INTERNSHIP REPORT

ON

MAHTAB FLEXIBLE PRINTING PRESS

By

Fahria Nipa

Submitted to the

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Department of Electrical and Electronic Engineering

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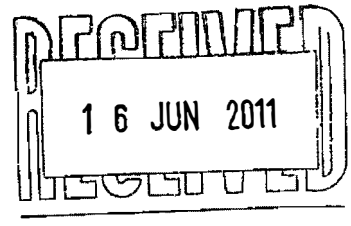
in partial fulfillment of the requirements for the degree of
Bachelor of Science in Electrical and Electronic Engineering
(B.Sc. in EEE)

Spring, 2011



Approved By

28.04.11

Academic Advisor

S. M. Shahriar Rashid

02.05.2011

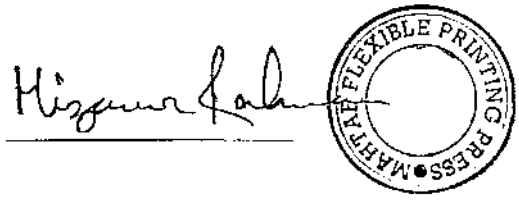
Department Chairperson

Dr. Anisul Haque

Approval Letter

To whom it may concern

This is to certify that Fahria Nipa, student ID 2006-1-80-020 as successfully completed the project work that was assigned to her as part of the internship program. I, Md. Mizanur Rahman, on behalf of Mahtab Flexible Printing Press am recommending this work as the fulfillment for the requirement of EEE 499 Industrial Training. I wish her success.



Md. Mizanur Rahman

Mahtab Flexible Printing Press
Long experience is our source of confidence

18 May , 2010

Mrs. Fahria Nipa
House 32, Block K
South Bonoshree

REF: EAST WEST UNIVERSITY

Dear Fahria Nipa

Welcome to Mahtab Flexible Printing Press internship Program. Your internship program begins with effect from May 20, 2010 for a period of 25 days under the following terms and conditions:

1. You will be working under the direct supervision of Managing Director and in the special project assigned by your supervisor. Apart from your project work you are also required to assist your supervisor by doing the job assigned to you from time to time.

2. Your working days will be: Saturday, Monday, and Wednesday.

3. You will conduct yourself in a manner, which is not prejudicial to the Company's interest.

4. You will be given a monthly [illegible] sum of BDT 3000.00 only.

5. On completion of the program you are required to submit a report on the project within the agreed time. At the end of your internship program the Company will issue a completion certificate in your name.

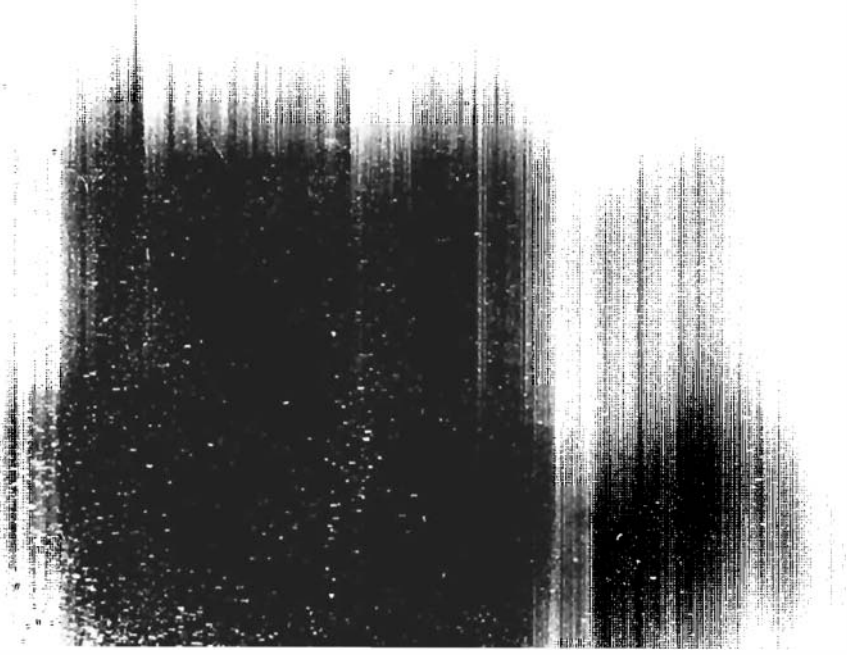
If the above terms and conditions are acceptable to you then please return the duplicate copy of this agreement duly signed.

Congratulations for choosing Mahtab Flexible Printing Press. I wish you every success in your future career.

MAHTAB FLEXIBLE PRINTING PRESS M.F.P.

General Manager

Factory: Ashrafabad,Madrashapara,(10th Floor) Kamrangirchar,Dhaka-1310,Bangladesh. Tel: 7341173, 7341174, Fax: 880-2-7320293, E-mail: mfpamin@yahoo.com



Acknowledgment

At first we wise to convey my heartfelt thanks to almighty Allah to complete the Internship successfully and also those who all work hard and cooperating to making this report. Without their assistance we could not have completed our Internship.

I regards thank to Md. Samiur Rahman, Senior Executive, Mahtab Flexible Printing Press.

I thank Abdur Rahman, Factory Engineer, Mahtab Flexible Printing Press. I worked under his supervision.

I would like to thank Mahtab Uddin, Managing Director, Mahtab Flexible Printing Press, give time to discuss about his industry and also giving us opportunity to do Internship. We would also like to Thank S.M.Shahriar Rashid, Department of Electrical and Electronic Engineering (EEE) East West University.

I also would like to thank to all the respected officers and employees of Mahtab Flexible Printing Press, for their endless support.

I am also very grateful to all of our teachers for their encouragement and cooperation throughout our Internship and academic life.

At last I am very grateful to my parents for their encouragement and patience.

Executive Summary

Electricity is the driving force of modern civilization as well as the backbone of all development activities of the country as a whole. But the present generation capacity of the country is not sufficient enough to meet the prevailing load demand of the country and causes hindrance to the development activities in industrial, commercial, agricultural and social sectors.

Mahtab Flexible Printing Press is a factory of good quality printing and packaging. They have very good reputation in printing industries. Their all projects are very big.
things which I could not learn from book.

This report is written on the basic used equipments in industry.
distribution, safety of machines, use of inverter, cooling tower, chiller, compressor and etc.
Inverter, we learn very few things about inverter from book but I got many new application of inverter from my training.

When I worked in Mahtab Flexible Printing Press I also got the opportunity to see the entire task of making their product, maintenances and use of so many new electrical equipments. I completed all of the work successfully.
Flexible Printing Press because it was a very good opportunity for me to relate my all theoretical idea with mechanical concept.

Internship Schedule

For Internship purpose I went to Mahtab Flexible Printing Press which is situated in Ashrafabad .

I visited the full factory which is divided into two sectors. At first I gathered information about their factory.

