human Body**
- **Contacts to avoid**
- **Preventive Measures**
- **Meralco Public Safety Initiatives**



MAJORITY OF PUBLIC INCIDENTS ARE BUILDING WORK SITE (BWS) RELATED

Summary of Public Incident Per Type (2012-2016)



Total = 1,710 Incidents



WHY DO BWS PUBLIC INCIDENTS OCCUR ?

Population increase in the franchise area

Continuous development and industry boom

Lack of Safety awareness

philstar
GLOBAL

BUSINESS

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TECHNOLOGY | BUSINESS AS USUAL | BANKING | MOTORING | SCIENCE AND ENVIRONMENT | REAL ESTATE

Philippine construction works seen growing over 50% by 2020

By [Richmond Mercurio](#) (The Philippine Star) | Updated May 26, 2016 - 12:00am

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A report by London-based Timetric's Construction Intelligence Center (CIC) showed the Philippine construction industry is seen to grow to \$47 billion by 2020 from \$30.2 billion last year on a compound annual growth rate of 9.22 percent. **File photo**

MANILA, Philippines – Construction activities across the country are expected to remain busy in the next four years, with the local construction industry seen growing more than half by 2020.

VOLTAGE INCREASES AS THE HEIGHT INCREASES



115, 000 Volts

34, 500 Volts



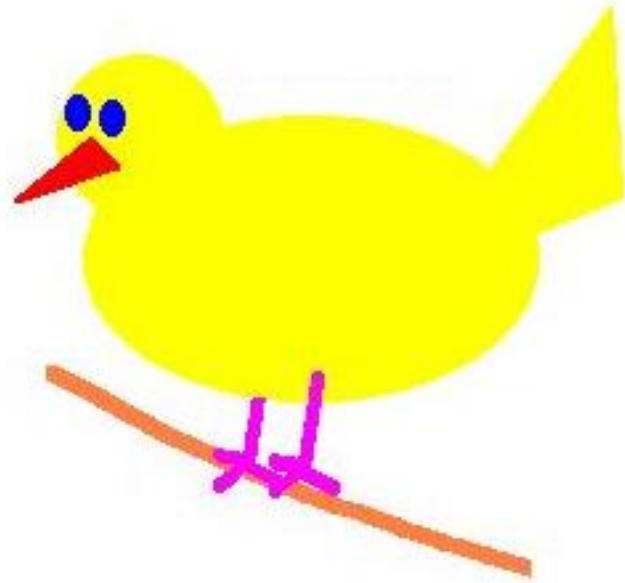
DISTRIBUTION LINES ARE EQUALLY DANGEROUS AS TRANSMISSION LINES



34, 500 Volts

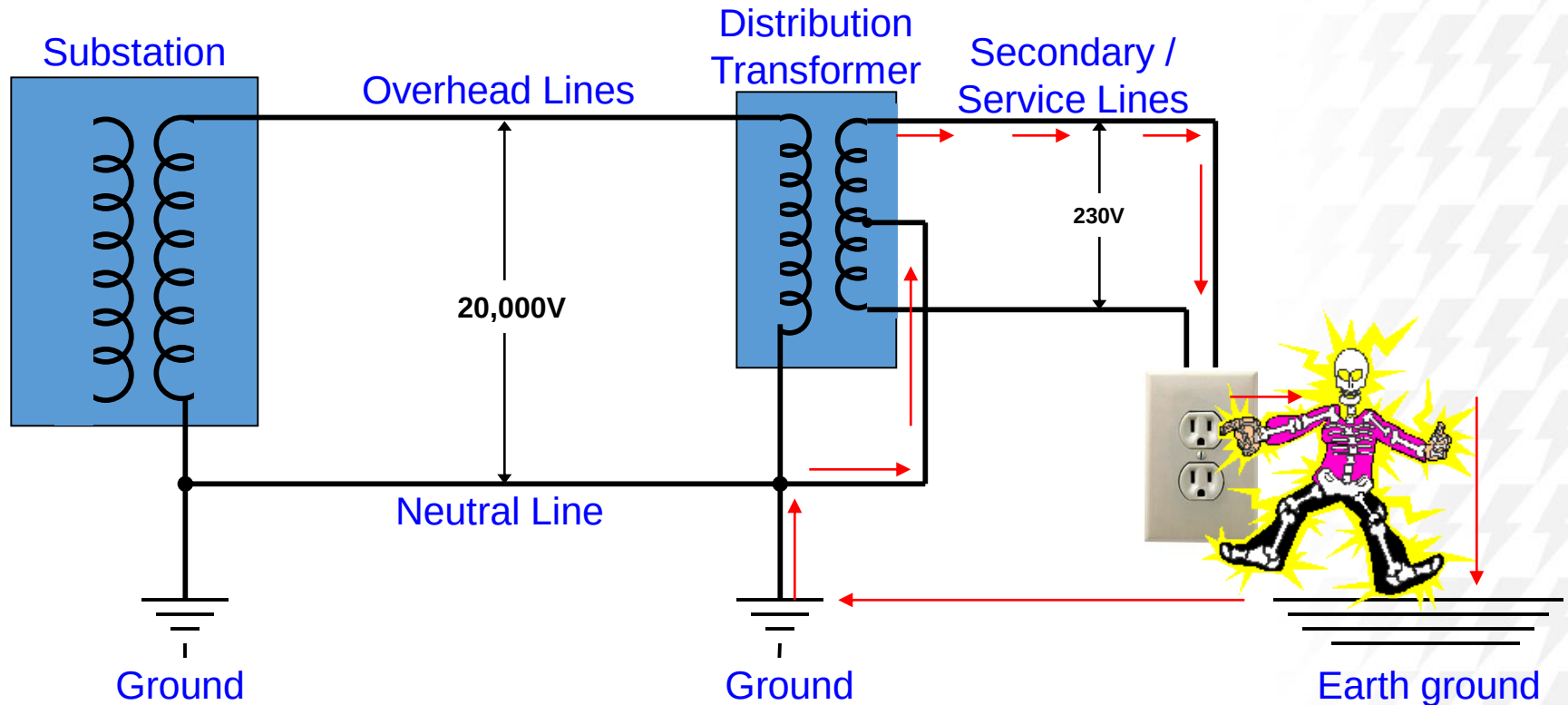
230 Volts



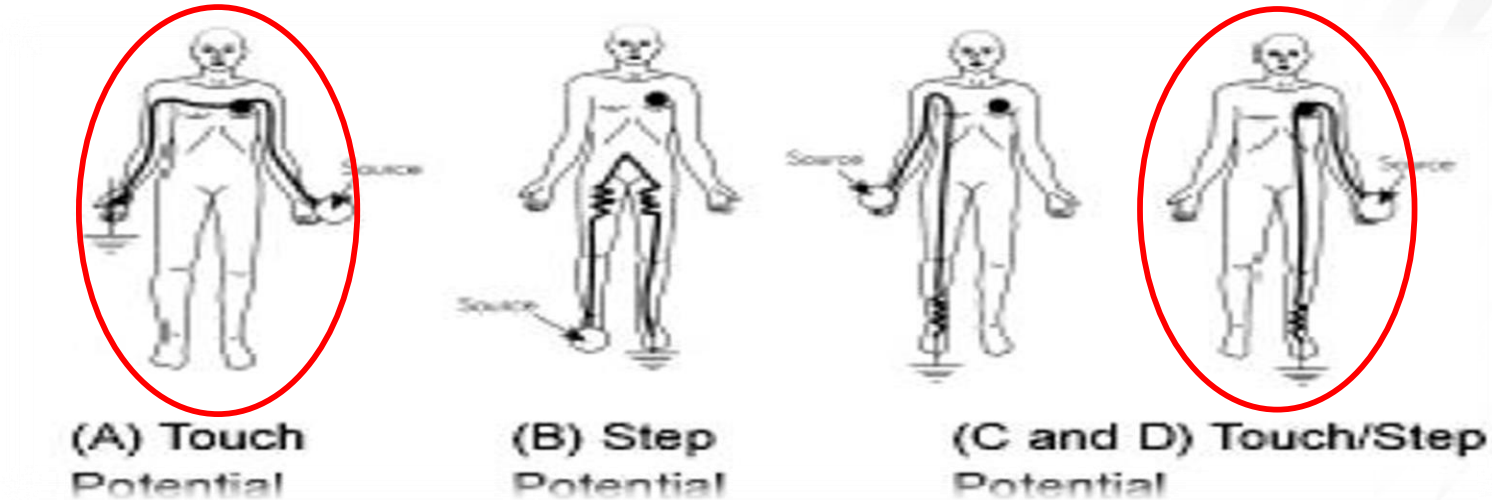




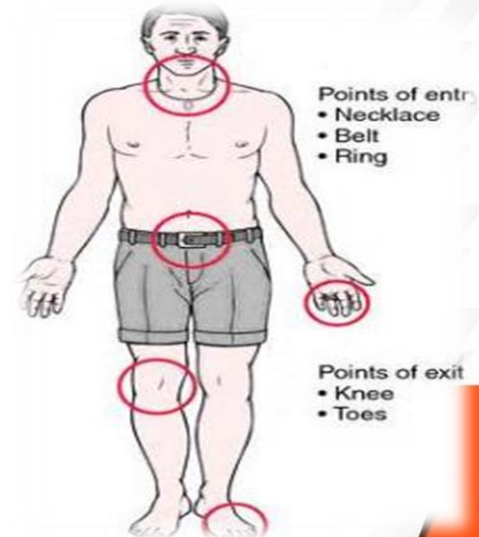
SHOCK IS A PRODUCT OF LIVE LINE & A GROUNDED BODY CONTACT



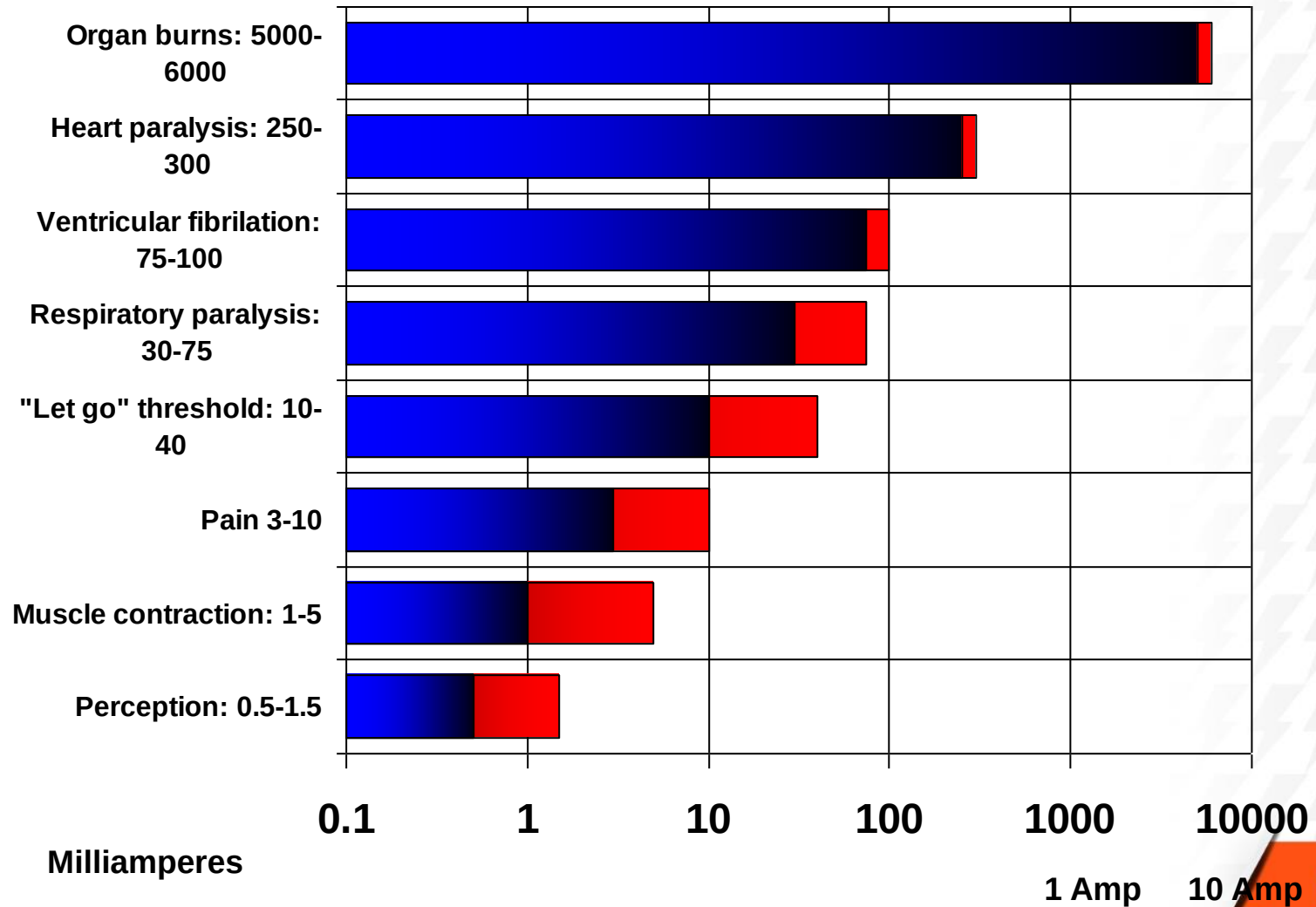
ELECTRICAL CURRENT CAN BE FATAL WHEN IT PASSES THROUGH THE HEART



