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MITIGATION VOLTAGE SAG USING DYNAMIC VOLTAGE RESTORER AT ADJUSTABLE SPEED DRIVE (ASD)

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ABSTRACT

The huge problem in power quality is voltage sag, normally affected to adjustable speed drive (ASD), optical devices and programmable logic controllers (PLCs). The most main problem to the sensitive load is the voltage sag. In this thesis, focus to mitigate voltage sag affected to adjustable speed drive. The best solutions to mitigate voltage sag by using dynamic voltage restorer (DVR). It is one of the main objectives. Therefore, the purpose of this project is study and analyzes the performance of DVR on ASD during voltage sag. Voltage sag type A and type B with of the sag magnitude and duration had been studied. The behavior of the torque and speed of ASD was studied. This project use Matlab software 2015b to simulate the system ASD without DVR and with DVR. In this simulation create the sag generator model, the asynchronous motor model and design DVR model. The result of the simulation show the DVR can recover voltage sag that can been seen details in this thesis. It can be seen the behavior of torque and speed during on the sag of magnitude and sag of duration. Besides that, this result simulation produces the graph ride-through capability curve depends on speed value. By using the DVR we can see that the efficiency of the magnitude sag can be improved from 0.5 pu at 0.25 s to 0.1 pu at 0.30 s but it took 0.05 s longer to recover the speed. Hence, it can be concluded that the DVR is effective since it can improved the sensitiveness of ASD toward the voltage sags.

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CHAPTER 1
INTRODUCTION

1.1 OVERVIEW OF STUDY

This thesis about analyses voltage sag for adjustable speed drives (ASD) using dynamic voltage restorer (DVR). Voltage sags is some of the power quality disturbances. The impact of voltage sag on the speed drive motor in the industry is huge. This chapter contain of information about power quality, adjustable speed drives, voltage sags, the influence of voltage sag, and solution for this problem. Problem statement, objectives, background of the study and scope of work also included and explained in this chapter.

1.1.1 Power Quality

The ideas of operating and preparation of sensitive equipment in a mode that is suitable for the operation of the equipment in order to definite the power quality by using IEEE Standard 1159. Other than that, IEEE 100 Authoritative Dictionary of IEEE Standard Terms is translated as the concept of using the electronic equipment in a good way to suit the operation of the tools so that it also compatible with the premise wiring system and other connected equipment. Other sources from the Standard Handbook of Electrical Engineer citatited that a good power quality is quite hard to define because a good power quality of a refrigerator motor may not be contribute enough for today's personal computers. Other sensitive loads such as short (momentary) outage would not remarkably affect the motors and lights but could cause a major problem to digital clocks and video cassette recorders (VCRs).

There are several types of power quality disturbances for instances voltage sag, voltage swell, impulsive transient, oscillatory transient, interruption, notching, voltage fluctuations and voltage imbalance. Each type of power quality has its own