Training	Start and Completion Date	Super Visor
Power Generating Proccess and Distribution	22,24 May ,2010	Mahtab Uddin, Managing Director
Machine Protection	26,29,31 May,2010	Abdur Rahman, Factory Engineer
Different types of motor	02,05 April ,2010	Abdur Rahman, Factory Engineer
Boiler Compressor, Chiller	07 April,2010	Abdur Rahman, Factory Engineer

Table 1: Internship Schedule

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1. Introduction

1.1. Company Profile:

The Mahtab Flexible Printing Press is one of the leading Bangladeshi trade associations for converters of flexible packaging and suppliers to the industry. It may be mentioned that our previous company "National Art Press" subsequently converted under the name and style of "Mahtab Flexible Printing Press".

Mahtab Flexible Printing Press is a printing company built up in 1982 and has a long and good history in the printing industry.

They provide a wide range of packaging bags, films in roll and pouches. Their products include candy bags, biscuit bags, food bags, packing films and many other kinds of plastic bags and films. With advanced productive facilities and technology, and strict quality control system, they have successfully passed 28 years. They can offer different solutions according to customer's requirements.

Mahtab Flexible Printing Press produces the best quality products with high speed machines. "C.P.P. & M.C.P.P." are our new productions. They also provide a good stage for staff members to develop themselves, which help us to be of good reputation in printing field .Their strength lies firmly the most reputed machine manufactures of Taiwan, China and Thailand and raw materials are from Korea, Taiwan, Singapore, India, Indonesia and Europe.

1.2. Objective of the Internship

The source of electric power required for the working of devices like torch, calculator etc. is known to normal people. But have they ever thought of the places where the electric power we get in our houses is generated? Do they know how this electric power is brought to our houses? This chapter deals with certain important points, pertaining to the generation and transmission of electric power and various problems related to transmission.

So my main object of doing internship is to know practically how it is generated and distributed to our houses. Before doing intern I have little bit idea about current generation and distribution for doing major on power. But for doing research on small power plant I can guess about large power generation and distribution.

Beside generating and distributing current I had also learnt few more things what are necessary to know for all engineers.

- To know the necessary steps to make a power plant
- To know the use of invertors
- To know the use of various kind of motors
- Use of circuit breaker
- Use of Relay for saving our electrical component
- Use of PLC which is most important part of an industry
- Use of Chiller, Cooling Tower

1.3. Scope and Methodology

I think, every engineering student should do intern because without practical knowledge we cannot utilize what we are learning from book. I am very lucky that I have got the chance to know about power plants as a student of Electrical and Electronic Engineering. As a result, I am able to know exactly what our today's current situation is. How much we are suffering for lack of power. What are use of invertors, relays, motors and etc.

This report is written on the basic of two ways information collection, one is talking and discussing with technicians and employee and personal observation. This report is completely representing the industrial background.

2. Detail of Internship Work

Before moving to the details about internship I want clear about the current situation of Bangladesh.

Bangladesh is a developing country and one of the most populated counties in the world, because Bangladesh has small land with large population nearly 20 cr. So Government can't yet handle or afford electricity for all family, Nowadays this is shocking matter in current world, Can you imagine a single moment without electricity? Absolutely not!

So our Industries are getting so many difficulties to run which is directly affected our country's economy. So nowadays most of the industries are using their own produced electricity to over the all problems regarding electricity.

Mahtab Flexible Printing press also has their own produced electricity which helps them to overcome their load shedding problem.

Below I am showing their total generated power,

Name of Unit	Unit Load, KW	Used Fuel
Wakasa	900	Gas
Marcedes-Benz	158.4	Gas
Cummins Power Generation	315	Gas
Daewoo	101	Diesel
Cater Piller	508	Diesel
Cater Piller	508	Diesel
Max Energy	326	Diesel
	Total=2816.4	

Table 2: Total Generated Power

Now I would like to share my experience of intern in an industry.

2.1. Basic information

Before moving to our main topic, first we should exactly should know what is Electricity?

Electricity has been with us ever since humans first appeared on Earth, in the form of lightening for example, and they created electricity by rubbing materials together. The first machine to generate an electric spark was built about 1650, and worked by rubbing a hand on a spinning sulfur ball. Electrified by friction, the sphere alternately attracted and repulsed light objects from the floor.

The movement of electric charge is known as an electric current, the intensity of which is usually measured in amperes. Current can consist of any moving charged particles; most commonly these are electrons, but any charge in motion constitutes a current. \Electricity is an extremely flexible form of energy, and has been adapted to a huge, and growing, number of uses. The invention of a practical incandescent light bulb in the 1870s led to lighting becoming one of the first publicly available applications of electrical power.

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2.1. Basic information

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2.2. Power plant

The heart of a power station is a large generator that extracts energy from a fuel. Some power stations burn fossil fuels such as coal, oil, or gas.

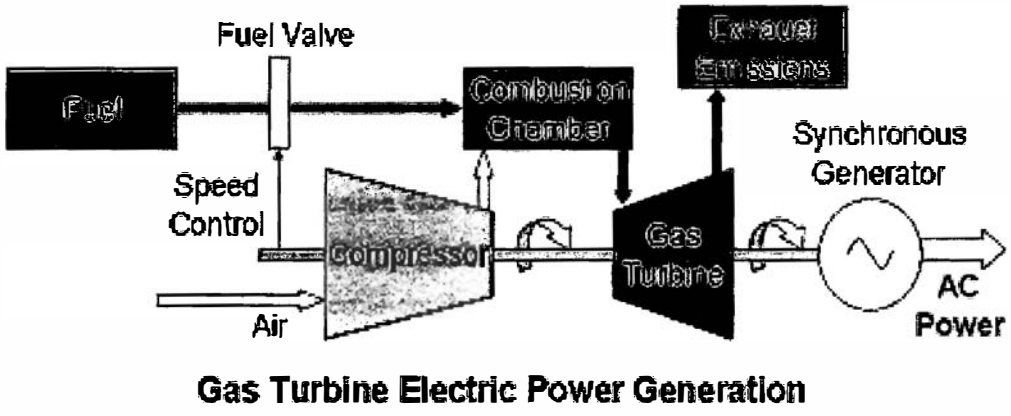

Figure 1: Electric Power Generation

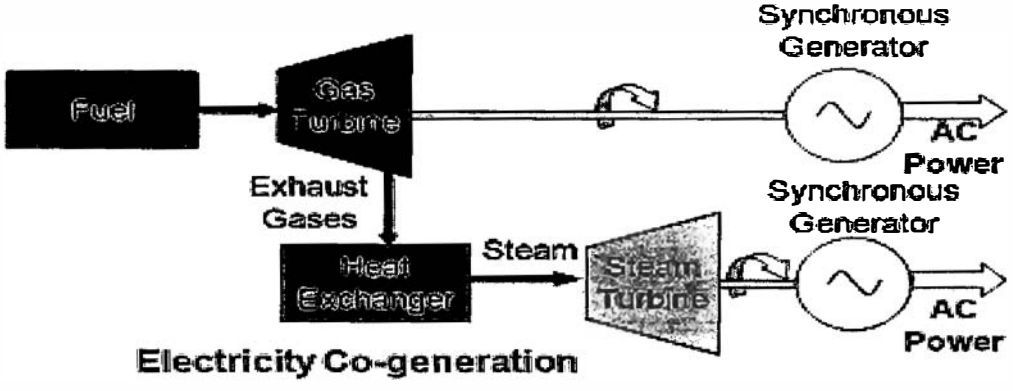

Figure 2: Electric generation

These are the necessary steps of a power plant:

