HIGHER TECHNICAL INSTITUTE

ELECTRICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

DESIGN OF THE ELECTRICAL SERVICE OF A FAST FOOD RESTAURANT

E.1321

BY: SHIAMISHIS ANASTIS

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1) INTRODUCTION

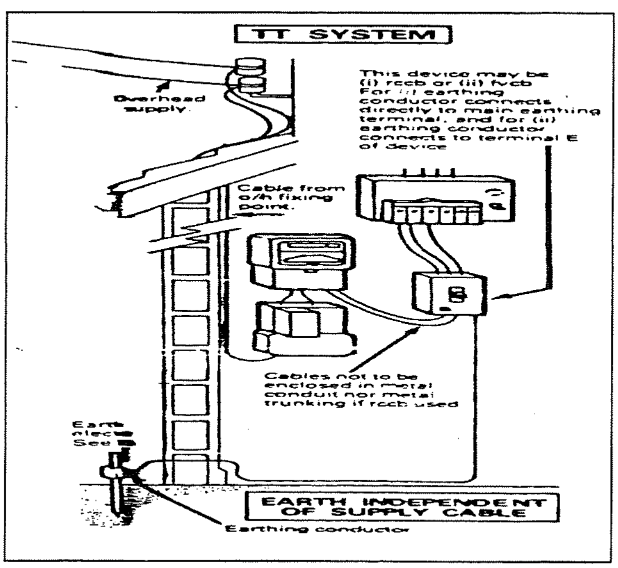
In an electrical installation the most important issue is the safety of the life stock and equipment. All the calculations are taken place regarding this issue. For this, certain regulations are used which cover all the needs of safety.

In Cyprus the **IEE Wiring Regulations 16th Edition and the EAC regulations for electricity** are used for any domestic electrical installation as well as this assignment.

a) PROTECTION

In a electrical installation and in every electrical installation protection is the important part of the procedure. To assure the safe operation of equipment and to protect the life of the user's during fault conditions an earthing system must be used.

The earthing system use in Cyprus is **the T.T SYSTEM.**



For a TT system, the main earthing terminal shall be connected via an appropriate sized earthing conductor to an earth electrode. The earthing T.T system concised of three elements. The **earthing terminal.**The protective conductors which are important in an electrical installation.

b) Prodective conductors

are used in every electrical point on the domestic installation to protect life stock and equipment during fault conditions of the installation.
Each prodective conductor is carefully selected for every point due to the needs and sizes of the life and neutral conductors.

$$S = (I^2 t)^{1/2}/k$$

The above formula determines the cross-sectional area of a prodective conductor.
is where:

S is the nominal cross-sectional area of the conductor in mm^2.

I is the value in amperes (rms for a.c.) of fault current for a fault of negligible impedance, which can flow through the associated protective device, due account being taken of the current limiting effect of the circuit impedances and the limiting capability (I^2t) of that protective device.

Account shall be taken of the effect, on the resistance of circuit conductors, of their temperature rise as a result of overcurrent.

t is the operating time of the disconnecting device in seconds corresponding to the fault current I amperes.

k is a factor taking account of the resistivity, temperature coefficient and heat capacity of the conductor material, and the appropriate initial and final temperatures.
And

c) Protective decises

Which are the most important in an installation . This are used to protect the life stock as well as the equipment from over-current and fault current conditions. This devices must be capable of breaking in the range time where the fault condition will not reach the life stock and the equipment and to avoid the result of temperature increasing over the limit in any live conductor.
This devices are selected to satisfy the following conditions:

Its nominal current or current setting (I_n) is not less than the design current (I_b) of the circuit, and

Its nominal current or current setting (I_n) does not exceed the lowest of the current-carrying capacities (I_z) of any of the conductors of the circuit, and

The current (I_2) causing effective operation of the protective device does not exceed 1.45 times the lowest of the current-carrying capacities (I_z) of any of the conductors of the circuit.

The time t, which a given fault current will raise the live conductors from the highest permissible temperature in normal duty to the limiting temperature, as an approximation, be calculated from the formula:
$t = (k^2S^2)/I^2$

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