AN ELECTRIC-POLE TILT NOTIFICATION SYSTEM

By

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DECLARATION

I **Tugume Kenneth, REG NO- BU/UG/2012/1800**, hereby declare that this Project report is my original work and has not been presented for a degree in any other University or any other award.

Signature……

Date……

DEDICATION

This project report is dedicated to my son Jedidiah and my daughter Jerushah and my wife Mary for being patient for all this time I have been away from you.

APPROVAL

The undersigned certify that they have read and hereby recommend for acceptance of Busitema University a Project report entitled "***An electric pole tilt notification system".***

Dr. SEMWOGERERE TWAIBU.
Department of Computer Engineering

Signature: ……..

Date: …….…….

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Mr. Tugume .k

ABSTRACT

In Uganda electric poles sometimes tilt due to strong winds and storms and other microorganism infections. This has always been difficult for UMEME know since most of the poles are in remote areas and other hard to reach areas like forests. The poles start tilting slowly by slowly until it falls down and this leads to destruction of property and sometimes loss of lives. This project was aimed at designing and implementing an electric pole tilt detection and notification system that will be able to detect the tilts and reports to the service center in case the tilts go beyond the threshold value. The work is arranged in mainly in six chapters, Chapter one includes the introduction of electric pole tilt detection and notification system in connection with the existing systems and its relevance. Chapter 2 discusses the literature about related to the system, Chapter 3 illustrates the methods employed in the whole research process and coming up of the working prototype of the system, Chapter 4 includes requirements analysis and system design, Chapter 5 talks about the implementation of a real system and its testing and finally chapter six contains recommendations from the researcher

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LIST OF ABREVIATIONS

AC	Alternating current
ADC	Analog to digital converter
DAC	Digital to analog converter
DC	Direct current
GSM	Global system for mobile communication
I/O	Input/output
IC	Integrated circuit
PIN	Personal identification number
RFID	Radio frequency identification
ROM	Electronically erasable programmable read only memory
SMS	Short message service.
SSD	Seven segment display
VLSI	Very large scale integration
RF	Radio frequency

CHAPTER ONE
INTRODUCTION

1.1 BACKGROUND

Uganda's total installed capacity is 822 MW and about 18.16% of her population accesses this power. All these power generation firms employ the use of terrestrial electric poles to transmit the electric power from the generation point to the end user [1]. Besides those who access the power, about 21.32% of the population is also in the neighborhood of the power transmission lines. This means that close to 40% of the population is at a risk of loss of property and/or lives among other tragedies in case of a pole falling. And it has on different occasions been reported on media about a falling or a fallen pole either threatening to or practically causing such damages [1]. If not detected and prevented in time, any pole that falls becomes a severe disaster to the people in the neighborhood as well as the homes and industries it was meant to supply electricity with [3].The photos below shows some of the falling electric pole transmission system indicating the likely disasters it can cause to the community around it. In Uganda, electricity supply system has developed since the 1950s and 1960s when the Owen Falls Hydropower Station (later renamed Nalubale Power Station) was constructed with a capacity of 150 MW before Kiira (200 MW) was also built [1] . With the liberalization of the economy and the unbundling of the electricity utility, both Nalubale and Kiira hydro power stations were leased to Eskom (U) Ltd under a 20-year concession agreement. The two hydropower stations form the back bone of the electricity supply network in the country [1].

Figure 1.1: An illustration of falling electric poles.

Therefore, the system designed gives notification of the falling electric pole notifying the control center the angle of tilt the pole has tilted the system consists of a network of small electronic systems (nodes) installed at either every pole or every other pole that can detect tilts and communicate to central long haul nodes. Each of such nodes include Transmitter tool that helps relay the information to a centralized computer software (database) system. The software then finds the location of the pole from a unique code included in the notification message from the pole and sends a message to the nearest technician in charge [2]. These technicians can log into the same system and use it to view/search for the actual pole and do the rest of the work required to avoid destruction. After correcting the mess, they can go back to the system and mark it solve.

1.2 PROBLEM STATEMENT

On many occasions, electric poles have tilted due to heavy storms with strong wind and rotting from excessive water, which makes the pole exert a heavy force on the wires until it finally falls and this can severely cause load shedding, deaths and destruction of property. It is anticipated that the frequency of pole falls will increase as longer as terrestrial electric

poles are still being employed for transmission thus resulting into serious need for a system that can detect pole tilts and call for immediate technical attention.

1.3 OBJECTIVES

1.3.1 Main Objective

To develop an electric-pole tilt notification system.

1.3.2 Specific Objectives.

i. To study and analyze the requirements for the design of electric-pole tilt notification system.
ii. To design a central data base for all electric poles in an operation area.
iii. To design a communication module that will link electric poles with central database.
iv. To implement the working prototype of the system.
v. To test and validate the system.

1.4 JUSTIFICATION.

If a tilt is not detected and prevented in time, any pole that falls becomes a severe disaster to the people in the neighborhood as well as the homes and industries it was meant to supply electricity.

The implementation of this system will greatly reduce three of major problems that arise from electricity transmission lines when there is a fall in electric pole(s). These include Load shedding, Destruction of people's property as well as loss of lives.

Real Time Communication is also evidenced in the system and this increases the responsiveness of the system thus making the project more relevant and significant.

1.5 Scope.

The system detects the tilt of electric pole basing on the set orientation of the pole and provide a notification to the central database indicating the range of current tilt angles, the geographical location of the pole and the pole serial number.

The systems have be installed on electric poles which are liable to falls basing on the soil texture, relief of an area, the depth of the pit and environmental weather conditions.

The system has been developed for a period of 5 months starting from august 2015 to April 2016.

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