ELECTRICAL SAFETY – STRATEGIC SOLUTIONS

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Chairman, Electrical Safety and ESEA Committee

Backgrounder

Electricity is an essential part of our daily life.

No nation can survive the present developmental challenges without ELECTRIC POWER.

Backgrounder

Electric power should not only be available, reliable and affordable, but above all SAFE.

One of the primary advocacies of IIEE is

ELECTRICAL SAFETY!

FIRE CAUSES

Statistic from the Bureau of Fire Protection of the Philippines (BFP) shows that 28.37% of the cause of fire is electrical related (Year 2016).

FIRE CAUSES

Though their reason is

“FAULTY ELECTRICAL WIRING”

ELECTRICAL SAFETY

Electrical safety should be a primary concern of all electrical practitioners and the whole community.

ELECTRICAL SAFETY

The need for regular electrical inspection of all work places and residences.

PEC

Philippine Electrical Code (PEC) should at all times be followed and impose!

ELECTRICAL SAFETY – STRATEGIC SOLUTIONS

The **Philippine Electrical Code** is used nationally as the basis for **safeguarding** persons, buildings and its contents from **hazards** that may arise from the use of **electricity**.

This code contains **provisions** which are considered necessary for **safety** and thus are used as basis for the legal enforcement agency in the government regarding electrical installation.

ELECTRICAL INSPECTION STRATEGY AND GUIDE

- Republic Act 7920

  An act providing for a more responsive and comprehensive regulation for the practice, licensing, and regulation of electrical practitioners

On June 27, 2011, President Aquino signed the

PRESIDENTIAL PROCLAMATION NO. 193

- DECLARING THE MONTH OF **MAY** OF EVERY YEAR AS THE **ELECTRICAL SAFETY MONTH**

"Electrical Safety Starts with Me!

SAFETY ADVOCACY CONCERNS

- Lives
- Property
- Economic Losses
- Educate
- Awareness

Audit

an **official inspection** of an individual's or organization's accounts, typically by an independent body.

Electrical Safety Audit

It is a formal and comprehensive **examination** of the entire facilities of a particular building, establishment, plant and house.

WHAT IS AN ELECTRICAL INSPECTION & AUDIT?

An electrical audit is a thorough **survey/ inspection**, **review** and **evaluation** of an electrical system which is already in operation for several years.

WHAT IS THE PURPOSE OF AN ELECTRICAL INSPECTION & AUDIT?

The purpose of an electrical safety inspection or audit is to **identify** potentially **hazardous** electrical situations and provide **corrective actions** for these situation.

Purpose

To assure that every single installation and devices are done in accordance with the **Philippine Electrical Code, Building Code, Fire Code** and other implementing rules from the **Local Government**.

Electrical Safety Audit

An electrical safety audit is a systematic procedure to evaluate potential electrical hazards, and to recommend measures to minimize/prevent these hazards

(i.e. electrical shocks,

electrical arcs, and

electrical blasts).

Electrical Safety Audit

An electrical safety audit is a loss prevention program:

1. Property/production loss
   (e.g. electrical fire hazards)
2. Loss of life/Injuries to personnel

Observations can be classified into 5 major areas:

1. Design features
2. Maintenance aspects
3. Training needs
4. Facilities and Procedures
5. Management commitment

Electrical Safety Audit

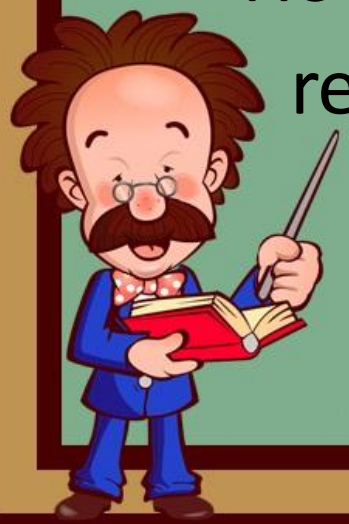
Recommendations as identified in the audit shall be implemented on a time bound program, and they shall be closely monitored for timely completion.

Electrical Safety Audit

For buildings, electrical audit is usually conducted immediately upon turn over of a project to the owner.

But not more than one (1) year after.

However, plant audit can be conducted as required by the management technical personnel.



Benefits

- Compliance with regulations
- Increased levels of safety
- More efficient use of resources
- Clarification of electrical safety responsibilities

Who are qualified to conduct the audit?

Licensed Electrical Engineers with **vast** experience in design and construction and maintenance.

Preferably, Licensed Professional Electrical Engineer (PEE) and/or Registered Electrical Engineer (REE).

