

# LOAD SHEDDING CONTROL USING GSM TECHNOLOGY

1 Mungase Punam , B.E Electrical, AVCOE, Sangamner, India  
 2 Joshi Rupali, B.E Electrical, AVCOE, Sangamner., India

## ABSTRACT

Nowadays, the demand of electricity is increasing. Therefore to conserve the energy, load shedding is the best option. To achieve this, proper control and management of load shedding is required. In this project, we monitor the distribution points from one central location and control the substation load shedding and sharing using a GSM modem. In substation the tasks like certain loads needs to be switched on/off are of prime importance. The loads can be operated in three modes- Set mode, Auto mode and Manual mode. In Set mode, input time is set by the user and operation is done with the help of timers .In Auto mode, it senses the time setting and operation is done automatically. In the manual mode it functions while respective loads are operated depending on the load necessity using GSM. All the modes and status of loads are displayed on an LCD. Finally GSM modem which sending SMS to the control system we can select the mode and timing remotely.

## I. INTRODUCTION:

The most common problem is to control the substation equipments, distribution transformers, distribution points from one central location. We designed this project to control all the equipments and distribution points and transformers from one central location. By using this, we can also control the faults which occurs on the substation. It is not possible to check the faults manually for 24 hours. So we can control it automatically by using GSM modem.

GSM modem is connected end to end. One end is connected to the distribution side and another end is connected to the mobile device. Mobile device makes the control of equipments of the substation.

When a fault occurs in a particular area, the complete power to that area is cut off. The basic utilities in that particular area also do not have power. It includes hospitals, street lights, fire bridged, police station etc. In this project, the power which is cut off by the particular area is provided to the another area where load shedding occurs and where basic utilities are present. Therefore energy conservation is achieved and wastage of power is also reduced.

We can also control the on/off switching operations from one central location manually or automatically by using GSM modem.

## II. LOAD SHEDDING BASICS:

load shedding is process in which an excess load is shed from system to maintain the stability of system. load shedding is helpful to enhance the transient stability of the power system. Total Generation (TG) = Total Load (TL) + Losses

Under balance condition the frequency of system remain stable (50 Hz or 60 Hz). Behavior of frequency with different condition is shown in table.

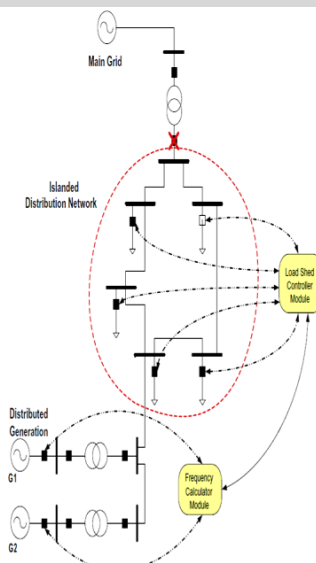


Fig 1 Test system load shedding for an islanded network

Table I: Behaviour of frequency with different condition

System frequency	System condition
Increase	$TG > TL + Loss$
No change	$TG = TL + Loss$
Decrease	$TG < TL + Loss$

Load shedding is used in under frequency condition, when frequency is deviated below from normal value. there are many type of load shedding scheme but, three are main. firstly, *traditional ls* is simple but unreliable to shed accurate amount of load and also do not use sophisticated relays like RCOF. secondly, *half adaptive ls* is similar to traditional relay at some extent but RCOF relays are used for shedding of right amount of load. thirdly, *adaptive ls* use both under frequency relay and rate of change of relay to shed the right amount of load. Criteria for Load Shedding

- Load shedding relay should be able to shed load equal to maximum value of overload.
- Load should be shed in number of stages, rather than in single stage for smooth transition and accurate load shed
- Frequency setting should be done for maximum and minimum setting.
- Each stage should shed enough loads to handle the next, more serious contingencies.
- Time delay should be short for frequency relay.
- Load shedding relay should be spread throughout the interconnected system to avoid unnecessary power loss and undesirable islanding.
- Load priorities should be created for load shedding

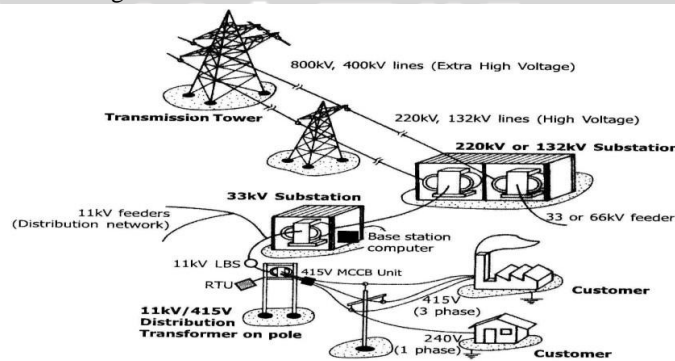
**III. METHODOLOGY:**

The purpose of electric power system is to attach the power system to consumers loads. An electric power system consists three parts:

1. Power station
2. Transmission lines
3. Distribution system

Electric power is normally generated at 11-25kV in a power station. For transmitting over long distances, it is then stepped-up to 400kV, 220 kV as necessary. Power is carried through a transmission network of high voltage lines. Usually, these voltage lines run into hundreds of kilometres and it deliver the power into a common power pool called the grid.