Jewelries are strong conductors, avoid wearing it in worksites



HOW ELECTRICITY CAN HARM YOU?



HOW ELECTRICITY CAN HARM YOU?

OHM's Law

$$V = IR \quad \text{or} \quad I = \frac{V}{R}$$

Where: **V** - potential in **VOLTS**
I - current in **AMPERES**
R - resistance in **OHMS**



HOW ELECTRICITY CAN HARM YOU?

Sample Computation

Under dry conditions, the resistance offered by the human body may be as high as 100,000 Ohms. Wet or broken skin may drop the body's resistance to 1,000 Ohms.



HOW ELECTRICITY CAN HARM YOU?

Sample Computation

$$I = \frac{V}{R}$$

Where $R = 2000$ ohms
(Resistance of human body)

12 Volts
car battery
40 Amperes

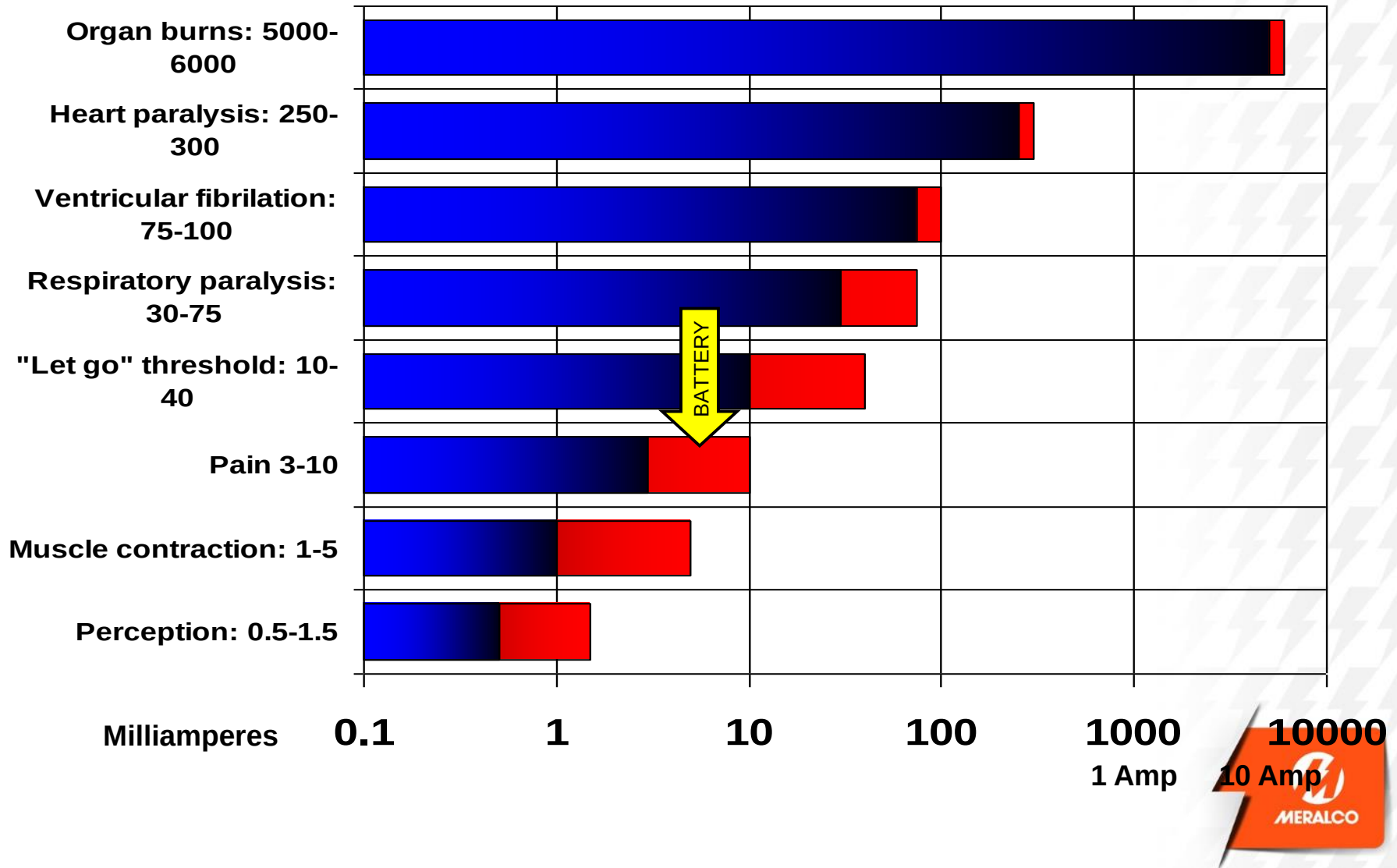


$$I = 12 \text{ Volts} / 2000 \text{ Ohms}$$

$$I = 0.006 \text{ Ampere}$$



HOW ELECTRICITY CAN HARM YOU?



HOW ELECTRICITY CAN HARM YOU?

