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FINAL YEAR PROJECT REPORT

WATER TANK MAINTENANCE SYSTEM

BY

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DECLARATION

I WAKABALA KENNETH do hereby declare that this Project Report is original and has not been submitted for any other degree award to any other University before.

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May the almighty GOD bless you richly and exceedingly!

Thanks.

DEDICATION

I dedicate this project report to my dear dad Mr. Khaukha Fredrick Paul and mum, Ms. Kituyi Justine.

I am very grateful for the support. May the Almighty richly reward you.

LIST OF ACRONYMS

DC: Direct Current

DRWH: Domestic Rainwater Harvesting

NWSC: National Water and Sewerage Corporation

SMS: Short Message Service

LDR: Light Dependent Resistor

LED: Light Emitting Diode

LCD: Liquid Crystal Display

PCB: Printed Circuit Board

uPVC: Unplasticized Polyvinyl Chloride

WHO: World Health Organization

ABSTRACT

This project combines a dirt sensor, ultrasonic sensor, servo and DC motor with an Atmel chip the 8-bit ATMega328PU microcontroller in 28 pin DIP package, with double flash space and an HD44870 character based LCD- JHD162A to make it easy for the user to monitor the bottom settled dirt in water tank. The overarching goal of this project is to detect and monitor water storage tank status and raise awareness about presence and accumulations of water foreign in water storage tank contaminates its water leading to water-borne infections. Detecting and monitoring dirt level and water volume makes it easy to determine dirt accumulation across a period and is accurate in terms of total usage. Both the dirt level and water volume are displayed on an LCD. This project was therefore aimed at developing a water tank maintenance system that would solve the above problem through the following ways; displaying the amount of settled dirt at the bottom and water volume in the tank, it also cleans the tank using a cleaning machine attached with a brush which rotates through 360 degrees for 10 seconds and automatically opens an outlet to draw dirty water for 10 seconds, finally, it notifies the user about water storage tank status. The work is arranged mainly in six chapters, Chapter one includes the introduction of a water tank maintenance system. Chapter two discusses the literature related to the system, Chapter three illustrates the methodologies used in coming up with the working prototype of the system, Chapter four includes system design and analysis, Chapter five contains the implementation and testing of the system and chapter six contains the summary of the work, discussions and recommendations.

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CHAPTER ONE: INTRODUCTION

1.0 Background of the Study

Water safety and quality are fundamental to human development and well-being. Providing access to safe water is one of the most effective instruments in promoting health and reducing Medical bills. As the international authority on public health and water quality, WHO (World Health Organization 2014) leads global efforts to prevent transmission of waterborne disease, it's bad enough to be able to see, smell, or taste a contaminant such as Chemicals and Organic Matter[1, 2]. People in homes, schools, institutes and other public places, especially in Uganda are highly exposed to unsafe tank water due to pipe corrosion, soil, viruses and bacteria from feces which are sucked into the network through pipe leakages and also bird/animal droppings on catchment surfaces and guttering structures, and tends to accumulate and overtime settles at the bottom of the storage tank, which may highly cause negative health effects such as skin rash, odour and dreaded diseases like Typhoid, Diarrhoea, Hepatitis, and Dysentery among others[3]. Although, some may be harmless, these sediments can carry chemical contaminants and microorganisms attached to them into the storage tanks[4]. Over time, changes in water oxygen content, pH, and temperature can produce new residues forming scale that damages storage tank components[5], hence contaminating water in that tank.

According to Nidege Pherry, a homemaker who lives in Kampala, said she always boils the family's drinking water. She has five children. "I cannot take chances", "Or I will end up paying more in medical bills" she said. Mr. Balimunsi places some of the blame on the people of Kampala. Often, he said, "they are slow to report breaks in the water lines". They also make their own problems, he said, "by failing to clean the water tanks at their home. Total spending on water and sanitation in 2008 was $4 million, down from $11 million four years earlier. The stated aim of the National Water and Sewerage Corporation is to provide "efficient and cost effective water and sewerage services, applying innovative solutions to the satisfaction of our customers" he said.

According to 2013 Water Aid report indicates that 70% of Ugandans have access to safe water and

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