An Analysis of Medium Voltage Feeder Tripping in Ceylon Electricity Board Distribution Network – A Case Study of Western Province South 1 Network

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Providing a reliable power supply with minimum breakdowns is one of the main objectives of any electricity supply company. Frequent breakdowns in the power system occur due to various faults. To improve network reliability, it is more essential to have a proper analysis of these faults and incorporate them into the network development plans. The main objective of this research is to do an analysis of the feeder tripping details in a selected area of the Ceylon Electricity Board Medium Voltage distribution network. The area of Ratmalana, Kalutara, Mathugama, and Dehiwala which operates under Western Province South 1, Ceylon Electricity Board were considered for the present study and feeder tripping data were collected from relevant grid substations for the year 2019. First, an analysis was done to identify the feeder lines with frequent failures. The Auto type feeder tripping details of the selected feeders were then further analysed and it was observed 75.02%, 14.48% and 6.15% of faults were due to Earth Faults, Over-Current and simultaneous occurrence of Earth Faults and Over-Current respectively. The rest were due to the Under Frequency relay operations and 132 kV incoming failures. Auto type feeder tripping occurs repetitively in the network and minimizing them leads to building up a healthy network. These repetitive failures can be minimized by addressing solutions for individual feeder lines, where frequent failures occur. Hence a comprehensive analysis to identify the reasons for auto type feeder trippings is extremely important. Utilities can incorporate these research findings in their network development plans. They will consequently be able to eliminate many repetitive breakdowns on the Medium Voltage Network, and thereby improve the network quality while maintaining reliability indices at an optimal level and increase their financial revenue.

***Keywords*:** Auto type Feeder tripping; Ceylon Electricity Board; Earth Faults; Medium voltage distribution network; Over-Current Faults