1. Fuel: Some power plants run on coal, while others use oil, natural gas, or methane gas from decomposing rubbish. Here natural gas is used as fuel for this power plant.
2. Furnace: The fuel is burned in a giant furnace to release heat energy.
3. Boiler: In the boiler, heat from the furnace flows around pipes full of cold water. The heat boils the water and turns it into steam.
4. Turbine:

   An electric utility power station uses a turbine, engine, water wheel, or other similar machine to drive an electric generator or a device that converts mechanical or chemical energy to power. Steam turbines, internal-combustion engines, gas combustion turbines, water turbines, and wind turbines are the most common methods to generate power.

   A turbine converts the kinetic energy of a moving fluid (liquid or gas) to mechanical energy. Steam turbines have a series of blades mounted on a shaft against which steam is forced, thus rotating the shaft connected to the generator. In a fossil-fueled steam turbine, the fuel is burned in a furnace to heat water in a boiler to produce steam.

5. Cooling tower:

   The giant, jug-shaped cooling towers you see at old power plants make the turbine more efficient. Boiling hot water from the steam turbine is cooled in a heat exchanger called a condenser.

6. Generator:

   The turbine is linked by an axle to a generator, so the generator spins around with the turbine blades. As it spins, the generator uses the kinetic energy from the turbine to make electricity.

7. Electricity cables:

   The electricity travels out of the generator to a transformer nearby.

8. Step-up transformer:

   Electricity loses some of its energy as it travels down wire cables, but high-voltage electricity loses less energy than low-voltage electricity. So the electricity generated in the plant is stepped-up (boosted) to a very high voltage as it leaves the power plant.

9. Pylons:

   Hugh metal towers carry electricity at extremely high voltages, along overhead cables, to wherever it is needed.

10. Step-down transformer:

    To solve the problem of sending power over long distances, the transformer allowed power to be efficiently transmitted over long distances. This made it possible to supply power to homes and businesses located far from the electric generating plant.

    Once the electricity reaches its destination, another transformer converts the electricity back to a lower voltage safe for homes to use.

11. Homes: Electricity flows into homes through underground cables.

12. Appliances:

    Electricity flows all round our home to outlets on the wall. When we plug in a television or other appliance, it could be making a very indirect connection to a piece of coal hundreds of miles away.

2.3. Transformer

Electrical transformers are used to "transform" voltage from one level to another, usually from a higher voltage to a lower voltage. They do this by applying the principle of magnetic induction between coils to convert voltage and/or current levels.

In this way, electrical transformers are a passive device which transforms alternating current (otherwise known as "AC") electric energy from one circuit into another through electromagnetic induction.

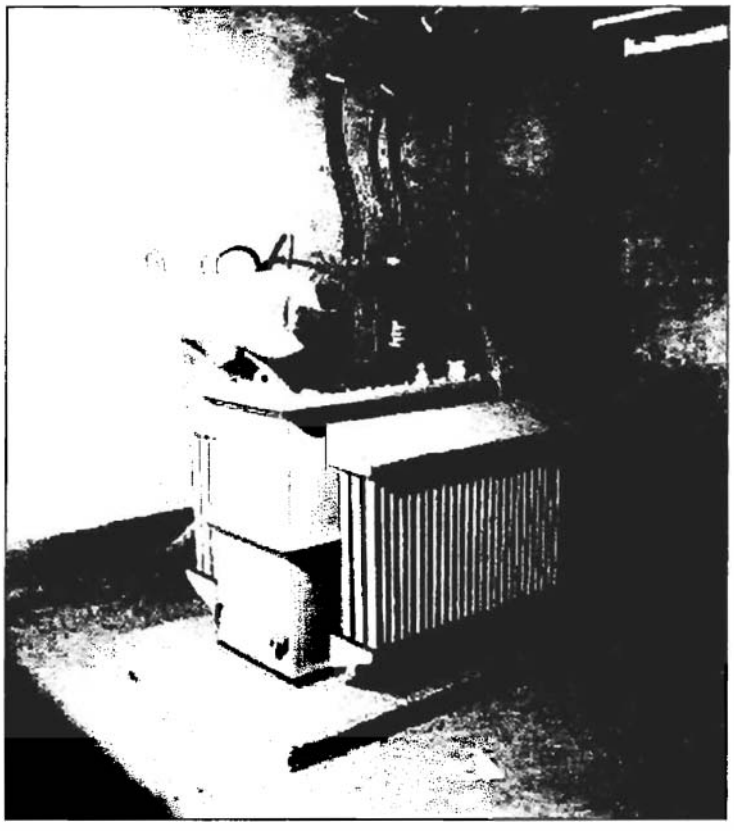

Figure 3: Transformer

Electrical transformers can be configured as either a single-phase or a three-phase configuration. There are several important specifications to specify when searching for electrical transformers. An electrical transformer may provide more than one secondary voltage value. Output choices include AC or DC. For Alternating Current waveform output, voltage the values are typically given in RMS values. Consult manufacturer for waveform options. For direct current secondary voltage output, consult manufacturer for type of rectification.

2.4. Generator

An electric generator is a device that converts mechanical energy obtained from an external source into electrical energy as the output.

It is important to understand that a generator does not actually 'create' electrical energy. Instead, it uses the mechanical energy supplied to it to force the movement of electric charges present in the wire of its windings through an external electric circuit.

This movement creates a voltage difference between the two ends of the wire or electrical conductor, which in turn causes the electric charges to flow, thus generating electric current.