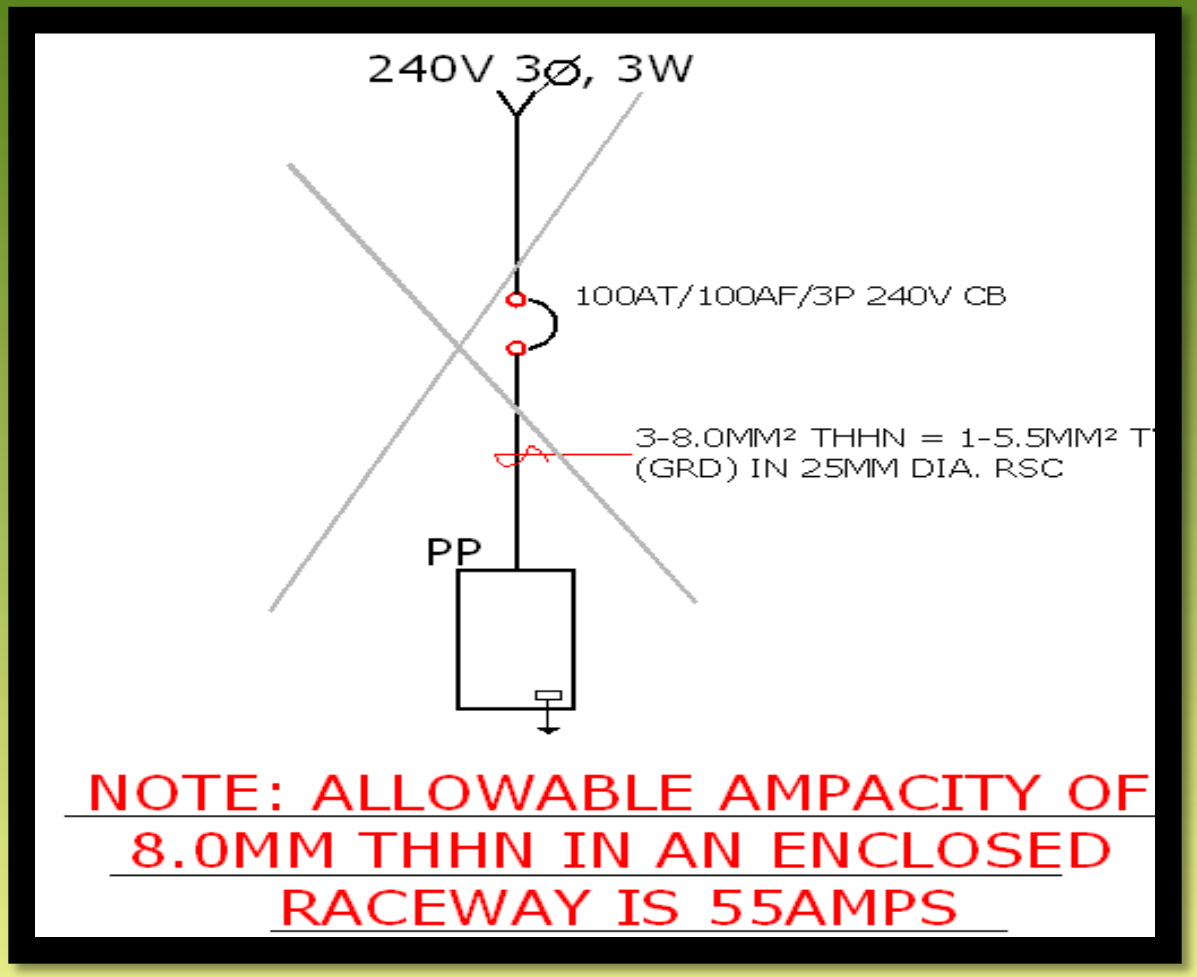
So what are the

samples of

electrical violations or errors

that you should be mindful of when you do your electrical audit/ inspections?