These grid is connected to load centres (cities) through a sub-transmission network of normally 33kV (or sometimes 66kV) lines. These lines terminate into a 33kV (or 66kV) at substation, where the voltage is stepped-down to 11kV for power distribution to load points through a distribution network of lines at 11kV and lower.



**1. Manual load shedding:**

In the load shedding process at substation who perform cut of the power for certain period of time to control shortage of electrical energy used by locality. Power system of some area are manually cut down by the workers for a period of time. Workers are engaged at substation. In this way the load shedding done by manually at substation to cut of the power. There were several conventional method or implementation of the above mentioned manual load shedding scheme .out of this,

**2. SMS based electrically load Shedding:**

In this method the distribution point monitored by one central location. The relay are use to operate a circuit breaker to cut off the supply of the zone. User can send commands in the form of SMS messages to read the remote electrical parameters .This system can be automatically send the real time electrical parameter periodically in the form of SMS. It can be designed to send SMS alerts when relay trips. In this system micro-controller are used to effectively communicate with the sensors. The controller is provided with internal memory to hold the code. .This internal memory is used to

dump some set of assembly instructions into the controller. The functioning of the micro-controller is dependent on the these assembly instructions.

**IV. PROPOSED SYSTEM:**

The proposed system will overcome manual effort for controlling the load shedding . MSEB can cut off power to specific area by just sending an SMS to the concerned Distribution Point there by retaining power for the basic utilities.

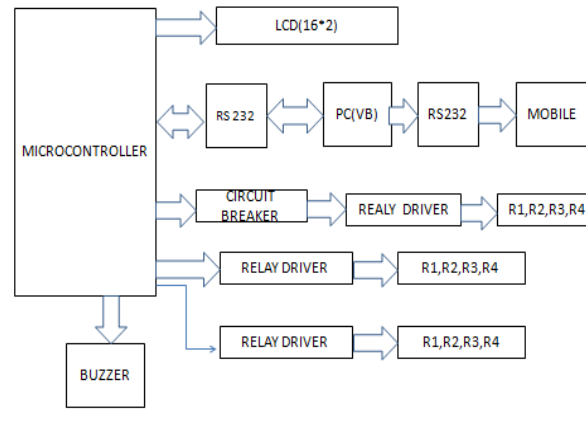


Fig. Block diagram of load shedding and controlling using GSM

**REQUIREMENTS**

- GSM MODEM
- MICROCONTROLLER
- CIRCUIT BREAKER
- RS232
- LCD
- BUZZER

1) GSM MODEM:

A GSM MODEM is a wireless modem that works with a GSM wireless network. It can be an external device or a PC card. Typically an external GSM MODEM is connected to a computer through a serial cable. A GSM MODEM in the form of a PC card is designed for use with a laptop or computer.

2) BUZZER:

BUZZERS are used to indicate or to grab the attention regarding an emergency situation occurred. It acts as a panic horn which indicates the need of instant attention as the condition goes haywire.

3) MICROCONTROLLER 89s52:

It is low power, high performance, inexpensive CMOS 8-bit microcontroller. It has 8Kbyte system programmable flash memory. The on-chip flash allows the program memory to be reprogrammed in-system.

4) LCD:

A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. This LCD has 2 registers- Command and Data.

5) RS232:

RS232 is a standard for serial communication transmission of data. This standard is commonly used in computer serial ports.

6) CIRCUIT BREAKER:

A Circuit Breaker is an automatically operated electrical switch. It is designed to protect an electrical circuit from damage caused by overload or short circuit. Its basic function is to detect a fault condition and interrupt current flow.

## V.CONCLUSION:

Due to the insufficiency of adequate power supply, electrical authority used to shut power supply in different urban and rural areas for proper distribution. To maintain this power shut down periods in several areas at peak hours requires enough manpower and continuous observations. The proposed system along with remote communication with SMS will be running automatically and minimized a huge amount of manual work and enhance efficiency to the existing manual system

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