Figure 4: Wakasa GAS Generator

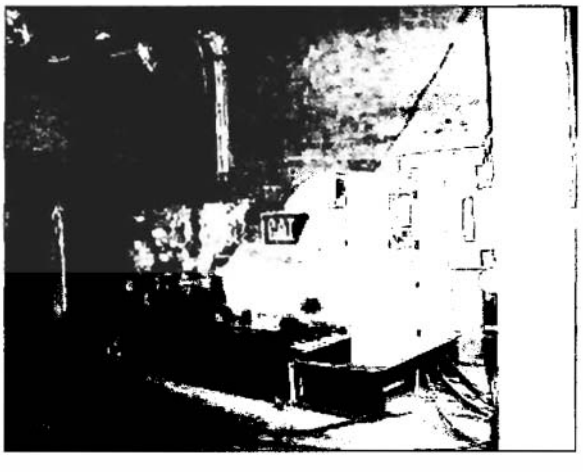

Figure 5: Cater Pillar Gas Generator

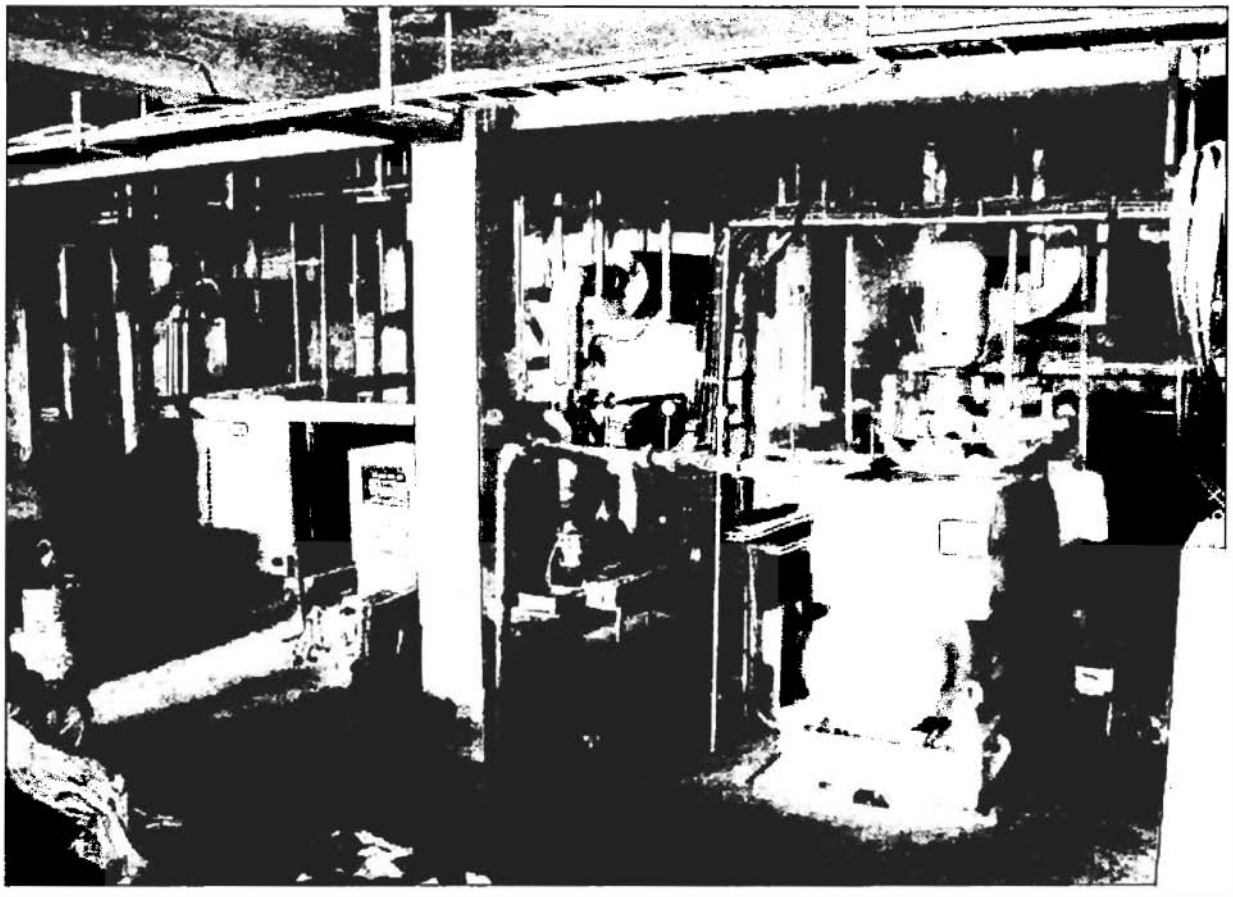

Figure 6: Generators

In Figure 6, we can see there are 4 set of generator. Here some generators are connected with pipes, those generators need GAS as fuel .So those pipes are the gas line. And there is also a meter which is measuring the GAS pressure. Basically GAS generator needs a fixed rated gas pressure to run. So it is very important check the meter frequently.

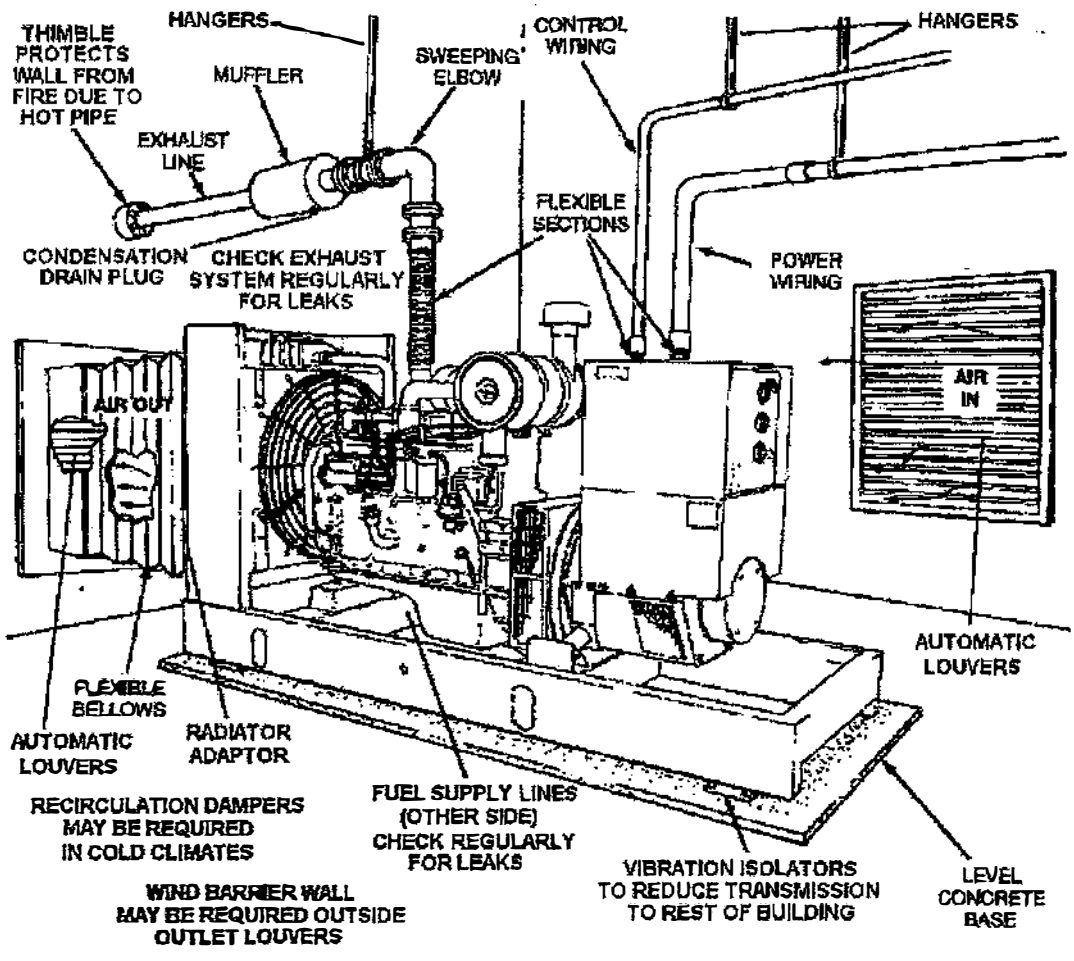

Figure 7: Indoor mounting of an industrial generator

Main components of a generator

the main components of an electric generator can be broadly classified as follows (refer to illustration above):

(1) Engine
(2) Alternator
(3) Fuel System
(4) Voltage Regulator
(5) Cooling and Exhaust Systems
(6) Lubrication System
(7) Battery Charger
(8) Control Panel
(9) Main Assembly / Frame

2.5. Relay

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and most have double throw (changeover) switch contacts.