1. THE USE OF HIGHER RATED CIRCUIT PROTECTION. . THIS IS A RAMPANT VIOLATION!

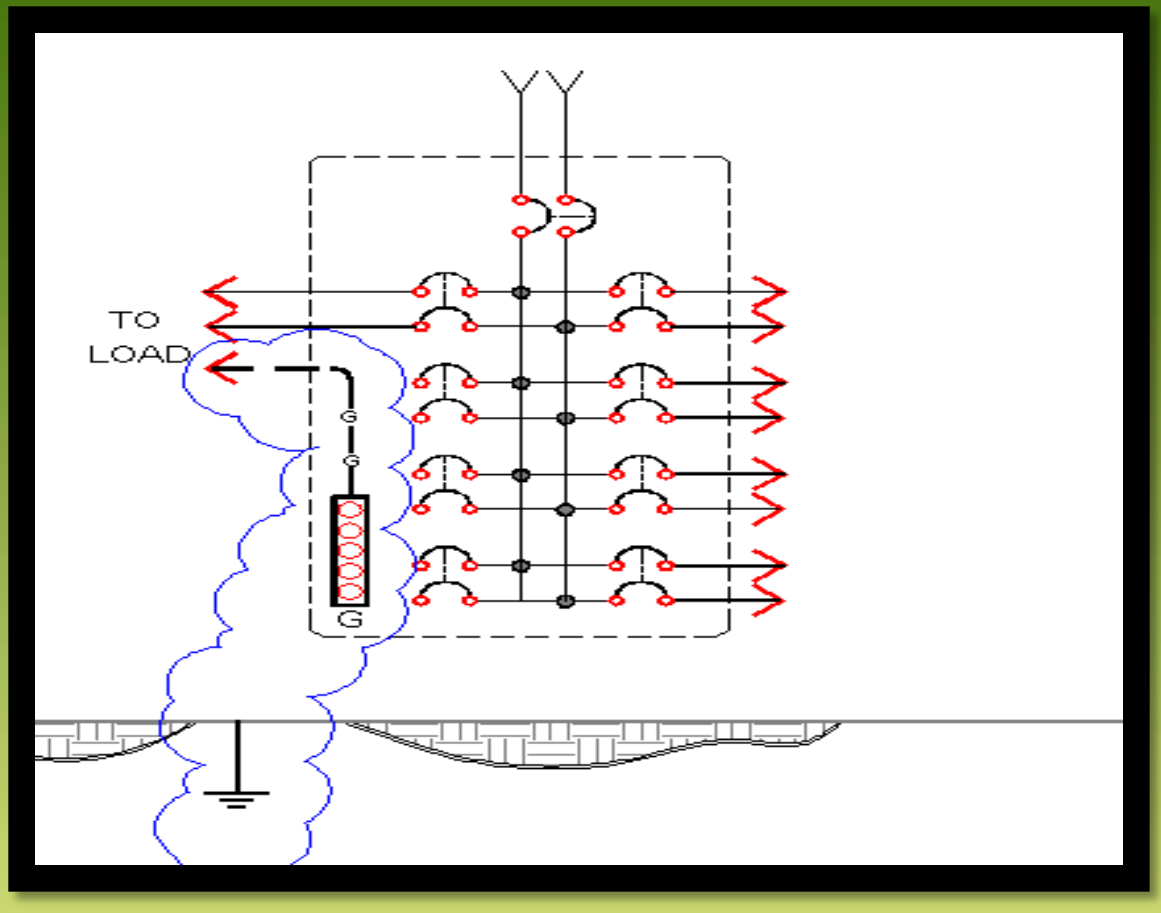


1-A. ANOTHER CASE OF USING VERY HIGH RATING OF PROTECTION..

THE IIEE ESC/ESEA VOLUNTEER TEAM IN 2012 REPLACED IT WITH 100-AMPERE FUSES.

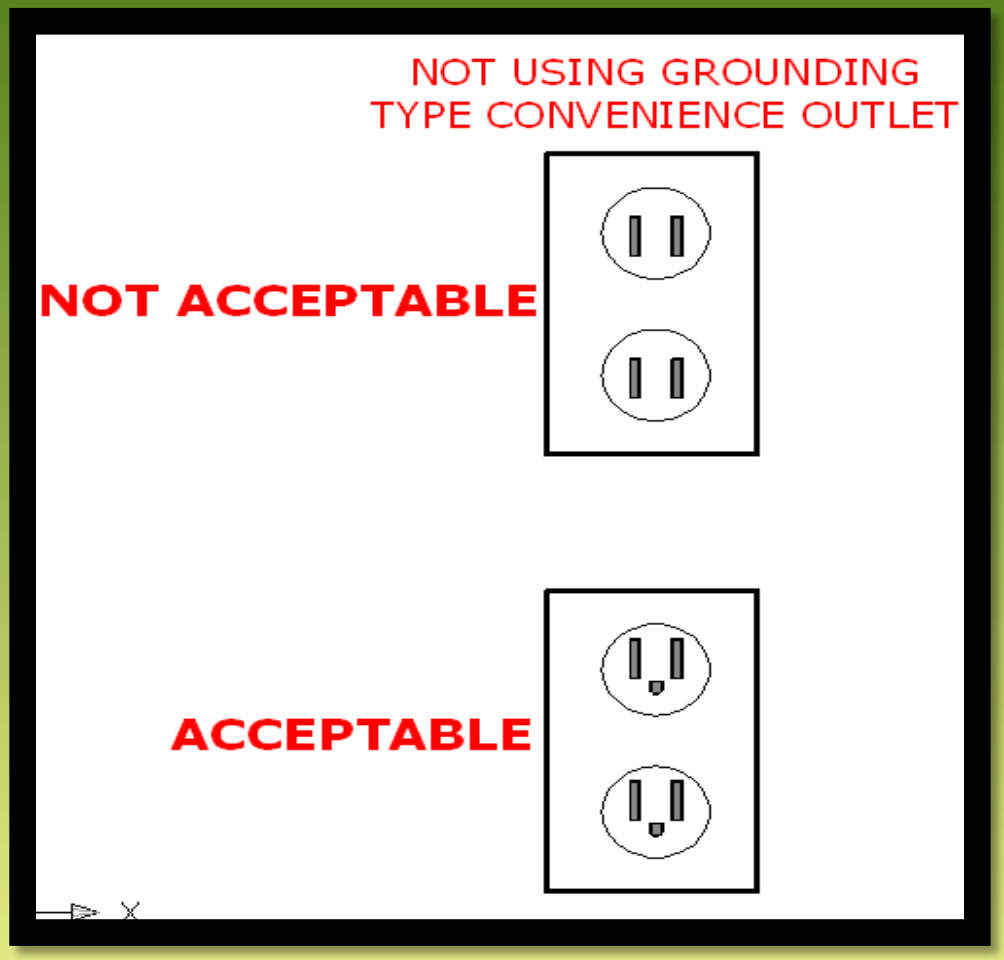
AS INSPECTED IN 2011, THE SIZE OF THIS SERVICE ENTRANCE FEEDER IS 2 – 14 SQUARE MM IN A PVC CONDUIT, SO THAT THE ALLOWABLE AMPACITY IS 70 AMPERES BUT THE PROTECTION IS 200-AMPERE FUSES!

