

INTERNSHIP REPORT
STUDY ON POWER STATION
AT

Bengal Hurricane Dyeing & Printing (Pvt.) Ltd.

B.K Bari, Mirzapur, Gazipur, Dhaka



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DEPT. OF ELECTRICAL & ELECTRONIC ENGINEERING

APPROVAL

This report entitled 'Internship Report' at **Daffodil International University, A. Y. 2019** prepared and submitted by **Md. Asaduzzaman & Md. IftekharAhammed** in partial fulfilment of the requirement for the degree of Electrical & Electronic Eng. has been examined and hereby recommended for approval and acceptance.

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Declaration

We declare that we complete the report under **Md. SohelRana**, Lecturer Department of **Electrical and Electronic Engineering**, Daffodil International University. Also said that is this “Internship Report” has neither have been used before to fulfill of the related purpose nor it will be submitted to any other person or authority in future.

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Acceptance Application



Bengal Hurricane Dyeing & Printing (Pvt.) Ltd.

Head Office: 122/A, Tejgaon I/A, Dhaka-1208
Phone : 01711-802026 Fax : 88 02 8851540, e-mail : infobhdp@nhk-ast.com
Factory : Taltoli (Near Monipur Bazar), B. K. Bari, P.O. Mirzapur, Gazipur, Bangladesh.

January 05, 2019

To,
Prof Dr. Md. Shahid Ullah
Head
Department of EEE
Daffodil International University

Sub: **Acceptance of Internship proposal.**

Dear Sir,

We are glad to accept internship of below mentioned student for the period of 02 (two) months as proposed by you vide letter dated December 9, 2018.

Sl	Name of Student	Student ID
01	Md. Asaduzzaman	152-33-193
02	Md. Iftekhar Ahammed	152-33-212

Please advise the intern student to report us for starting their program with effect from January 10, 2019.

Best regards,


Nasirul Gani
Manager (HAC)
Human Resource Department
Bengal Hurricane Dyeing & Printing (Pvt.) Ltd.



Certificate of Internship



Bengal Hurricane Dyeing & Printing (Pvt.) Ltd.

Corporate Office : 122/A, Tejgaon Industrial Area, Dhaka-1208, Bangladesh.
Phone : 88-02-8870455, 8870456, 8870459, Fax : 88-02-8870458, E-mail : Infobhdp@nhk-ast.com
Factory : Taltoli (Near Manipur Bazar), B.K. Bari, P.O. Mirzapur, Gazipur, Bangladesh.

Date: May 09, 2019

To whom it may concern

This is to certify that Md. Asaduzzaman, S/O- Md. Atuar Rahman & Parvin Akhter, ID No: 152-33-193 B.Sc in Electrical & Electronic Engineering From 'Daffodil International University (DIU), Dhaka, Bangladesh. has successfully completed 02 (Two) months (From 10th January, 2019 to 09th March, 2019) long internship programme at this Bengal Hurricane Dyeing & Printing (Pvt.) Ltd. His internship subject Study on Power station during the period of his internship programme with us he was found punctual, hardworking and inquisitive.

We wish him every success in life.


.....
Nasirul Gani
Manager (HAC)





Bengal Hurricane Dyeing & Printing (Pvt.) Ltd.

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Date: May 09, 2019

To whom it may concern

This is to certify that Md. Iftekhkar Ahammed, S/O- Md. Kayum Mollah & Ms. Afroza Khatun, ID No: 152-33-212 B.Sc in Electrical & Electronic Engineering From 'Daffodil International University (DIU)', Dhaka, Bangladesh. has successfully completed 02 (Two) months (From 10th January, 2019 to 09th March, 2019) long internship programme at this Bengal Hurricane Dyeing & Printing (Pvt.) Ltd. His internship subject Study on Power station during the period of his internship programme with us he was found punctual, hardworking and inquisitive.

We wish him every success in life.

Nasirul Gani
Manager (HAC)



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First of all we express our gratitude to supreme Allah for Blessings, approval, protection, mental power and wisdom in all aspects of your life. The applauses to Allah to complete this internship report.

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Our special thanks to **Md. Jalil Mollah** SR. Executive of Electrical Maintenance, **Rupak Karmoker** Executive Officer (Dyeing Unit) and other Electrical Maintenance Officers for their important cooperation with us.