Sample Computation

$$I = \frac{V}{R}$$

Where $R = 2000$ ohms
(Resistance of human body)

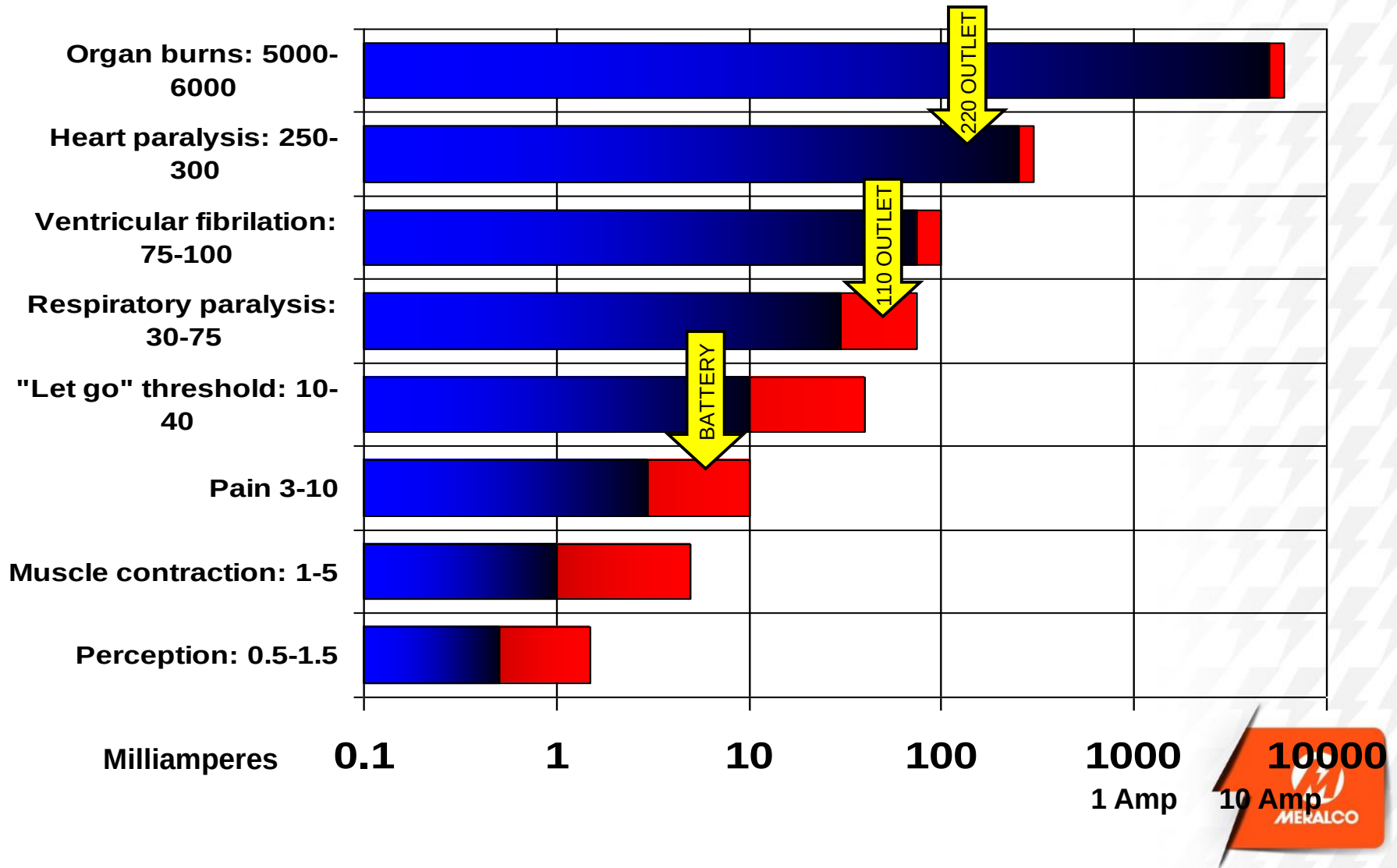
110 Volts
line-to-ground
15 Amperes



$$I = 110 \text{ Volts} / 2000 \text{ Ohms}$$
$$I = 0.055 \text{ Amperes}$$



HOW ELECTRICITY CAN HARM YOU?