2. INADEQUATE EQUIPMENT GROUNDING . .

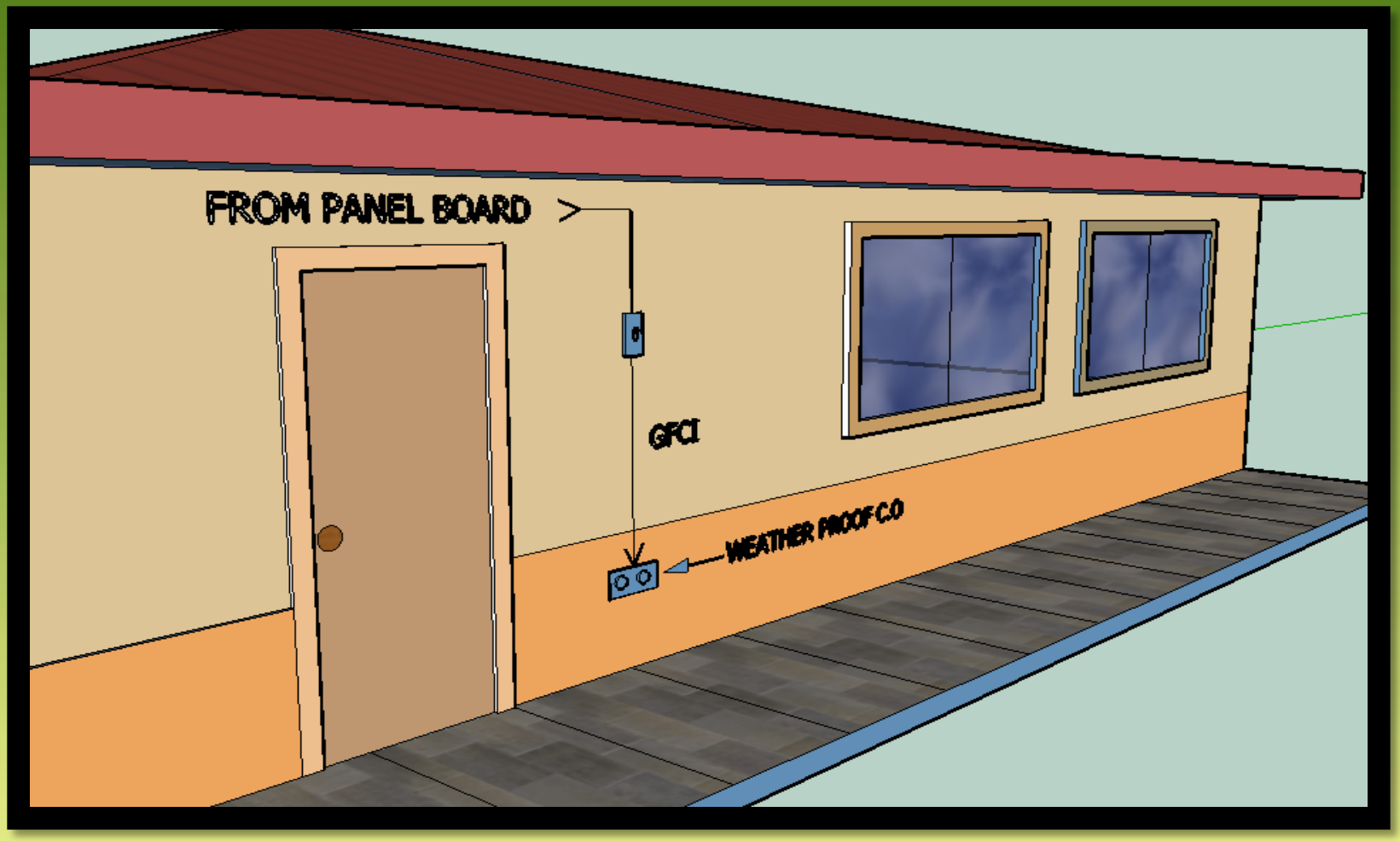


WHAT WOULD BE THE MAXIMUM GROUNDING RESISTANCE? IS IT 25 OHMS?5 OHMS?1 OHM? THE LOWER THE VALUE, THE SAFER! WHY? GROUND FAULT CURRENT SEEKS THE PATH OF LOWER RESISTANCE.