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ABSTRACT

We did our internship at **Bengal Hurricane Dyeing & Printing (BHDP) Pvt. Ltd.** located on the BK Bari ,Mirzapur, Gazipur from 10th of January 2019 to 10th of March 2019 (weakly 4 days) and this internship report is the result of those 45 days attachment with the BHDP. Bengal Hurricane Dyeing & Printing (Pvt.) Ltd. is a Bangladesh-Denmark joint venture company.

This paper is based on our intern work in Bengal Hurricane Dyeing & Printing (Pvt.) Ltd. There are three basic part in power system, these are power generation, power transmission and power distribution. Bengal Hurricane Group of company is a big Textile Company and they Generate power for running there machineries operation by self-ward Power Plant. We were make known to with different hardware of Power Plant, for example, Generator, Relay, Circuit Breaker, Transformer, Boiler, Bus-bar, Magnetic Contractor, Timer and so on. We worked at BHDP as understudy for 45 days. At Fast our administrator conversed with us about the hypothesis behind our day movement. At that point we visited the Factory Power Station to relate hypothesis with useful usage. Here we found out about some fundamental significant gadget association for all intents and purposes, Such as Series Circuit association, Magnetic Contractor association, Relay switch association, Circuit Beaker association, Timer Connection. This report contains a detail portrayal about these gear.

Chapter 1: INTRODUCTION

We completed our internship at Bengal Hurricane dyeing & Printing (Pvt.) Limited (BHDP). In BHDP we work forty five (45) Days. This report is on forty five days activity.

The factory has one Gas Generator rated 1125kVA which is using as normal power source. The generator is protected and controlled by the generator control panel. The factory has one Diesel Generator set rated 250kVA which is using dedicatedly for fire pump ((dedicated for fire hydrant system) and the factory is also using a 440V line of REB sanctioned load is 10kW which uses normally when the factory remained close. Power is distributed through 1 LT Panel, 2 Main Distribution Boards, and 13 Distribution Boards and 12 Sub-Distribution Boards respectively. PFI panel rated of 200kVAR has been provided for improving the power factor of Gas Generator. Bengal hurricane Dyeing and Printing is the famous and successful textile company. They have 15 dyeing machine, 7 Sample dyeing machine, 3 slitting machine, 2 Ferraro Compactor, 2 Stantar , and one Big Canlar Dryer machine. All of these machines are running by the source of electricity generation and protection in Bengal hurricane group.

The factory has no substation. They are using two gas generator as normal power source and a diesel generator as emergency power source. They have taken a grid connection from pole mounted transformer of REB, sanctioned load is 10 kW.

The course of our internship the Power Station generation and Switchgear Protection covers almost everything related to protection system in power system.

Electricity is a vital element of any country. Without suitable electricity no country cannot accomplish Economic prosperity. Now 77.9% of Bangladeshi population has access to electricity. To increase the GDP growth rate available and reasonable priced electricity is prerequisite.

1.1 Company Profile

Bengal Hurricane Dyeing & Printing (Pvt.) Ltd. Is a 100% export knit vertical integrated company. The factory situated at BK Bari, Mirzapur, Gazipur, Bangladesh. The factory has started its operation from 1999. The corporate office and factory building at present address.

Bengal Hurricane Dyeing & Printing (Pvt.) Ltd. is a Bangladesh-Denmark joint venture company. The main purpose of the company is to produce world class knit dyed fabrics for the export concerned with garments factories in Bangladesh. The Dyeing capability of the company is 15 (Fifteen) tons per day. World class branded instruments have been installed for manufacture, to dye and finish a various range of fabrics including Single Jersey, Interlock, Pique Polo and Rib. In addition, we are able to dye more refined fabrics such as Viscose /Lycra, Nylon /Lycra, 100% Polyester, and offer enzyme washing. There Dyes /chemicals are of European origin including, Dyester, Bezema and Ciba from Switzerland. The factory has been awarded Oeko-Tex and BSCI Certificate for its quality products and Compliance

1.2 Objective of the Internship

In the classroom we have just accumulated the hypothetical learning about various themes, however in the temporary job we assembled the handy information about those points. To satisfy the necessity and assimilated some down to earth information we incline toward temporary job. We accumulated the information about after points.