EFFECTS OF ELECTRICAL CONTACT TO THE HUMAN BODY



POSSIBLE OUTCOMES AFTER BECOMING IN CONTACT WITH POWER LINES

Fall from height



Unconsciousness or
head injury from
falls



SEVERE SKIN BURNS RESULT FROM ELECTRICITY FLOWING IN THE BODY



ELECTRICAL CURRENT ENTERS AND EXITS FROM EXTREMITIES



ELECTRICAL CONTACT CAN BE FATAL



CONTACTS THAT MUST BE AVOIDED



Antenna Installation



Tree Trimming/Pruning



Fruit Picking



Kite Flying



CONTACTS THAT MUST BE AVOIDED

CONSTRUCTION ACTIVITIES



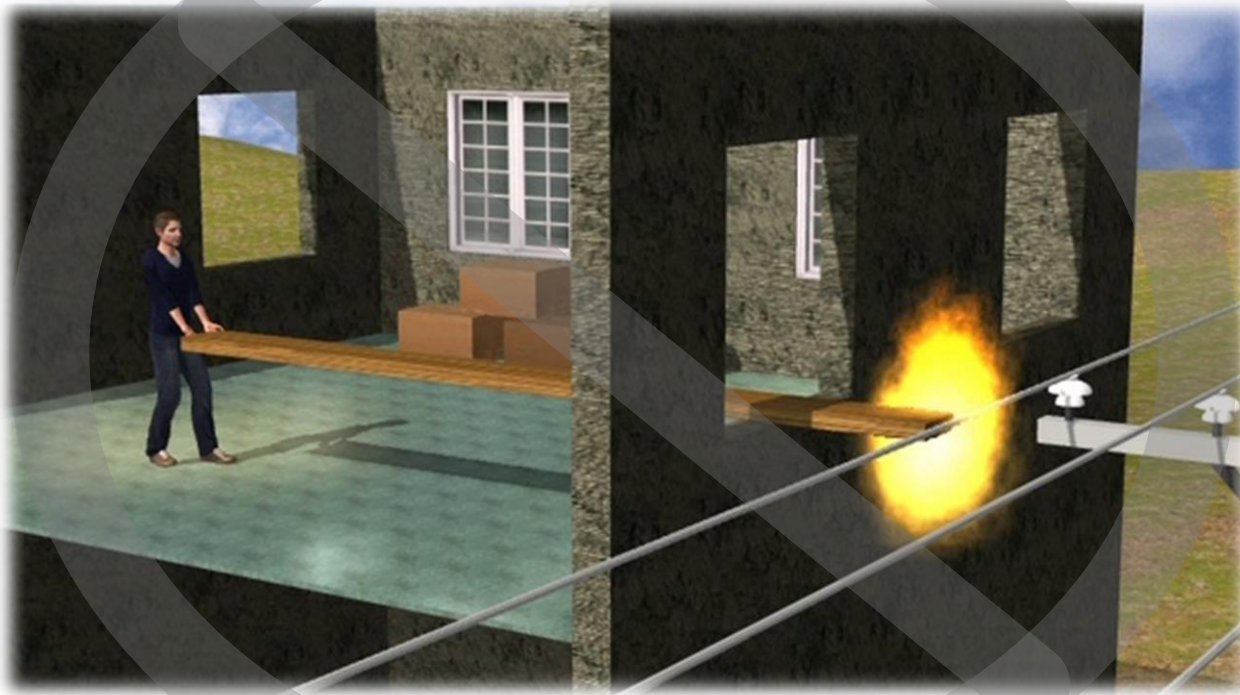
WORKING NEAR POWERLINES MUST BE AVOIDED



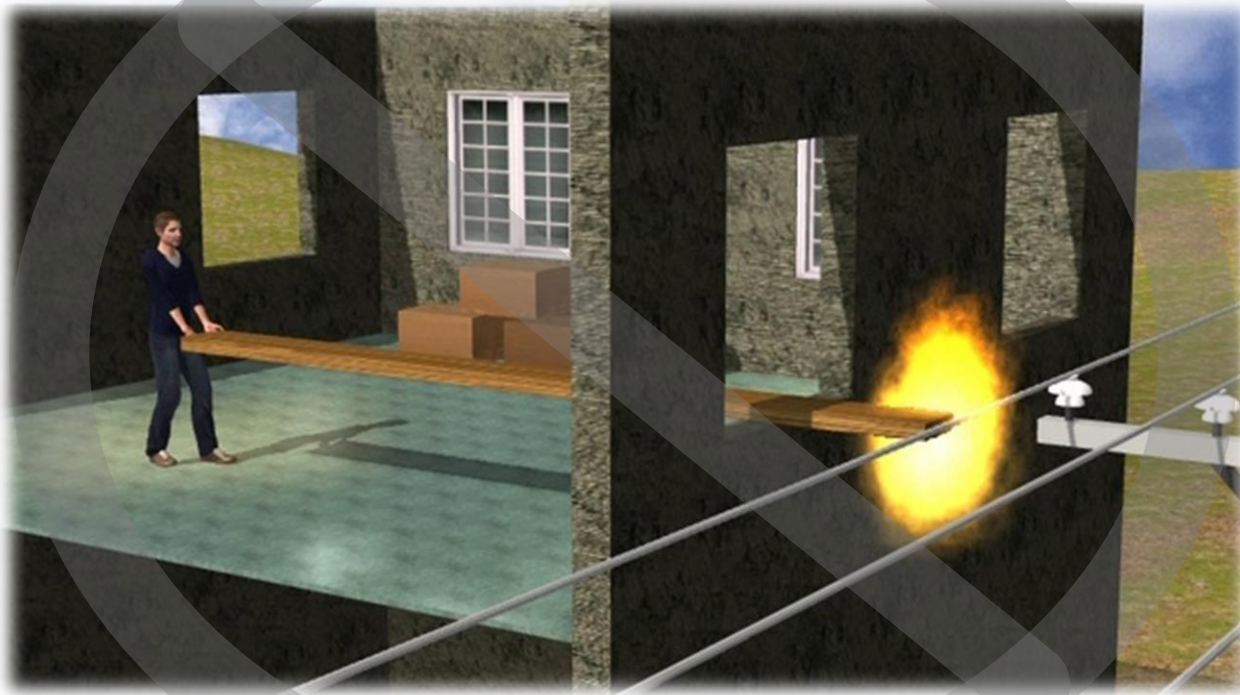
IMPROPER HANDLING OF ITEMS ARE COMMON ACCIDENT CAUSES



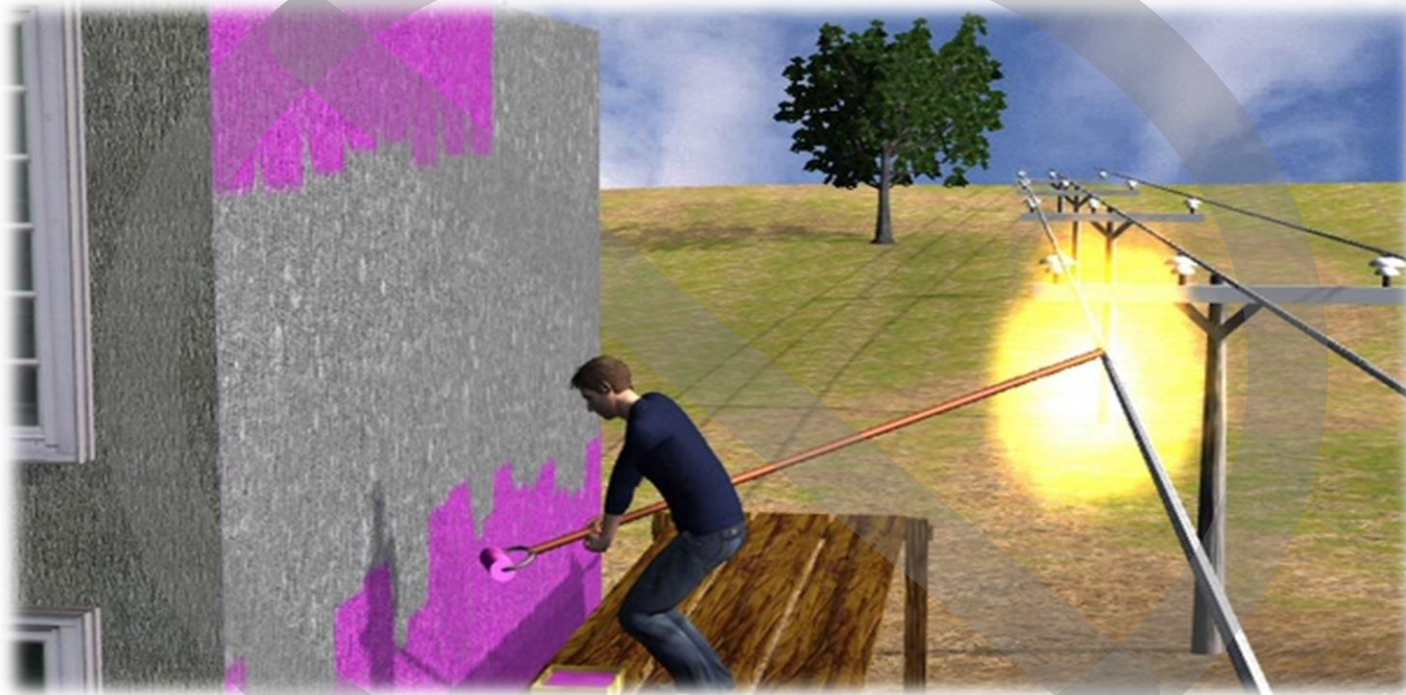
ALL CONSTRUCTION MATERIALS ARE CONDUCTORS OF ELECTRICITY



