FINAL PROJECT REPORT

BTS STANDBY GENERATOR FUEL LEVEL MONITORING & TRANSMISSION VIA GSM

Project Advisor
Mr. Saleem Atta

Submitted by
Abbas Malik (060820-047)

Saboor Ruhail (060820-062)

Department of Electrical Engineering

School of Science & Technology

University of Management and Technology

A Report Submitted to the
Department of Electrical Engineering
In the partial fulfillments of the requirements
for the
Degree

Bachelor of Science
In

Electrical Engineering

By

Abbas Malik
Saboor Ruhail

School of Science & Technology
University of Management and Technology

ABSTRACT

This project is a solution to the problem of base station site shutdown due to extensive load shedding and complete consumption of standby generator fuel. The primary task was to measure the fuel level in a tank through an ultrasonic transducer, which is interfaced with an 8052 micro-controller. This fuel level is then transmitted via SMS using GSM module to3 cell phone numbers. If the fuel level falls below certain critical level it generate additional SMS to concerned person of base station site as well as the SMS to the cell phone in the control room.
The system has been successfully designed and it does not only prevent abrupt site shutdown but the revenue losses to the cellular operator due to abrupt site shutdown are also eliminated. This system can be implemented in various industries for wireless fuel level monitoring.

ACKNOWLEDGEMENTS

First of all, we are grateful to Almighty Allah, who granted us with such esteem knowledge that enables us to achieve what we desired. We are also obliged to our parents, who constantly encouraged us and provided us with all opportunities and affection.

Secondly we would like to express our gratitude to our project advisor, Mr. Saleem Atta, who has been a source of inspiration and guidance throughout the duration of the project. We wish to thank him for spending countless hours supervising our working on project and encouraging us whenever we were about to give up. I also value his advice and desire to attain professional and personal glory that will make him proud.

We extend our thanks to various people who have shared their opinions and experiences through which we received the required information crucial for our report.

LIST OF SYMBOLS AND ABBREVIATIONS

MCU	Microcontroller Unit
ROM	Read Only Memory
RAM	Random Access Memory
LCD	Liquid Crystal Display
TOF	Time Of Flight
IC	Integrated Circuit
Tx	Transmitter
Rx	Reciever
MTBF	Mean Time Between Failures
SMS	Short Messaging Service
GSM	Global System for Mobile communication
GPRS	General Packet Radio Service
AT	Attention
CR	Carriage Returns
LF	Linefeed

List of Figures

Table of Contents

CHAPTER 1

INTRODUCTION

1.1: Background

Due to frequent commercial power failure, the cellular operators use standby generators at the BTS for uninterrupted provision of service to customers. The fuel refilling visits on these sites are pre-scheduled and this schedule varies from location to location, based on the load-shedding schedule issued by the commercial power supplier. In case of additional power disruption, which happens at a fair magnitude, the fuel in the standby generator gets finished before the due time, which leads to site shutdown. This does not only result in interrupted service to the cellular subscribers but it also results in heavy revenue losses to the respective cellular operator.

An effort has been made in this regard and a system has been successfully designed to cater the above described problem. This system constantly monitors the fuel level in a tank and transmits this fuel level wirelessly to the respective control room, so that the respective maintenance person is notified about the fuel level multiple times an hour. This prevents power disruption of BTS. Unnecessary refilling visits also gets eliminated as well as the losses due to site shutdown are also minimized.

1.2 : Methodology

1.2.1: Fuel Level Acquisition:

Ultrasonic ranging is performed by transmitting a high frequency pulse (40kHz) sound, and then counting how long it takes for its echo to be detected. The length of time taken between the transmitted pulse and the received echo is then used to determine the fuel level.

1.2.2: Transmission of SMS:

The calculated value of fuel level in MCU is fed serially into the GSM module. It is interfaced with the MCU. Upon reception of proper AT commands, the fuel level is transmitted via SMS.

1.2.3: Hardware:

The systems includes

- 8052 Microcontroller
- Ultrasonic transducer (SQ40T/SQ40R)
- Transducer interfacing circuit (transmission/reception)
- GSM Module (SIM-300 DZ)
- Microcontroller Assemble Language Code

1.3: Process Flow

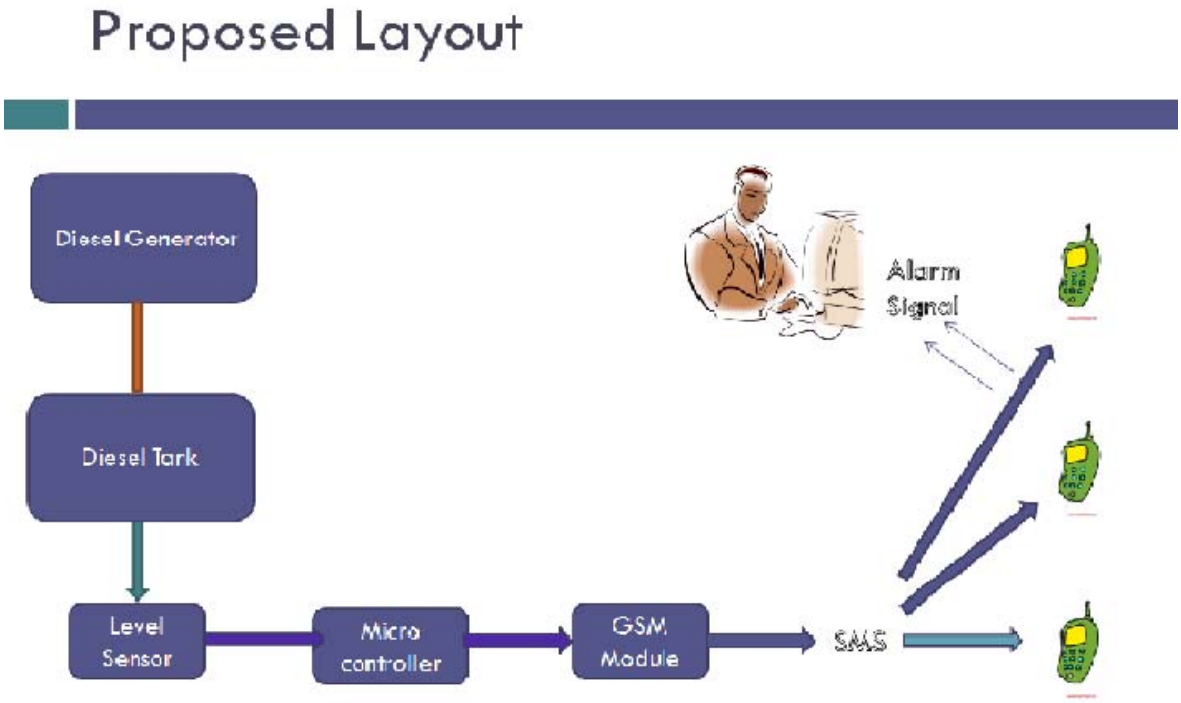

Fig 1.1 System Block diagram