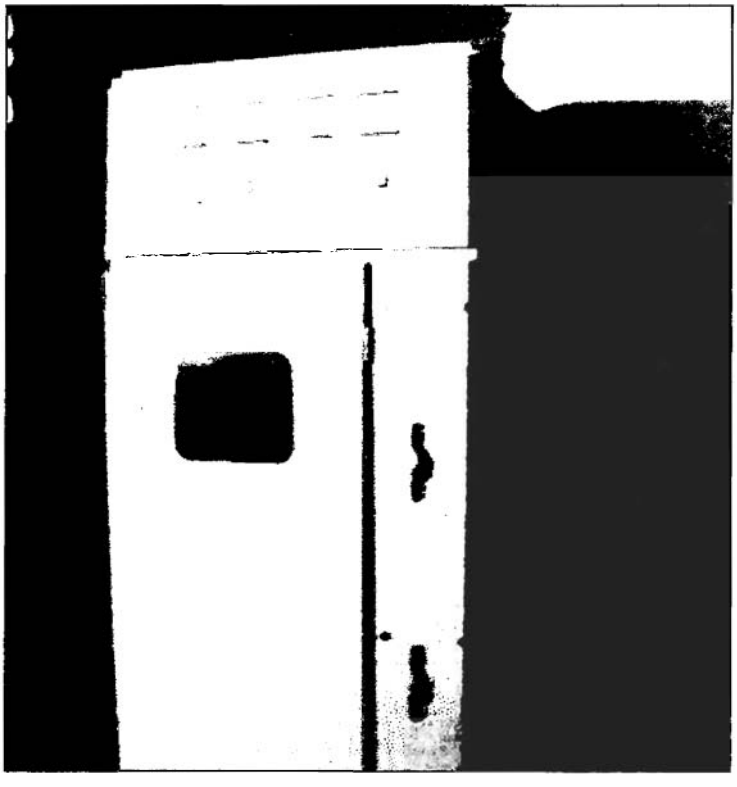

Figure 8: Relay

For protection of electrical apparatus and transmission lines, electromechanical relays with accurate operating characteristics were used to detect *overload*, *short-circuits*, and *other faults*. While many such relays remain in use, digital devices now provide equivalent protective functions.

In electrical engineering, a protective relay is a complex electromechanical apparatus, often with more than one coil, designed to calculate operating conditions on an electrical circuit and trip circuit breakers when a fault is detected. Unlike switching type relays with fixed and usually ill-defined

operating voltage thresholds and operating times, protective relays have well-established, selectable, time/current (or other operating parameter) curves. Protection relays respond to such conditions as over-current, overvoltage, reverse power flow, over- and under- frequency. An important transmission line or generator unit will have cubicles dedicated to protection, with many individual electromechanical devices.

2.6. PLC

A Programmable Logic Controller, or PLC, is more or less a tiny computer with a built-in operating system (OS).

This OS is highly specialized to handle incoming events in real time. The PLC has input lines where sensors are connected to notify upon events and it has output lines to signal any reaction to the incoming events. The system is user programmable.

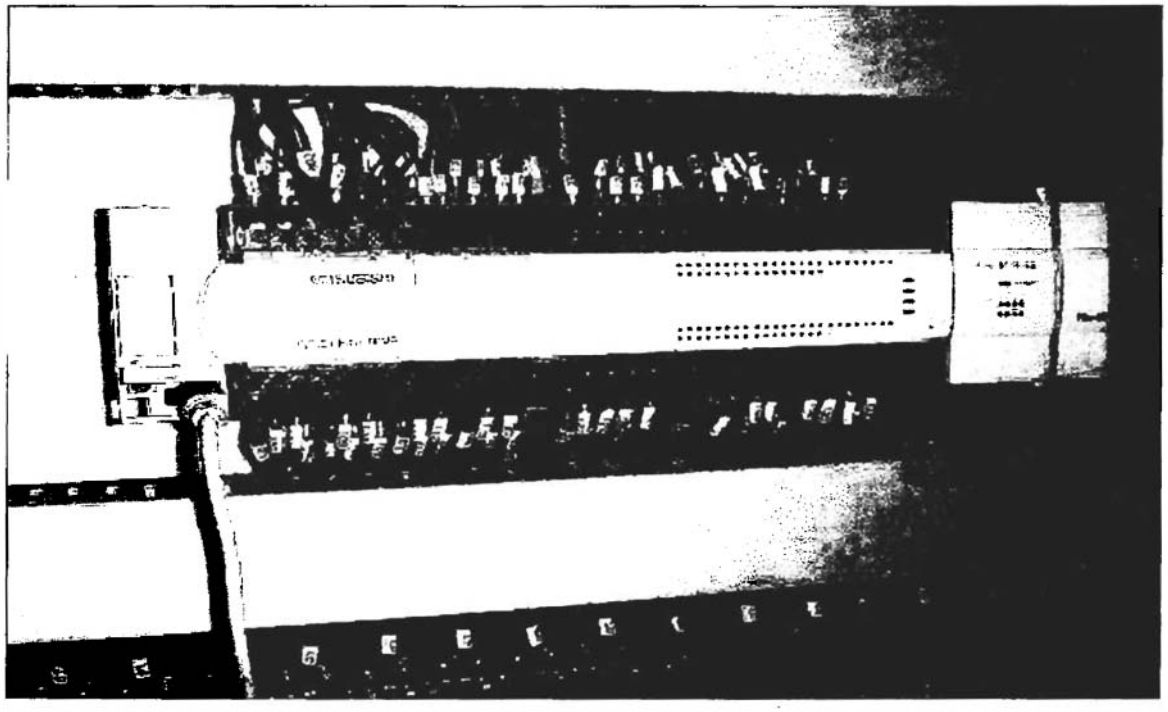

Figure 9: PLC

The functionality of the PLC has evolved over the years to include sequential relay control, motion control, process control, distributed control systems and networking. The data handling, storage, processing power and communication capabilities of some modern PLCs are approximately equivalent to desktop computers. So basically all updated machine will must have PLC.

Here are just a few examples of plc programming applications that have been successfully completed and are in use today.

