

# **FINAL PROJECT REPORT**

## **BTS STANDBY GENERATOR FUEL LEVEL MONITORING & TRANSMISSION VIA GSM**



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## **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 to 3 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**

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## LIST OF SYMBOLS AND ABBREVIATIONS

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

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# 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

## Proposed Layout

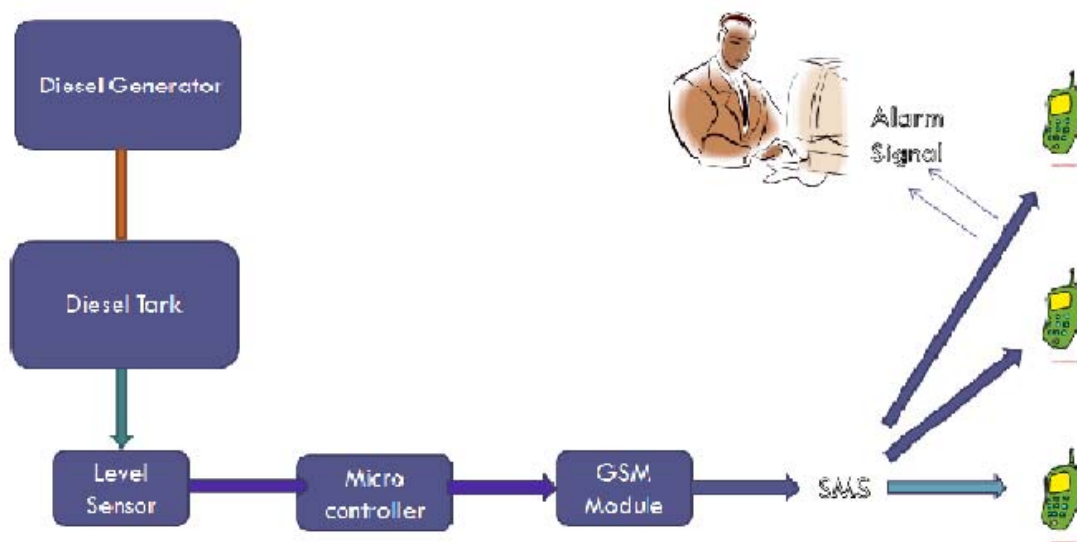


Fig 1.1 System Block diagram