ALL CONSTRUCTION MATERIALS ARE CONDUCTORS OF ELECTRICITY



BE MINDFUL OF LONG ITEMS THAT MAY BRING CONTACT TO POWERLINES



SPOTTERS ARE NECESSARY TO GUIDE CRANE OPERATORS AVOID POWERLINE CONTACT



CONCRETE PUMPS ARE EXPOSED TO THE SAME HAZARDS AS CRANES

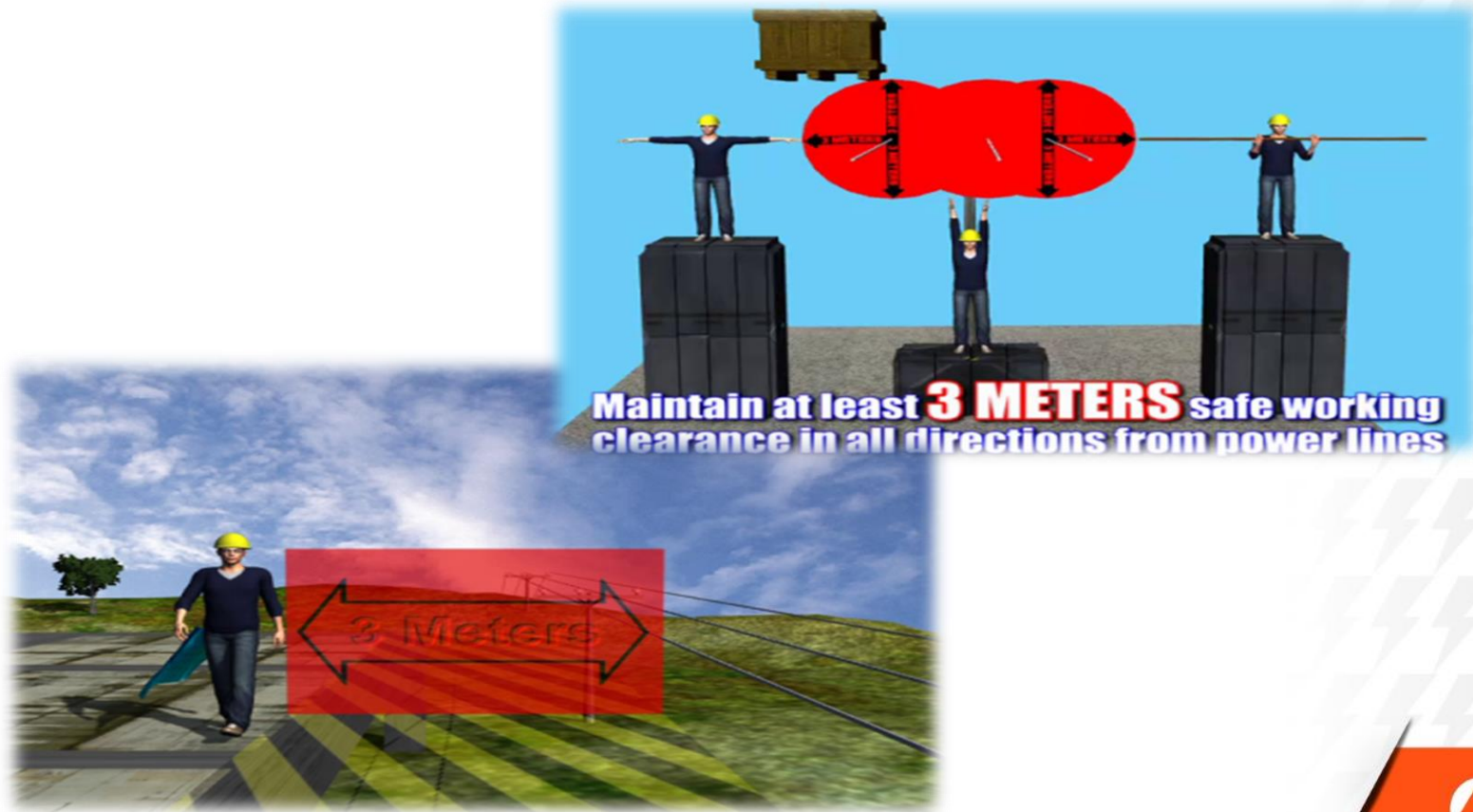


MEASURES TO AVOID CONTACT

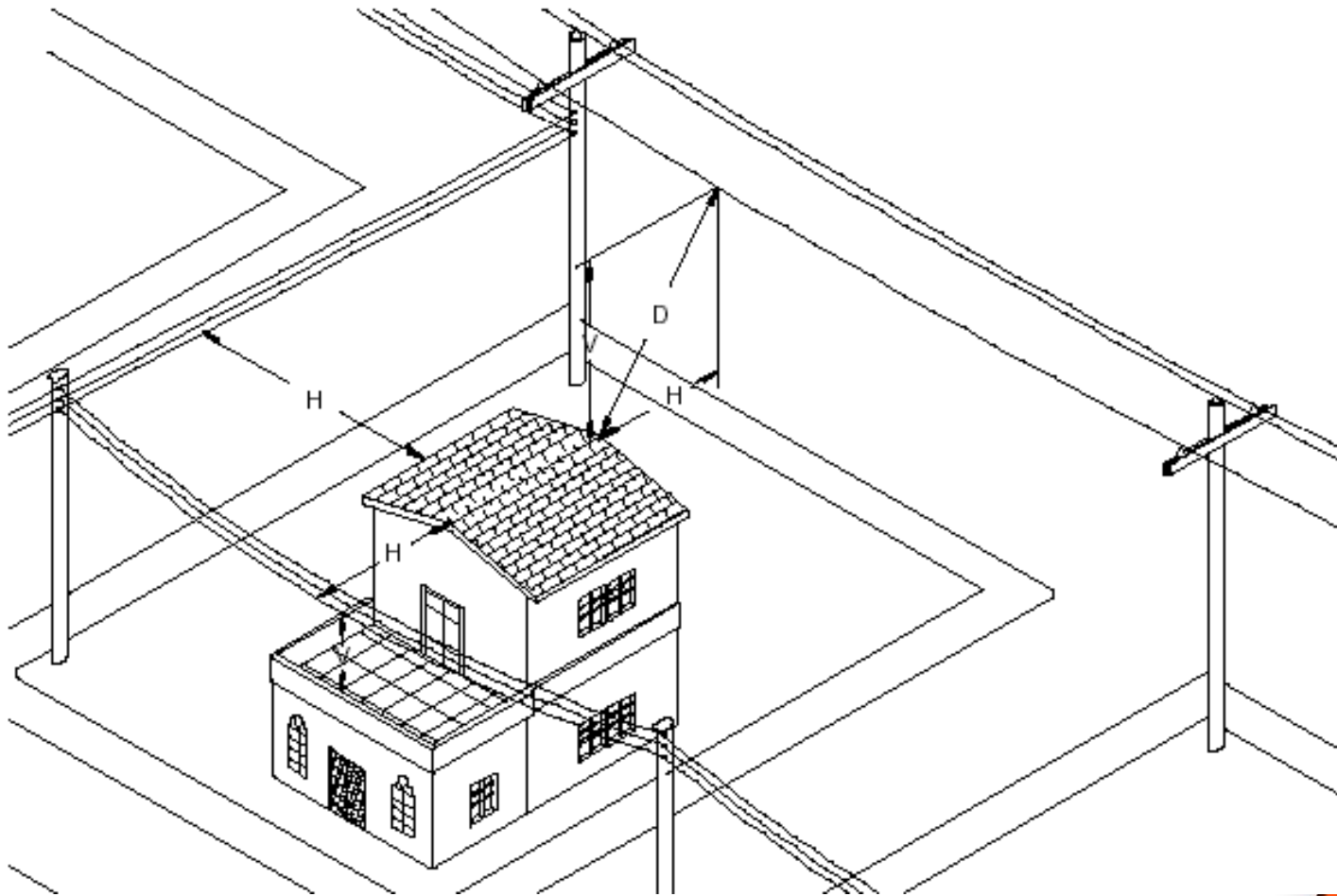
CONSTRUCTION ACTIVITIES



AVOID POWERLINE CONTACT, MAINTAIN A MINIMUM SAFE DISTANCE OF 3-METERS



BEFORE CONSTRUCTION COORDINATION SHOULD BE MADE WITH MERALCO



SAFE CLEARANCES REQUIRED BY LAW

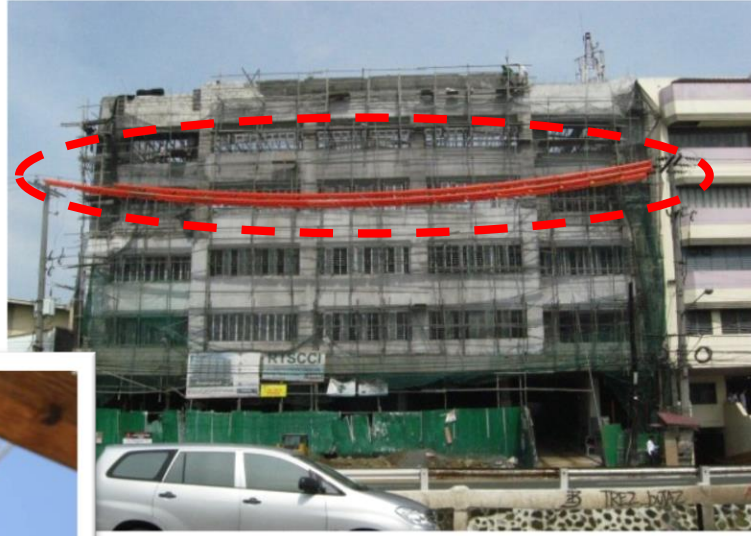
Clearance Description	Primary Lines up to 34.5/20 kV		69 kV Open Supply Cond.	115 kV Open Supply Cond.
	Open Supply Cond.	Unguarded Rigid Parts		
A. Buildings				
1. Horizontal, H, to walls, projections, guarded and unguarded windows, balconies, and areas readily accessible to pedestrians	2 300	2 000	2 480	2 780
2. Vertical, V				
(a) Over or under roofs or projections not readily accessible to pedestrians	3 800	3 600	3 980	4 280
(b) Over or under balconies and roofs readily accessible to pedestrians	4 100	4 000	4 280	4 580
(c) Over roofs accessible to vehicles but not subject to truck traffic	4 100	4 000	4 280	4 580
(d) Over roofs accessible to truck traffic	5 600	5 500	5 780	6 080
B. Signs, Chimneys, Billboards, Radio and Television Antennas, Tanks, and Other Installations not Classified as Bldgs or Bridges				
1. Horizontal, H	2 300	2 000	2 480	2 780
2. Vertical, V				
(a) Over or under catwalks and other surfaces upon which personnel walk	4 100	4 000	4 280	4 580
(b) Over or under other portions of such installations	2 450	2 300	2 630	2 930