- **Manufacturing Industry**
  - Lead acid battery plant, complete manufacturing system
  - Extruder factory, silo feeding control system
- **Travel Industry**
  - Escalator operation, monitored safety control system
  - Lift operation, monitored safety control system
- **Aerospace**
  - Water tank quenching system
- **Printing Industry**
  - Offset web press print register control system
  - Multi stage screen washing system
- **Food Industry**
  - Filling machine control system
  - Main factory feed water pump duty changeover system
- **Textile Industry**
  - Industrial batch washing machine control system
  - Closed loop textile shrinkage system
- **Hospitals**
  - Coal fired boiler fan change-over system
- **Film Industry**
  - Servo axis controlled camera positioning system

- **Corrugating**
  - Main corrugators machine control system
  - BOBST platen press drive and control system
- **Plastics Industry**
  - Extruder factory, silo feeding control system
  - Injection molding control system
- **Agriculture**
  - Glasshouse heating, ventilation & watering system
- **Foundry**
  - Overhead transportation system from casting process to shot blasting machine
- **Leisure**
  - Roller coaster ride and effects control system
  - Greyhound track 'Rabbit' drive system

2.7. PFI

Low voltage automatic power factor adjusting capacitor set is used to improve the power factor of electric power system main circuit and branch circuits to avoid non power electric power caused by electric power system. The whole automatic power factor improving capacitor device includes MKP type capacitor unit, the main structure is capacitor electromagnet contactor (or compound switch) and mini breaker. This makes the maintenance very easy. The capacitor unit can be extending under allowing current of the cable or copper line.

For large capacity capacitor set equipment (above 300KVAR), the equipment can be divided into several cabinets but use same automatic power factor regulator. Every cabinet has its protection system. The low voltage automatic power factor regulating capacitor set

equipment can design for 3-phase compensation or the combination of common compensation and separate compensation

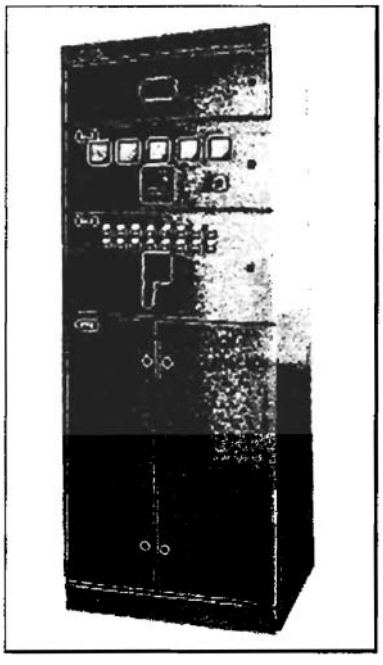

Figure 10: Power Factor Improver

2.8. Simple Vertical Boiler

A **boiler** or **steam generator** is a device used to create steam by applying heat energy to water. Although the definitions are somewhat flexible, it can be said that older steam generators were commonly termed *boilers* and worked at low to medium pressure.

In this industry I have seen the use of Simple vertical Boiler.

Figure 11: Simple Vertical Boiler

Figure 12: Simple Vertical Boiler

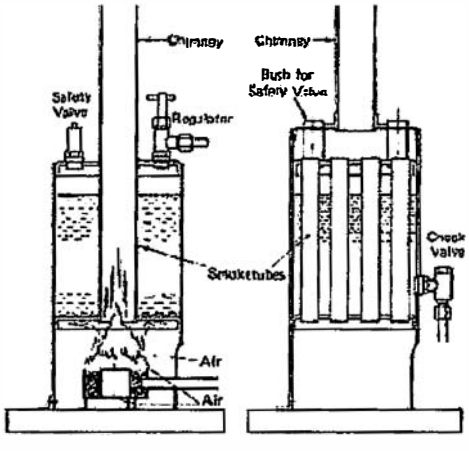

Figure 13: Two types of Vertical Boiler

The vertical boiler is a simple type which consists of a firebox at the bottom and a copper barrel with a smoke tube. It typically is used to drive stationary engines and boats. Firing is accomplished by alcohol or solid fuel pellets. More sophisticated versions of the vertical boiler contain many small tubes and are sometimes fired by coal or charcoal.

In this factory basically this type of boiler is used in printing machine to dry color.

2.9. Cooling Tower

A cooling tower is a heat rejection device, which extracts waste heat to the atmosphere though the cooling of a water stream to a lower temperature. The type of heat rejection in a cooling tower is termed "evaporative" in that it allows a small portion of the water being cooled to evaporate into a moving air stream to provide significant cooling to the rest of that water stream. The heat from the water stream transferred to the air stream raises the air's temperature and its relative humidity to 100%, and this air is discharged to the atmosphere. Evaporative heat rejection devices such as cooling towers are commonly used to provide significantly lower water temperatures than achievable with "air cooled" or "dry" heat rejection devices, like the radiator in a car, thereby achieving more cost-effective and energy efficient operation of systems in need of cooling.

Figure 14: Cooling Tower

Common applications for cooling towers are providing cooled water for air-conditioning, manufacturing and electric power generation. The smallest cooling towers are designed to handle water streams of only a few gallons of water per minute supplied in small pipes like those might see in a residence, while the largest cool hundreds of thousands of gallons per minute supplied in pipes as much as 15 feet (about 5 meters) in diameter on a large power plant.

2.10. Chiller

Industrial chillers typically come as complete, packaged, closed-loop systems, including the chiller unit, condenser, and pump station with recirculation pump, expansion valve, no-flow shutdown, internal cold water tank, and temperature control. The internal tank helps maintain cold water temperature and prevents temperature spikes from occurring.

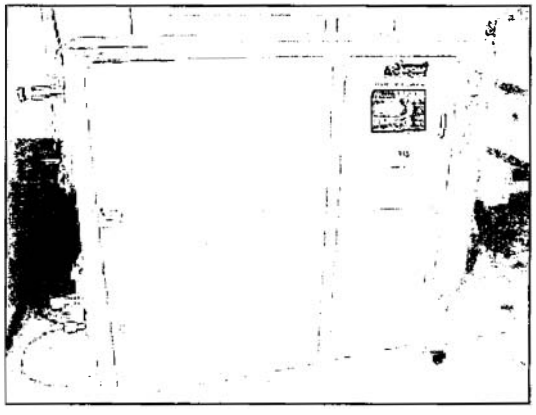

Figure 15: Chiller (a)

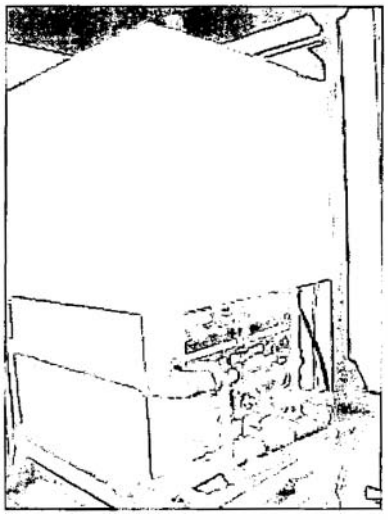

Figure 16: Chiller (b)

There are various types of chillers which vary on use.

