



Republic of the Philippines
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
Manila

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NBC MEMORANDUM


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**SUBJECT: ELECTRICAL DESIGN ANALYSIS
PHILIPPINE ELECTRICAL CODE
COMPLIANCE**

**TO : All Building Officials
City / Municipal Engineers and Others concerned**

In order to attain an electrically safe environment and pursuant to Section 1301 of the National Building Code (PD 1096) and Article 1.3.2 of the Philippine Electrical Code, all Building Officials are hereby enjoined to be stricter in approving Building Permits by requiring the submission of electrical plans that include design analysis showing all the calculations of short circuits, voltage drop and other essential data as requisite for the issuance of Electrical Permit. Likewise, existing buildings, factories and infrastructures with substantial electrical load shall be subjected to inspections and that an updated design analysis and calculations is required to ensure that fire and life safety requirements are being complied.

For strict and immediate compliance of all concerned.


ROGELIO L. SINGSON
Secretary

Department of Public Works and Highways
Office of the Secretary



7.5.1 erfh/JVD/GRV

(PEC)

1.3.1.2 Drawing Scale. Appropriate metric drawing scales shall be used.

1.3.1.3. Graphic Scale. Since the size of the drawing sheet can be changed photographically, graphic scale shall be shown on each drawing sheet.

FPN: Graphic scale denotes nominal or average plan scale and remains true when plans are photographically reduced.

1.3.2 Plans and Specifications

1.3.2.1 Plan Requirements.

(a) Location and Site Plans. Location and site plans, with proposed structure and owner's land drawn to appropriate metric scale shall show:

(1) Bordering areas showing public or well-known streets, landmarks and/or structures which need not be drawn to scale unless they extend into the area concerned;

(2) Location of service drop, service equipment and nearest pole of the utility company furnishing electrical energy; location of the meter as well as sizes of service entrance wires, conduits and service equipment; and

(3) Clearance of the path or run of service drops and entrance wires to adjacent existing and/or proposed structures.

(b) Legend or Symbols. Refer to Appendix A – Electrical Symbols

(c) General Notes and/or Specifications. General Notes and/or Specifications, written on the plans or submitted on separate standard size sheets shall show:

(1) Nature of electrical service, including number of phases, number of wires, voltage and frequency;

(2) Type of wiring;

a. Service entrance

b. Feeders, sub-feeders and branch circuit wires for lighting and/or power load

- c. Fire alarm system, if required by law
- d. Signaling and communication

(3) Special equipment to be installed, indicating ratings and classification of service or duty cycle of;

- a. Rectifiers
- b. Heaters
- c. X-ray apparatus
- d. Electric welding equipment
- e. Others

(4) System or method of grounding;

(5) Type and rating of main disconnecting means, overcurrent protection (OCP) and branch circuit wiring;

(6) Clearances of service drop, burial depth for service lateral, mounting height and clearance for service equipment, mounting height and clearance for kWh meter.

(d) Electrical Layout. Floor plan showing location of equipment and devices, and their interconnection wiring.

(1) Plan for Power. Layout and wiring plans for power on the floor plans drawn to scale, shall show:

a. Sizes and location of service entrance conductors, raceways, metering equipment, main switchboard, layout of feeders and distribution panels or switches and their sizes, types and ratings;

b. Complete circuits of motors and other electrical equipment, their controlling devices, their locations and ratings;

c. Complete wiring of emergency power system, if any;

d. Nature of processes/activities carried out in each room or area

FPN: In residences, apartment houses and small commercial establishments, layout of equipment and motors of one horsepower or less may be incorporated in the layout for General Lighting and Receptacle Outlets. In general, layout of motors and power outlets not exceeding a total of ten, may be included in the lighting layout provided such inclusion will not make reading, interpretation and/or checking of said plan difficult.

Philippine Electrical Code

(2) Plan for Lighting and Receptacle Outlets. Layout and wiring plans for general lighting and receptacle outlets on floor plans drawn to scale, shall show:

- a. Location, type and rating of lighting fixtures, indicating illumination in lux in each room or area. In residences, hotels, apartment houses, and churches, the illumination level in each room or area need not be shown nor computed;
- b. Location of switches for each fixtures or group of fixtures;
- c. Location of receptacle outlets and appliances to be served and their ratings;
- d. Complete circuits of the lighting and receptacle outlets;
- e. Complete wiring of emergency lighting system, if any;
- f. A separate drawing showing layout of receptacle outlets may be made at the discretion of the design engineer.