- Understanding company management.
- Understanding industrial environment.
- Gaining practical information about power station in BHDP
- Acquiring practical knowledge about switchgear protection.
- Idea about safety

1.3 Brief History of the Power Section in BHDP

Around then power age and conveyance of this piece of the nation were in the hands of some privately owned businesses. Bengal Hurricane Group is one of them, a self-ward Power Generation Company. The power supply from REB to industrial main substation, 03 Generator and 13 MDB Board, 13 DB Board and 12 SDB Board was inside the Production, Knitting, Dyeing, Printing, Finishing and Quality limitedly. Just special case was Bengal Hurricane Dyeing and Printing ltd. where control used to be provided by Two 900 KW Gas generator, Pick hours 2 generators are 900 KW (1125 KVA), 88 KW generators. Age Next Power Station endowed with duty of intensity age, transmission and appropriation of power through the Company introduced electric producing limit with 02 (two) Gas generator and One Diesel Generator.



Figure: 1.1 FG-Wilson P110E



Figure: 1.2 Gas Engine 1, Model: VHP5904-GSID



Figure: 1.3 Gas Engine 2, Model: VHP5904-LTDE

Monthly energy consumption
 Engine No.1 Model-VHP 5904 GSID
 Engine No.2 Model-VHP 5904LTDE
 Month of January 2019

Date	Generator -01 Energy Consumption MWh	Generator- 02 Energy consumption MWh
1	5.64	Not in Operations
2	15.16	"
3	12.19	"
4	Off day	"
5	20.30	"
6	12.01	"
7	11.85	"
8	11.78	"
9	11.80	"
10	16.25	"
11	Off day	"
12	17.32	"
13	12.16	"
14	12.33	"
15	12.18	"
16	12.84	"
17	12.26	"
18	Off day	"
19	22.41	"
20	13.45	"
21	12.91	"
22	12.79	"
23	12.84	"
24	12.73	"
25	Off day	"
26	23.89	"
27	13.26	"
28	13.88	"
29	13.13	"
30	12.81	"
31	10.30	"
Total energy consumption =	370.47 MWh	"

Table 1.1: Energy Consumption (January 2019)

Monthly energy consumption
 Engine No.1 model-VHP 5904 GSID
 Engine No.2 model-VHP 5904LTDE
 Month of February 2019

Date	Generator -01 Energy consumption MWh	Generator -02 Energy consumption MWh
1	Off	Not in Operations
2	12.45	"
3	12.59	"
4	12.64	"
5	12.76	"
6	13	"
7	13.06	"
8	Off	"
9	25.03	"
10	13.17	"
11	13.17	"
12	12.2	"
13	13	"
14	13.15	"
15	Off	"
16	24.55	"
17	16.21	"
18	13.33	"
19	13.17	"
20	12.3	"
21	Off	"
22	Off	"
23	7.15	"
24	12.4	"
25	12.81	"
26	12.94	"
27	12.67	"
28	12.96	"
29		"
Total energy consumption=	316.61 MWh	"

Table 1.2: Energy Consumption (February 2019)

1.4 Outline of the Internship:

The framework of the entry level position is as per the following:

Part 1: Introduction of Bengal Hurricane Dyeing and Printing (Pvt.) Ltd., BHDP Company profile, Brief Story Of intensity Sector in BHDP, Then the goal of the temporary position, framework of the entry level position

Part 2: Power distribution system of BHDP, Single line diagram of these industry (layout of substation), Grounding system, Station Operation Mode, Power factor control, Emergency backup generating station.

Part 3: General Description of Generator, Typical Rating Plate, Generator set Description, Outdoor Installation, Alternator main component, Synchronous machine construction, Generator operation, Design and Dimension, Cooling, Synchronization, Alternator maintenance, Protection relay, Engine, Maintenance & Safety of Engine.

Part 4: Substation in BHDP, Description of component and their operation, liquid immersed distribution transformer in BHDP, Vacuum Circuit breaker, Current transformer (CT), Potential Transformer (PT), Isolator, Bus Bar, Maintenance of Transformer, Protection of transformer

Part 5: Boiler, Boiler type and classification, Water tube boiler in Bengal Hurricane Dyeing & Printing (BHDP) Ltd., Major component of boiler, Operation of Water tube boiler, Preventing maintenance of water tube boiler.