2.11. Inverter

An **inverter** is an electrical device that converts direct current (DC) to alternating current (AC); the converted AC can be at any required voltage and frequency with the use of appropriate transformers, switching, and control circuits.

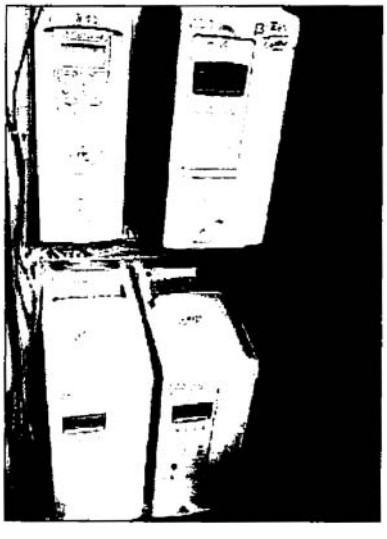

Figure 17: Set of inverter

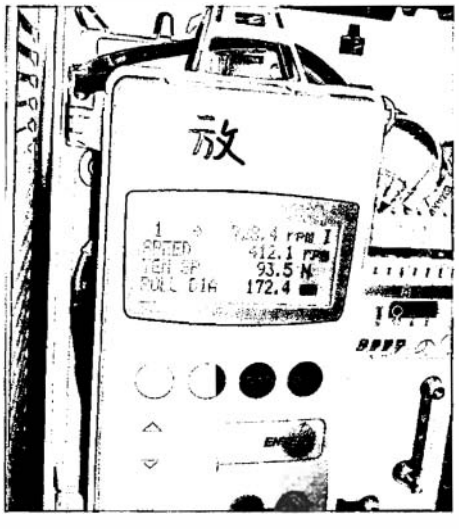

Figure 18: Monitor of the inverter

From the theory we have only learnt that inverter converts DC to AC current. But in this factory I have seen different use of inverter. Every machine has inverter to control the speed of motors and rollers. Basically manufactures company set those inverters on customer's requirement.

Figure 19: Inverters

2.12. Servo Driver

A **servo drive** is a special electronic amplifier used to power electric servo motors. It monitors feedback signals from the motor and continually adjusts for deviation from expected behavior.

A servo drive receives a command signal from a control system, amplifies the signal, and transmits electric current to a servo motor in order to produce motion proportional to the command signal. Typically the command signal represents a desired velocity, but can also represent a desired torque or position. A velocity sensor attached to the servo motor reports the motor's actual velocity back to the servo drive. The servo drive then compares the actual motor velocity with the commanded motor velocity. It then alters the voltage frequency to the motor so as to correct for any error in the velocity.

Figure 20: Servo Driver

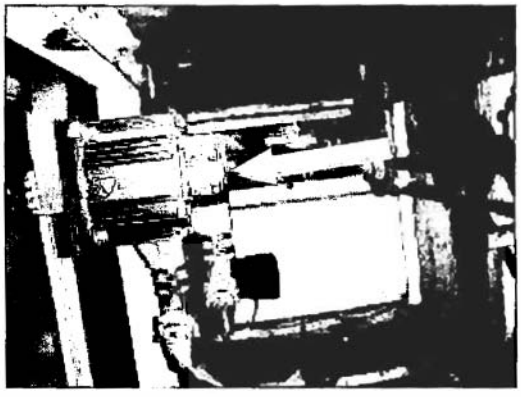

Figure 21: Servo motor

2.13. Diffusion Pump

The most common type of pump for use in high vacuum applications is the diffusion pump (or, more properly, vapor jet pump). Vacuum diffusion pumps are one of the oldest and most reliable ways of creating a vacuum down to 10-10 Torr, or even lower, at 25° C.

A vacuum diffusion pump is basically a stainless steel chamber containing vertically stacked cone-shaped jet assemblies. At the base of the chamber is a pool of a specialized type of oil having a low vapor pressure. The oil is heated to boiling by an electric heater beneath the floor of the chamber. The vaporized oil moves upward and is expelled through the jets in the various assemblies. Water circulated through coils on the outside of the chamber cool the chamber to prevent thermal runaway and permit operation over long periods of time.

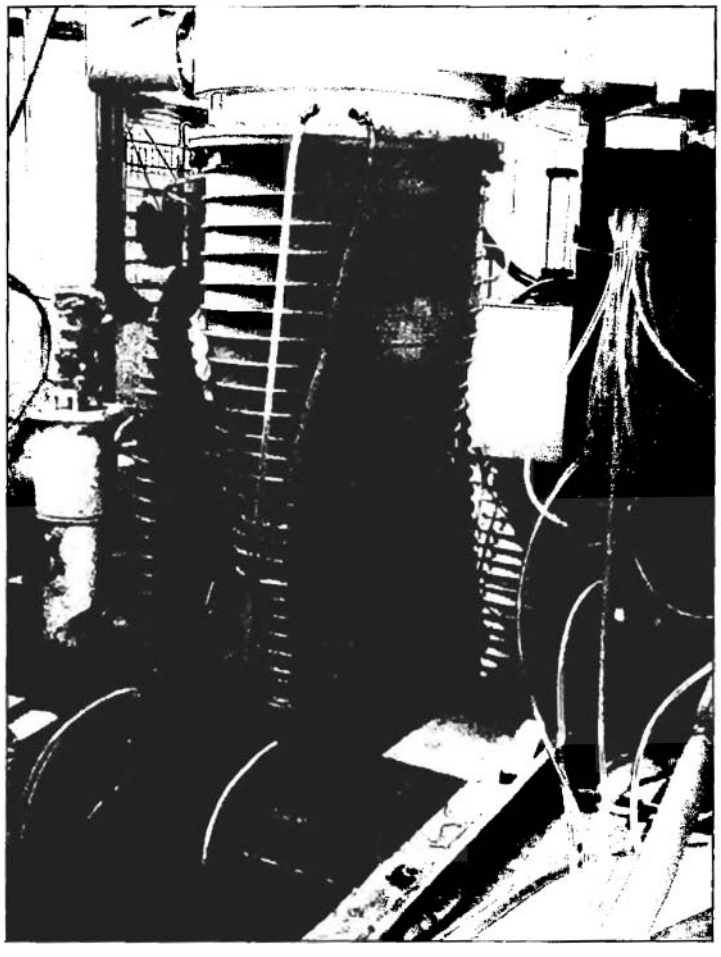

Figure 22: Diffusion Pump

2.14. Voltage stabilizer

Voltage Stabilizer is the Automatic Voltage regulator. It regulates the output power. It produces the output 230 V ± 1% (Variable 5%) **OR** 415 ± 1% (Variable 5%) **OR** as per customer demand for appliance.