3. NOT USING GROUNDING TYPE CONVENIENCE OUTLETS . . .



4. NOT USING GFCI DEVICE FOR CIRCUITS IN DAMP LOCATIONS OR EXTERIOR AREAS . .



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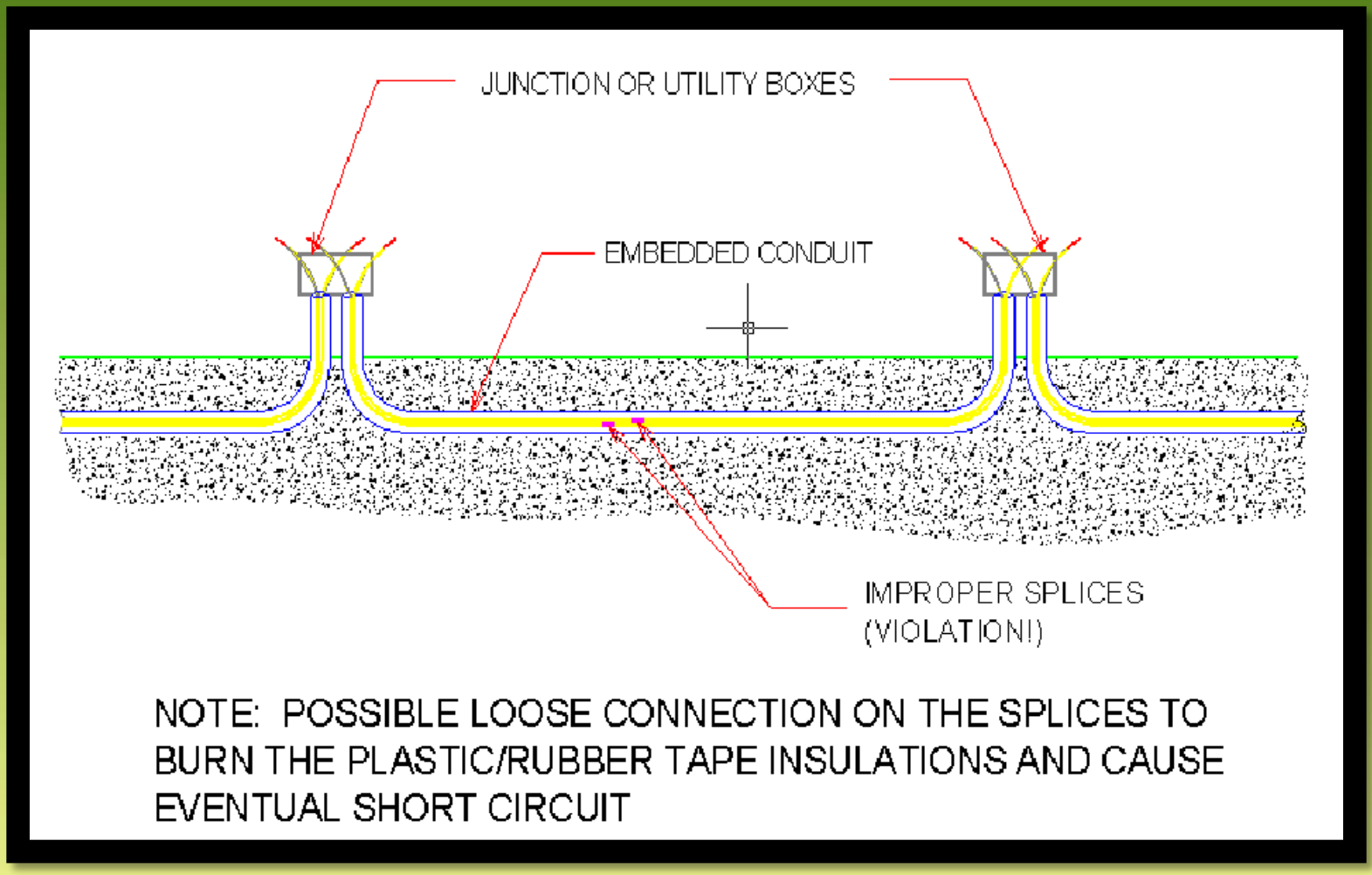
5. USING IMPROPER SPLICES



NOTE: POSSIBLE LOOSE CONNECTION ON THE SPLICES TO BURN THE PLASTIC/RUBBER TAPE INSULATIONS AND CAUSE EVENTUAL SHORT CIRCUIT

6. LACK OF SUPERVISION DURING CONSTRUCTION…

THESE INAPPROPRIATELY/POORLY SPLICED WIRES INSIDE A BADLY BURNT FLEXIBLE PVC CONDUIT. THE ELECTRICAL SUPERVISOR/FOREMAN MISSED THIS.

7. TEMPORARY WIRING ALLOWED TO BECOME TEMPORARY-PERMANENT

THE FLYING WIRES/CABLES WHICH INCLUDE POWER & COMMUNICA-TION LINES ARE INSTALLED TEMPORARILY.. UNTIL AN UNTOWARD INCIDENT HAPPEN AGGRAVATING MATTERS – ACCIDENTS.

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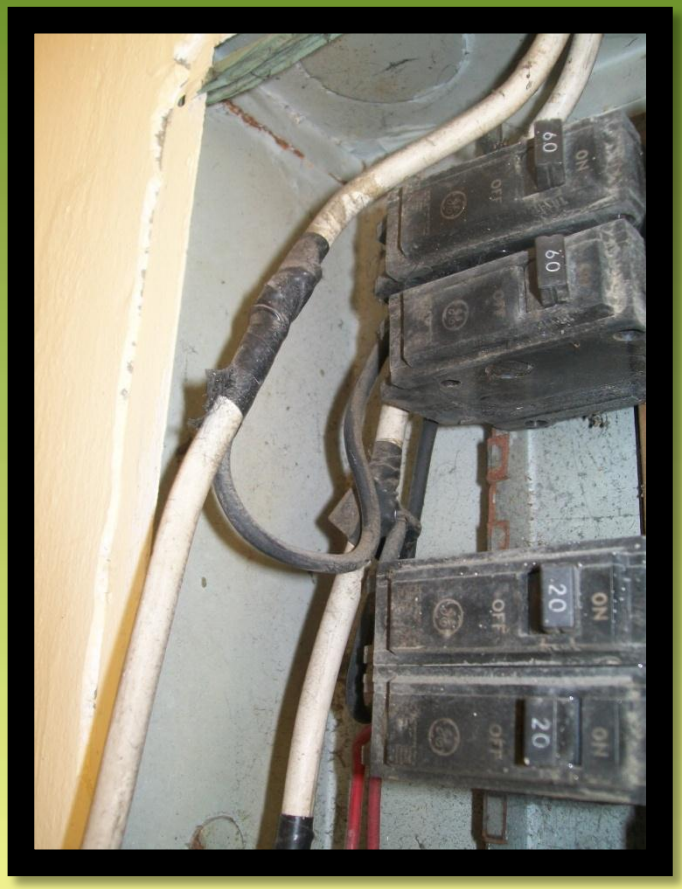
8.LACK OF SAFETY SENSE…

NOTICE THE SERVICE ENTRANCE WIRES, NO ENTRANCE CAP OR DRIP LOOP – THIS ALLOWS WATER TO ENTER CONDUIT AND MAY EVEN REACH PANELBOARD INSIDE, CAUSE DAMAGE, OR GROUND FAULT. THERE IS ALSO NO GROUND WIRE.