(3) Plan for Fire Alarm Circuits. Layout and wiring plans of fire alarm station, fire alarm bell, fire alarm control panel, and other shall be drawn to scale and show:

- a. Location of outlets, equipment and/or apparatus and controls;
- b. Complete circuit showing no. and size of raceway and wire;

(e) Schedule of Loads. Schedule of load in tabulated form shall indicate:

(1) Motor Loads;

- a. Motors as numbered or identified in power layout
- b. Type of motor
- c. Horsepower/kilowatt/kilovolt ampere rating
- d. Voltage rating
- e. Full-load current rating
- f. Frequency rating other than 60 hertz
- g. Number of phases
- h. Type and size of wiring
- i. Protective device rating

(2) Lighting and Receptacle Loads;

- a. Panel as numbered in the feeder diagram
- b. Circuit designation number

- c. Number of lighting outlets in each circuit
- d. Number of switches in each circuit
- e. Number of receptacles outlets (convenience outlets)
- f. Voltage of circuit
- g. Type and size of wiring
- h. Protective device rating

(3) Other Loads.

- a. Designation number on plan
- b. Description of load
- c. Classification of service duty, if required
- d. Rating of kilovolt-ampere or kilowatt
- e. Phase loading indicating full load line current
- f. Voltage rating
- g. Type and size of wiring
- h. Protective device rating

(f) Design Analysis. Design analysis shall be included on the drawings or shall be submitted on separate sheets of standard size, and shall show:

(1) Branch circuits, sub-feeders, feeders, busways, and service entrance;

(2) Types, ratings, and trip settings of overload protective devices;

(3) Calculation of short circuit current for determining the interrupting capacity of overcurrent protection device for residential, commercial, and industrial establishment;

(4) Calculation of voltage drops.

(g) One Line Diagram. One line diagram shall indicate:

(1) Lighting and Receptacle Outlet Loads;

- a. Single line or schematics diagram of lighting and receptacles panelboards showing mains and branch circuit rating;
- b. Size of conductors for feeders.

National Building Code of the Philippines

RULE XIII - ELECTRICAL AND MECHANICAL REGULATIONS

SECTION 1301. Electrical Regulations

All electrical systems, equipment and installations mentioned in the Code shall conform to the provisions of the Philippine Electrical Code Part 1 (PEC-1) and Part 2 (PEC-2), as adopted by the Board of Electrical Engineering pursuant to Republic Act 7920, otherwise known as the Philippine Electrical Engineering Law.

1. Overhead Service Entrance

In Subdivisions, Housing Projects, Commercial and Industrial Buildings, overhead transmission and distribution voltages are required to supply power source including transformers, poles and supporting structures.

2. Attachments on and Clearances from Buildings

- a. An Attachment Plan approved by professional electrical engineer shall cover power lines and cables, transformers and other electrical equipment installed on or in buildings and shall be submitted to the local Building Official.
- b. Where building/s exceed 15.00 meters in height, overhead lines shall be arranged where practicable so that clear space or zone at least 1.80 meters (horizontal) will be left adjacent to the building or beginning not over 2.45 meters (horizontal) from the building, to facilitate the raising of ladders where necessary for fire fighting.

EXCEPTION: This requirement does not apply where it is the rule of the local fire department to exclude the use of ladders in alleys or other restricted places, which are generally occupied by supply lines.

3. Open Supply Conductors Attached to Buildings

Where the permanent attachment of open supply conductors to any class of buildings is necessary for service entrance, such conductors shall meet the following requirements:

- a. Conductors of more than 300 volts to ground shall not be carried along or near the surface of the building unless they are guarded or made inaccessible.
- b. To promote safety to the general public and to employees not authorized to approach conductors and other current-carrying parts of electric supply lines, such parts shall be arranged so as to provide adequate clearance from the ground or other space generally accessible, or shall be provided with guards so as to isolate persons effectively from accidental contact.
- c. Ungrounded service conduits, metal fixtures and similar noncurrent-carrying parts, if located in urban districts and where liable to become charged to more than 300 volts to ground, shall be isolated or guarded so as not to be exposed to accidental contact by unauthorized persons. As an alternative to isolation or guarding noncurrent-carrying parts shall be solidly or effectively grounded.
- d. Service drops passing over a roof shall be securely supported by substantial structures. Where practicable, such supports shall be independent of the building.

4. Conductors Passing By or Over Buildings

- a. Unguarded or accessible supply conductors carrying voltages in excess of 300 volts may be either beside or over buildings. The vertical or horizontal clearance to any buildings or its attachments (balconies, platforms, etc.) shall be as listed in Table XIII.1. The