

**COMPARATIVE STUDY BETWEEN CAPACITOR PLACEMENT
OPTIMIZATION (PSS/ADEPT) AND BUS RANKING METHOD
FOR OPTIMAL CAPACITOR PLACEMENT**

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ABSTRACT

This paper proposed efficient method for determining optimal capacitor placement in distribution network. The capacitor placement optimization was determined by the CAPO application available in the power system simulation programmed for planning, design and analysis of distribution system (PSS/Adept) and bus ranking method. Bus ranking determines suitable location by calculate loss reduction index. High loss reduction index is considered as critical area. CAPO is determined by application in PSS/Adept that already programmed inside that.

Comparison between these methods has been made to determine more suitable method to optimal capacitor placement in term of low power losses and high power factor. This paper consists of finding the optimal location and size of capacitors in electrical distribution with an objective to improving the voltage profile, reduction power loss, and power factor correction.

The proposed study was conducted on the 45 bus distribution system contain 33Kv bus and 11Kv bus. The result has shown that significant reduction in power losses, voltage profile and power factor improvement was obtained with the installation of capacitor bank at the suitable location with appropriate sizing. Proposed solution methodology has been implemented and the test results are including in this paper.

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CHAPTER 1

INTRODUCTION

1.1 Background Of Project

Power distribution from electric power plant to consumer is accomplished via the transmission line and distribution line. Studies have indicated that total power generated from power plant distribute to customer has some losses. The losses can cause low voltage, low power factor and low power at the load. The losses that have been generated at the distribution level are I^2R losses [1].

The I^2R losses can be separated to active and reactive component of branch current, where the losses produced by reactive current can be reduced by the installation of shunt capacitor. The main function of a power system is to feed the load with electrical energy as economically and reliably as feasible. The distribution system is responsible for transfer electrical energy from substation to load [2]. In distribution system low voltage at load end will caused big power losses and the power factor become small [3].

Growing load on the distribution system result is can increase of reactive power demand necessary to maintain the voltage within acceptable level [4]. Load related demand is the best compensated nearest to the load. It has the effect of reducing network loading, losses, and voltage drop and power factor. The problem is where and what quantum of capacitor including size and location need to be installation results in several effects and requires investment [9].