9.NOT USING BOLT-ON TYPE MAINS

THE 60A PANEL MAIN CBs ARE PLUG-IN TYPE, SHOULD BE BOLT-ON TYPE..



THE PLUG-IN MAINS WILL RESULT TO LOOSE CONNECTION, LOCALIZE HEATING..

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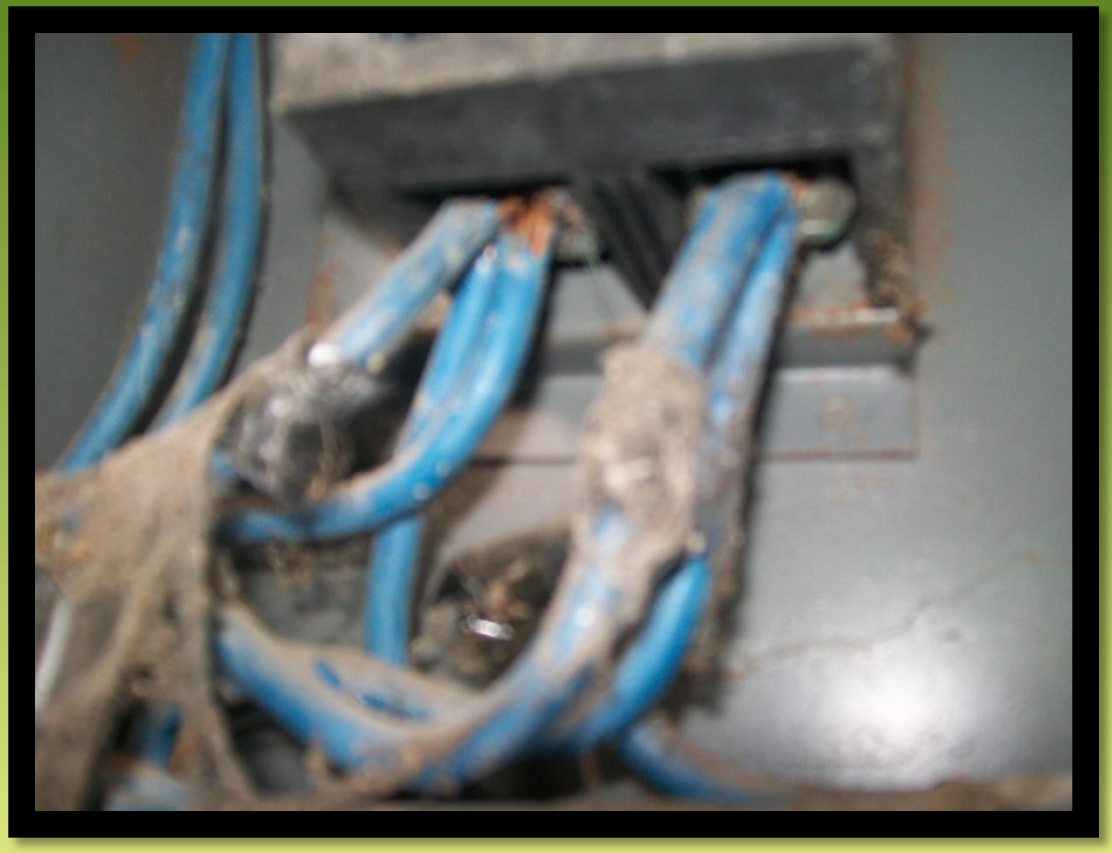
10. LACK OF MAINTENANCE

REGULAR CLEANING REQUIRED.

CABLE TERMINATIONS ARE VIOLATIONS.

COLOR CODING OF WIRES MUST BE FOLLOWED.



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FIRE TRAGEDIES
When will we learn?
"Electrical Safety Starts with Me!

CY 2016 : Damage to Properties –

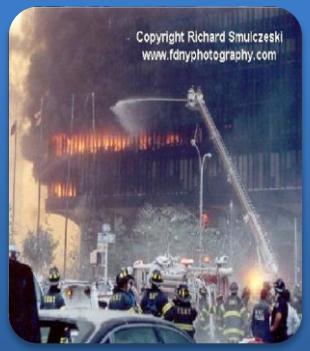
Php **3,079,545,138.04**

- 28.37% causes of fire – due to electrical in nature such as:

Defective Electrical Device, Sub-standard electrical appliances and wires, circuit overloading, short circuits, arcing, overheating and malpractice of electricity.

