

The Protection System of the Electric Power Distribution System of Notre Dame of Marbel University, Koronadal City, South Cotabato

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Abstract

A vital instrument for evaluating the effectiveness and safety of electrical systems is the power system analysis. Protecting people and equipment from errors is part of this. These assessments examine the load, the equipment, and the foreseeable needs. A lack of short-circuit current protection can harm equipment and endanger workers. The main goal of this study is to assess if the various protection devices utilized in the Notre Dame of Marbel University's Main Campus electrical system comply with the established standards. Through a real survey (opening panel boxes and reviewing the original Electrical Plan), the researcher will ascertain the various protection devices in operation. Two approaches are used to test for short circuits: the MVA method and the per-unit method. When determining fault current, only the three-phase fault is considered in the calculation since it is the one having the largest fault value. Aside from the mentioned, the transformer rating calculations were also done. The resulting data will then be compared to the actual protective devices installed in the building. Short circuit currents must be less than the Kilo Ampere Interrupting Capacity rating of the installed protective devices. In conclusion, after conducting a thorough analysis of the current loading schedule and comparing the results obtained through the MVA and per-unit methods, it is evident that the various installed Overcurrent Protective Devices are operating safely. The calculations revealed a substantial disparity of 35.57% between the two methods. Furthermore, the t-test conducted on paired data confirmed the statistical significance of the differences between these two approaches. With this, the researcher recommends conducting a separate study to verify branch circuit calculations, implementing primary metering, and prioritizing the rehabilitation of the Pantua and Alunan lines to enhance the safety and reliability of the electrical system, particularly in tracing complex branch circuits.

Keywords: power system analysis, MVA method, per unit method, comparative analysis, Notre Dame of Marbel University