*Based from 2009 Philippine Electrical Code Part 1 Volume 1

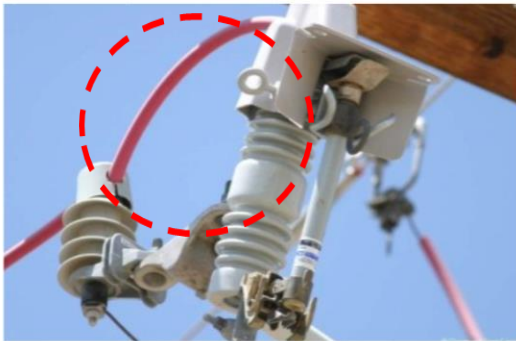
MERALCO PUBLIC SAFETY INITIATIVES



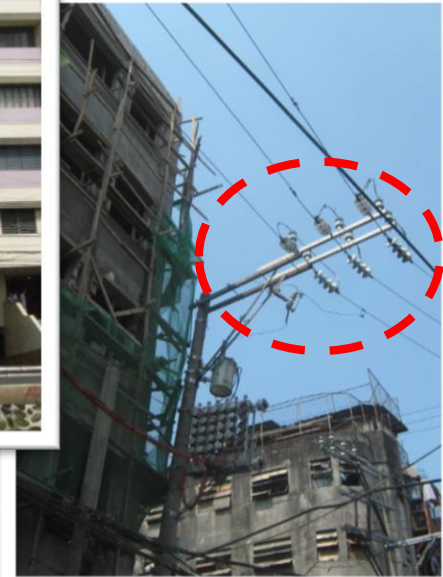
Reconstruction of Facilities/Engineering Methods



Installation of conductor covers to provide barrier to construction workers.



Installation of insulated wires to line facilities to avoid accidental contact.



Reconstruction of facilities to maintain safe clearance from building under construction.

Ground Work Activities



Electrical safety lectures at Roxas High School, Quezon City



Council of Student Chapters Forum at Meralco Theater

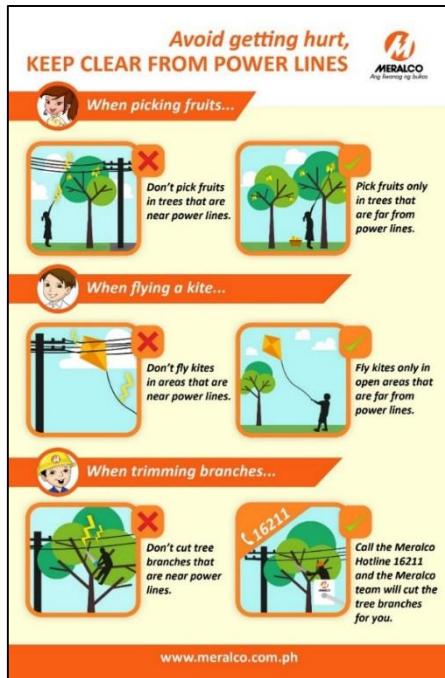


Building work site safety lectures were conducted using Flip Charts

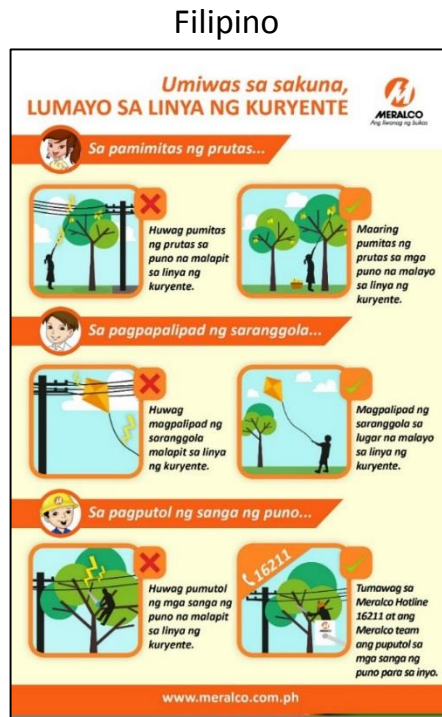


Ground Work Activities

Leaflets distributed to customers



English



Poster Type Collaterals for Kiosks and Building Work Sites



Ground Work Activities

Safety Message Fan distributed to customers



8" Diameter

Front



8" Diameter



Public Safety Flash Animation
(link <https://www.youtube.com/watch?v=GhwHb8R7MGk>)



Tri-media and Other Engagements



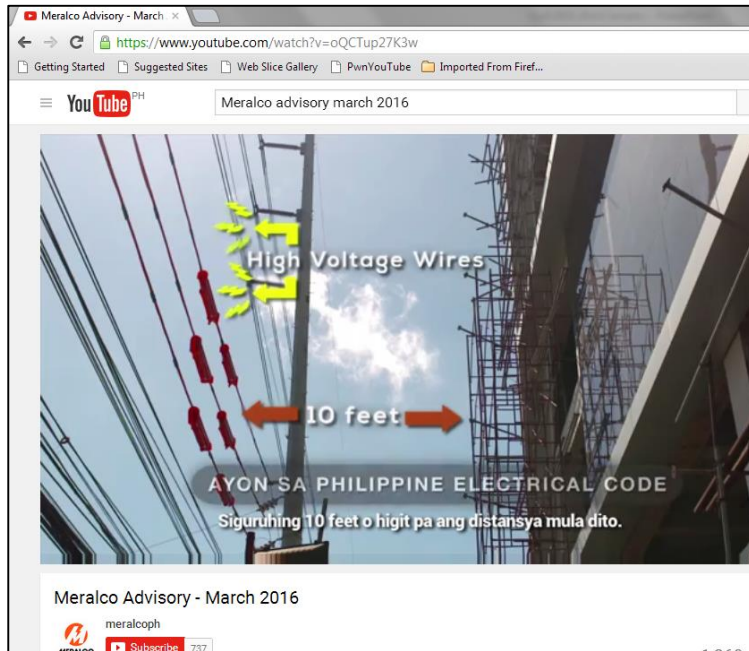
Power line safety discussions during Broadcasters' Forum



CNN Philippines guesting



Tri-media and Other Engagements



Social Media Public Safety Tips



WHAT I CAN DO?



IMMEDIATELY REPORT DANGERS BEFORE AN ACCIDENT COULD OCCUR



SHARE WHAT YOU HAVE LEARNED



DO NOT HESITATE TO CONTACT US



SMS : 0920-9716211 (Smart)
0925-7716211 (Sun)
0917-5516211 (Globe)

Social Media:

[Facebook.com/Meralco](https://www.facebook.com/Meralco)
[Twitter.com/Meralco](https://twitter.com/Meralco)