285 Civilians died

894 were injured

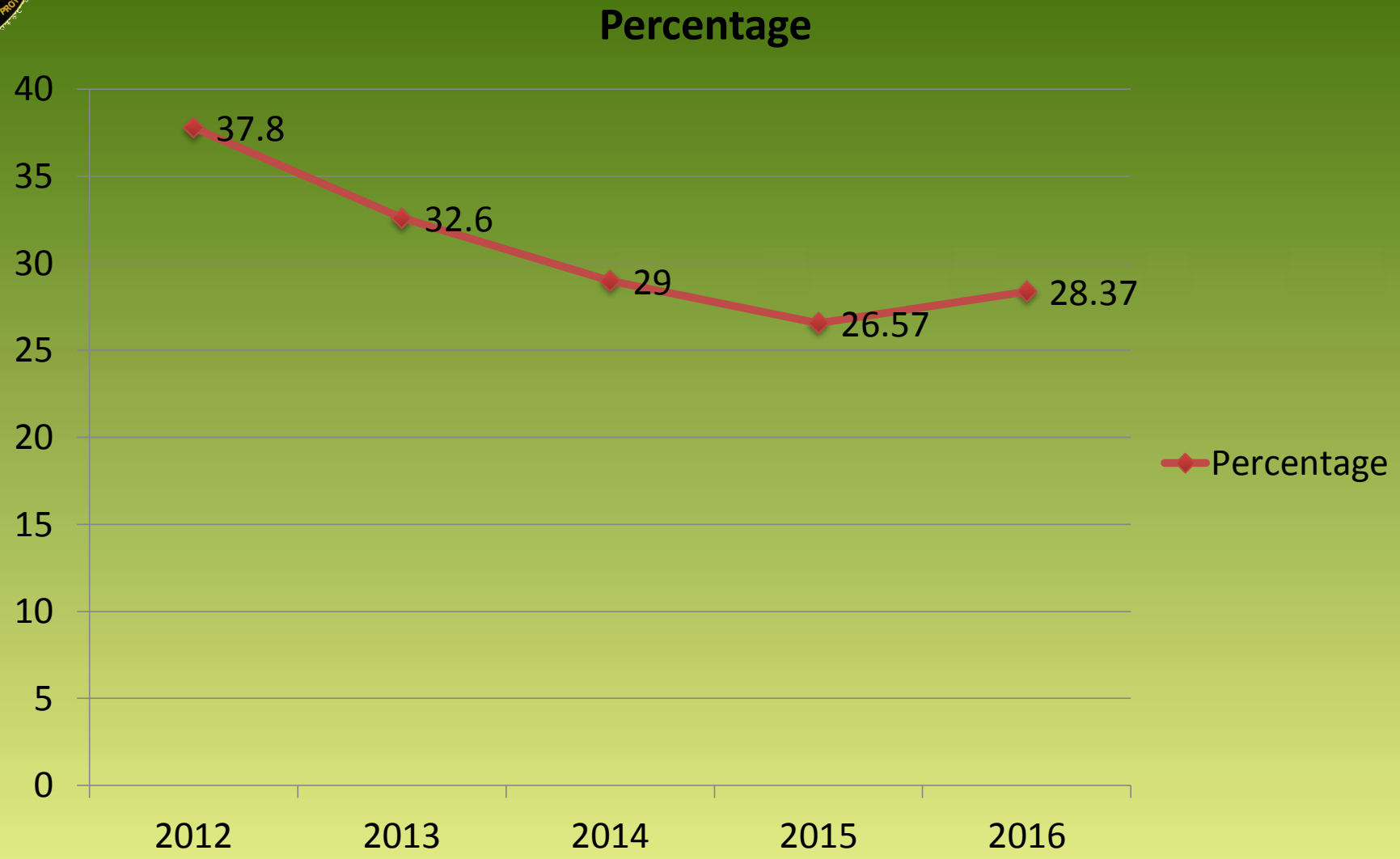


0 Firefighter died

93 were injured

Total of 285 fatalities

and 987 were injured



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Fire exit at the 3rd Floor without stairs

95% of faults are Line to Ground Fault

Effective Ground Fault Path is the backbone of Electrical Safety

Grounding Electrodes
(PEC 2.50.3.3)

1. Metal underground water pipe
2. Metal frame of the building
3. Concrete encased electrode
4. Ground ring
5. Rod and pipe electrodes
6. Plate electrodes
7. Other local metal underground system

Ozone Disco Fire

Electrical Malfunction (overloading)

Location : 57-A Timog Ave., Quezon City

Date/Time : 19 2405H March 1996

Cause of Fire: Electrical Malfunction (overloading)

Casualty : 162 persons

Injured : 100 persons m/l

Est. Damages: 15 Million m/l

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REPORT:
ELECTROCUTION ACCIDENT IN BRGY. BACUNDAO EAST, MALASIQUE, PANGASINAN (August 15, 2016)

Engr. Romeo T. Bravo-2016 IIEE Pangasinan Chapter President

This is the **main service entrance** wire of the house where the CENPELCO lineman cut the live wire to stop the live current inside the house.

This is the **extension cord outlet** where the electrocution started.
Notice the **GI Wire** which was accidentally inserted into the plug of the **CP battery charger**.

These are the victims laying helplessly. Notice the house wall have no plaster finished forcing them to use **extension cords** tapped at their main switch.

Close up picture with the victims. Notice the GI wire which they all hold that cause electrocution to all of them which was accidentally inserted to the plug.

The victims holding the GI wire laying near the extension cord. While one neighbor hold the small girl hoping if she's still alive.