Voltage stabilizers are an effective solution to voltage fluctuation problems. They are designed to current a wide range of Input Fluctuations to maintain specified output voltage. The output voltage waveform is completely distortion free and the regulation is unaffected by the load power factor.

Voltage stabilizer should have the high voltage protection. If the Input is going beyond the limit and Output is going beyond the limit in worst cases the stabilizer should sense Input and Output condition and cutoff the output supply of the stabilizer. So In this way stabilizer protects the connected appliances.

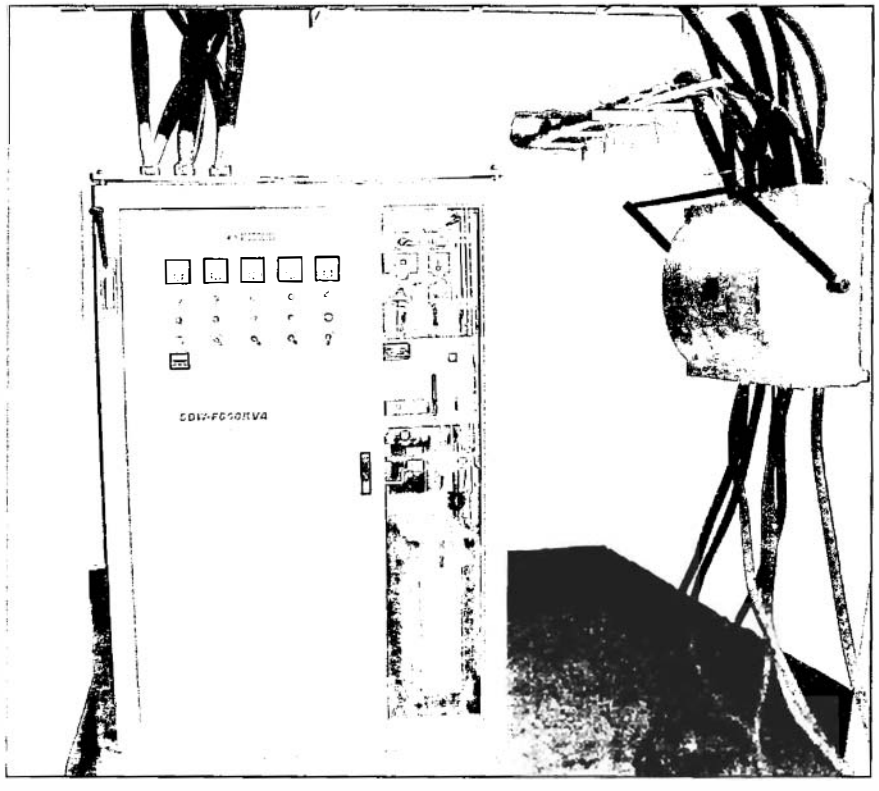

Figure 23: Voltage Stabilizer

2.15. Others:

Here I have also got some idea about current distribution. This factory has in total 7 generators and factory is separated to different building. So there I saw so many change over which are used to connect with different control panel board.

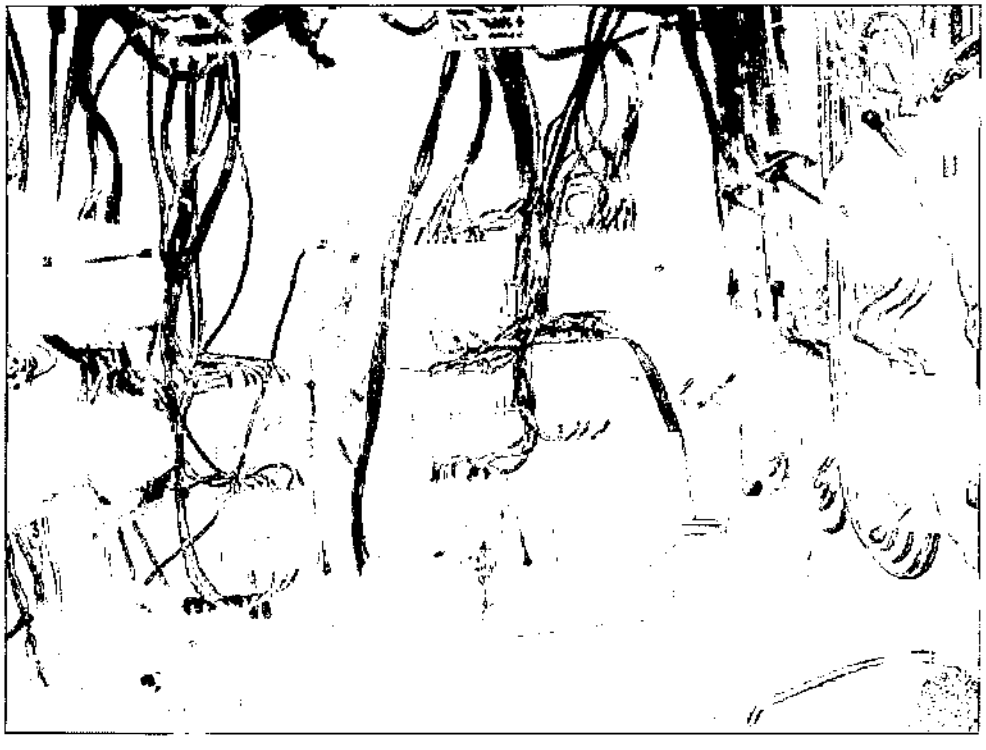

Figure 24: Room of line distribution

3. PROBLEMS AND RECOMMENDATIONS

3.1. Problems

Bangladesh is a developing country. Our current needs are very high but production is very low only because of our economic situation and lack of fuels. Besides this problem we also face some mechanical problems also.

Besides having economic problem, we also have shortage of man power. Still there are so many mechanical sectors which we cannot solve without help of foreign engineers. So we will have to develop our own skills more. We can get good theoretical support from our academic institute but we do not get the practical support from any institution. So for this intern I have got that opportunity to improve my practical skill.

3.2. Recommendations

Electricity is the driving force of modern civilization as well as the backbone of all development activities of the country as a whole. But the present generation capacity of the country is not sufficient enough to meet the prevailing load demand of the country and causes hindrance to the development activities in industrial, commercial, agricultural and social sectors.

I have so many new thing from the intern .So I felt still our industries have shortage of man power. For any small and big problem we depend on foreign engineers. So our government and Industrialist both should train our people though we do not need to depend on others.

4. CONCLUSION

In this report I have mainly focused on some equipment which is commonly used in all industry. We should know about these equipments because we have learnt it from book but we did not know exactly where it uses. Here I have tried to gather practical knowledge about this equipment and some important process what we have learned from theory. We have learned approximately all about transformer, switchgear, Boiler, Generator, PFI and so many things. I have tried to write all about in this report .Thanks all of our honorable teacher and Mahtab Flexible Printing Press team, employee and worker who helped me to complete our internship successfully and give me some new way to think about Electrical and Electronic Engineering .Basically It gives me new interest to know and learn more and more about electrical and electronic devices.

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