1.1 Demonstrate knowledge of regulations, codes, standards, and safety - this includes local engineering procedures and practices as applicable.

Situation: This situation demonstrates my understanding of the IEC, NEC, BSS standards. I was responsible for determining the capacity of electrical substations that feed the street lighting poles, pump station, and underpass lighting.

Action: I was involved in the design of distributing and selecting the types of lighting fixtures. When the final design and shape of fixtures was approved by the architect discipline, I was responsible for determining the type of fixtures (LED, HPS, or fluorescent).
I determined the capacity of transformers by calculating the total load of the project by using Ecodial software.
I used Dialux program to design and calculate the LUX intensity.
I calculated the maximum number of conductors in conduits as per 1993-NEC, and assure that conduit filling percentage do not exceed 40% from the total cross sectional area of conduit.
I selected the sizes and types of cables according to the voltage drop in which the values shall not exceed 2%.
I selected the cable type as single core or multi core as per IEC60228.
I prepare drawings and all designs according to project's specification.

Outcome: I took into consideration all the safety factors as per IEC standards for installing the substations and panel boards .The safety devices which I included in the designs such as ELCB (Earth-leakage circuit breaker) and SPD (Surge Protector Device) met with positive client satisfaction.

1.2 Demonstrate knowledge of materials, or operations as appropriate, project and design constraints, design to best fit the purpose or service intended and address inter-disciplinary impacts.

Situation: I designed a lighting system for a fly over bridge to light up a one lane fly over with LED type lighting fixture.

Action: I met with the client and reviewed with him my design and make sure that the design meets the project's specifications in all aspect (Lighting level, fixture type).
I recommended Orus LED, which has a reasonable price, high quality, and simple in installation.
After I finalized the design, I calculated the cables and wires which are suitable for the circuit according to voltage drop calculation.
I coordinated with both structural and architectural disciplines in order to insure a well-coordinated installation method (good arrangement of embedded electrical conduits, location of junction box, location and position of lighting fixture above the concrete barrier).

Outcome: Installation of lighting fixtures was done in a proper and safe way which is suitable for the traffic movement. The fixtures functions very well.

1.3 Analyze technical risks and offer solutions to mitigate the risks.

Situation: I was responsible to make a mitigation study for the street lighting panel boards.

Action: To avoid the electric hazard shock of the lighting panels, I decided to use an ELCB (Earth Leakage Circuit Breaker) which contains a relay coil that is connected to a metallic load body at one end and to ground wire at the other end.
If the voltage of the load is rise, it will cause a difference between earth and load body voltage, thus it will cause a danger electric shock. The purpose of using ELCB is that when it detects fault current and sufficient voltage appears across the ELCB'S sense coil, it will switch off the power and remain off until manually reset. I adjusted the trip setting as per NEC standards to be 5 milli-Amperes, and after installation I ensured that it is working properly by using digital ELCB tester.

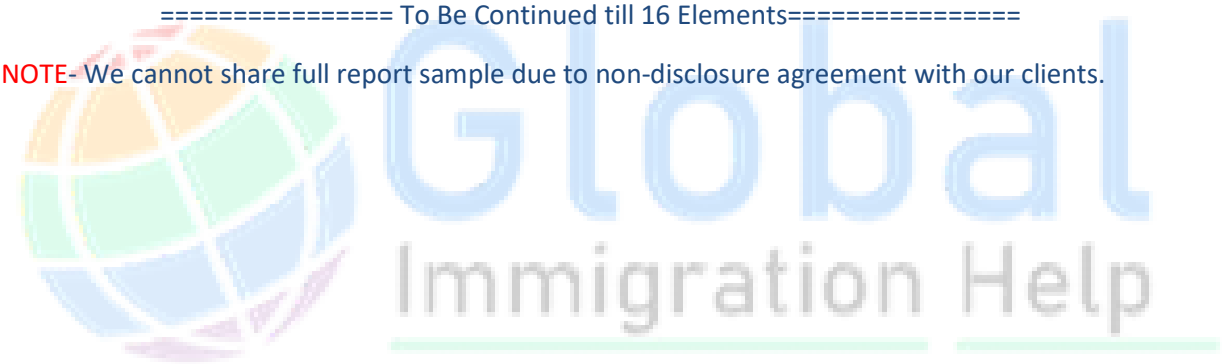
Outcome: By adding ELCB, I ensured the safety factors for the street lighting panel and human injuries due to electric shock have been prevented.

1.4 Apply engineering knowledge to design solutions.

Situation: in KAFD project I was responsible to study and design a power schematic single line diagram that show electrical distribution system in a high rise building.

Action: I designed an adequate SLD to show the power stream for the high rise building indicating the connections for all SMSB(Sub Main Switch Boards) from the main LV panel which is connected to the power transformer. Added to that, I calculated the voltage drop for the busbar and cables indicating cable's length and size, busbar size and rating, and breakers' sizes on the diagram.
After calculating the Busbar size, I noticed that the busbar which was recommended to be used by the panel's supplier is underrated to take a load of 1000A as per client's requirement. The supplier wanted to use a busbar size of 60MMX10MM Single Run Aluminum type, however, as per my calculations of current density, it has to be 2 runs instead of 1 run, therefore I instructed him to change it immediately into 2 runs instead of single, and to use a copper type instead of Aluminum to improve the conductivity.

Outcome: the cables, breakers, busbar were installed successfully in accordance with the required project's specifications. The client was satisfied with my calculation and chosen materials.



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