REPORT:

ELECTROCUTION INCIDENT IN SITIO BAYBAY

BRGY. NAGSAING, CALASIAO, PANGASINAN (October 24, 2017)

Engr. Clarence Emmanuel Morillo-2017 IIEE Pangasinan Chapter President

Sixteen-year-old Christian Reyes, his 12-year-old sister Francine Reyes, and one-year-old brother Reynaldo Reyes Jr. were pronounced dead on arrival at the Pangasinan Provincial Hospital in San Carlos City, where rescuers took them.

Christian was washing clothes at noon when he decided to fish in the pond at the back of their house in Brgy. Nagsaing. He threw an improvised electric fishing rod into the water which was plugged into an outlet.

Site where the victims have been found and retrieved.

When the fish started to float to the surface, he plunged into the water to collect them, forgetting to unplug the rod, police said.

Seeing her brother struggling in the water, Francine, who was carrying her 1-year-old brother, tried to rescue Christian. But she and the baby were also electrocuted.

GOVERNMENT / MANAGEMENT SUPPORT

CAPACITY BUILDING OF GOVERNMENT INSPECTOR

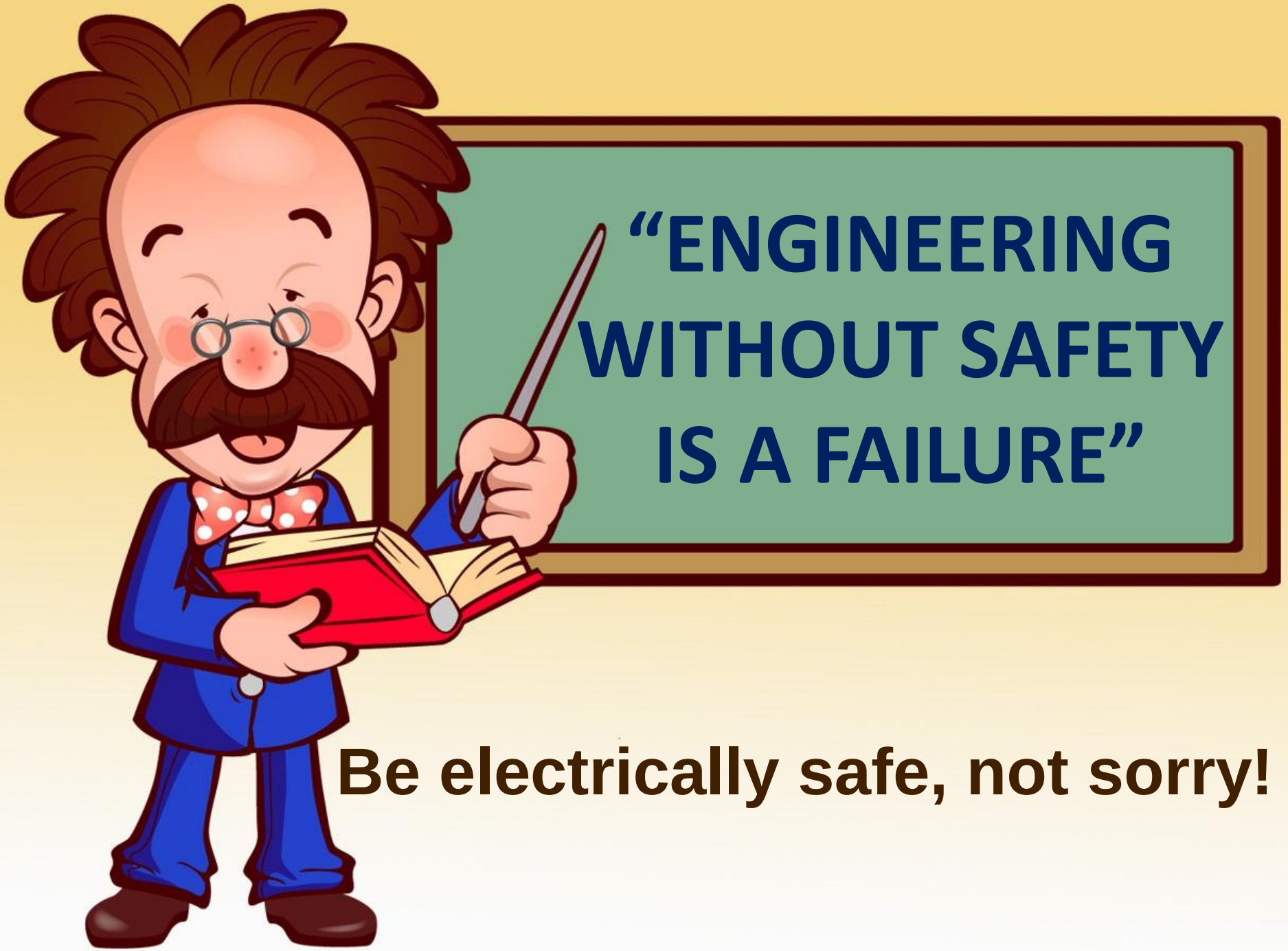
BUILDING AND ENGINEERING MAINTENANCE

IIEE SAFETY CULTURE (ADVOCACY)

TRAINING AND EDUCATION / AWARENESS

PUBLIC / PRIVATE COOPERATION

CONTINUOUS IMPROVEMENT



Be electrically safe, not sorry!

Thank you!

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