Part 6: General, Emergency Stop Button, Personal Protective Equipment, General Hazard Information, Pressurized Air and Water, Disposal of Waste, Fire and Explosion, Fire Extinguisher, Chemical, Coolant, Oils, Electrical, Neutral-Earth Link, Electric Shock First Aid

Chapter 2. Power Plant Electrification

The principle target of a power plant is to create the power that way to change over the mechanical capacity to electrical power. In any case, it is increasingly essential to energize the entire power plant. That is the reason a structure is fundamental for the zap of the power plant. This framework is called power plant zap framework. We can in like manner get the full layout of the plant. We are discussing the experiences with respect to the framework.

2.1 Single Line Diagram of BHDP

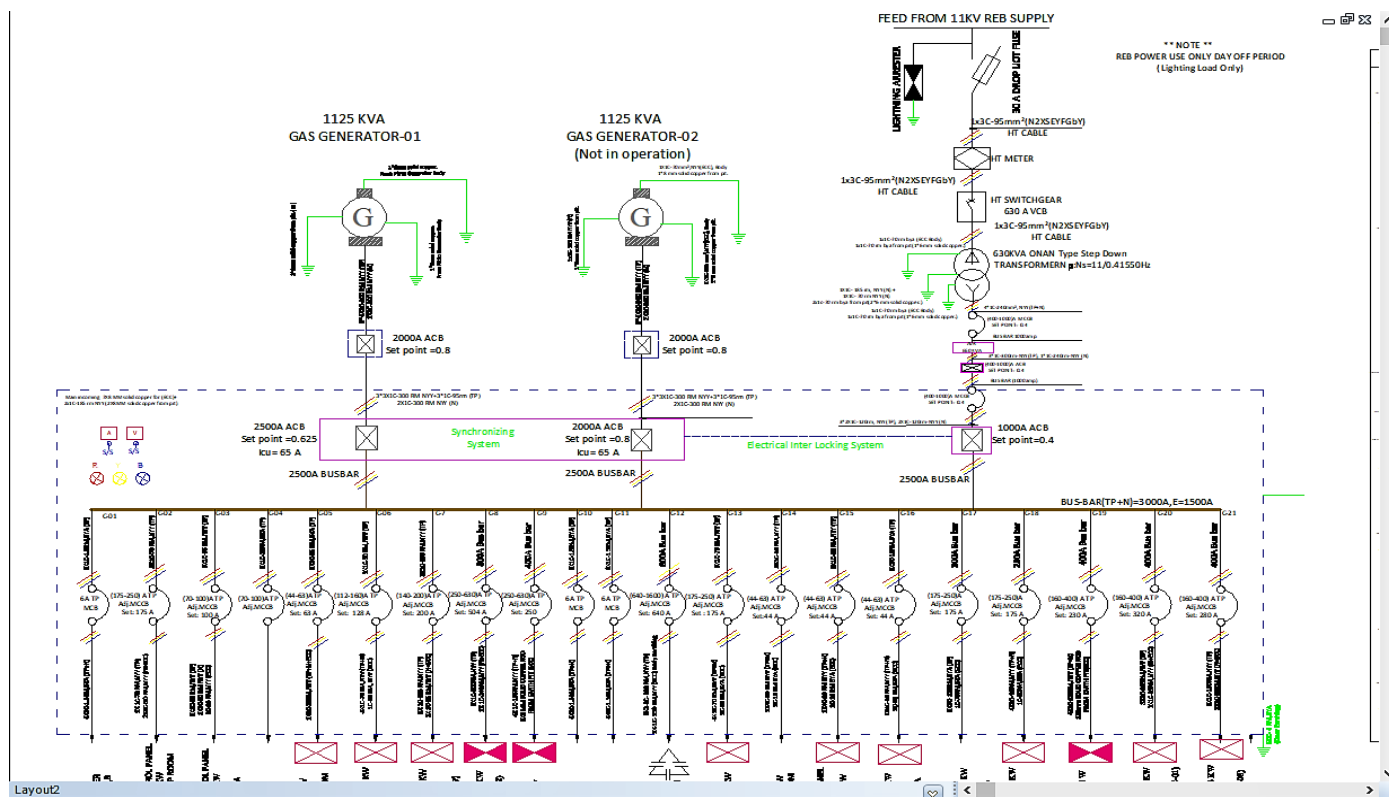
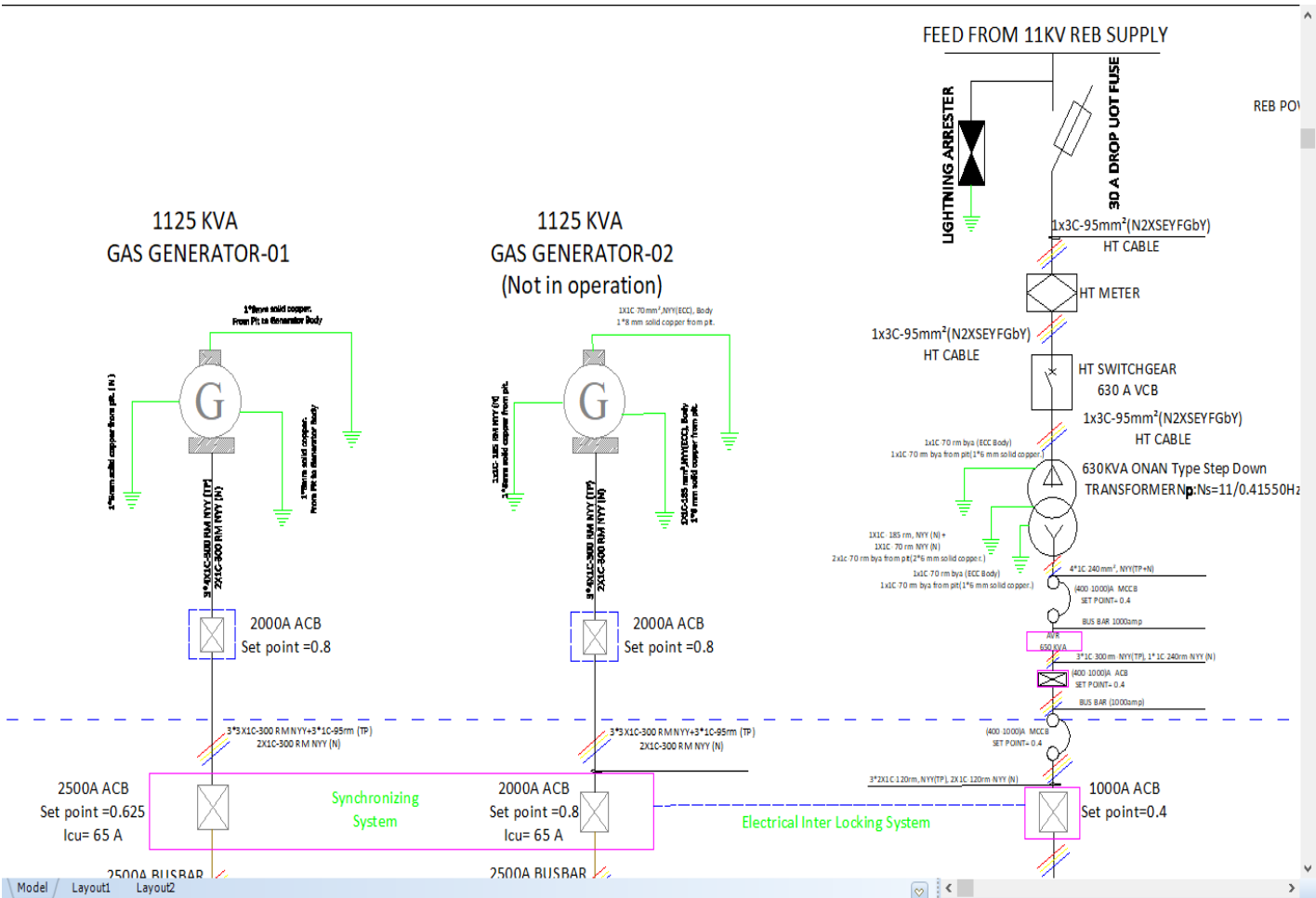
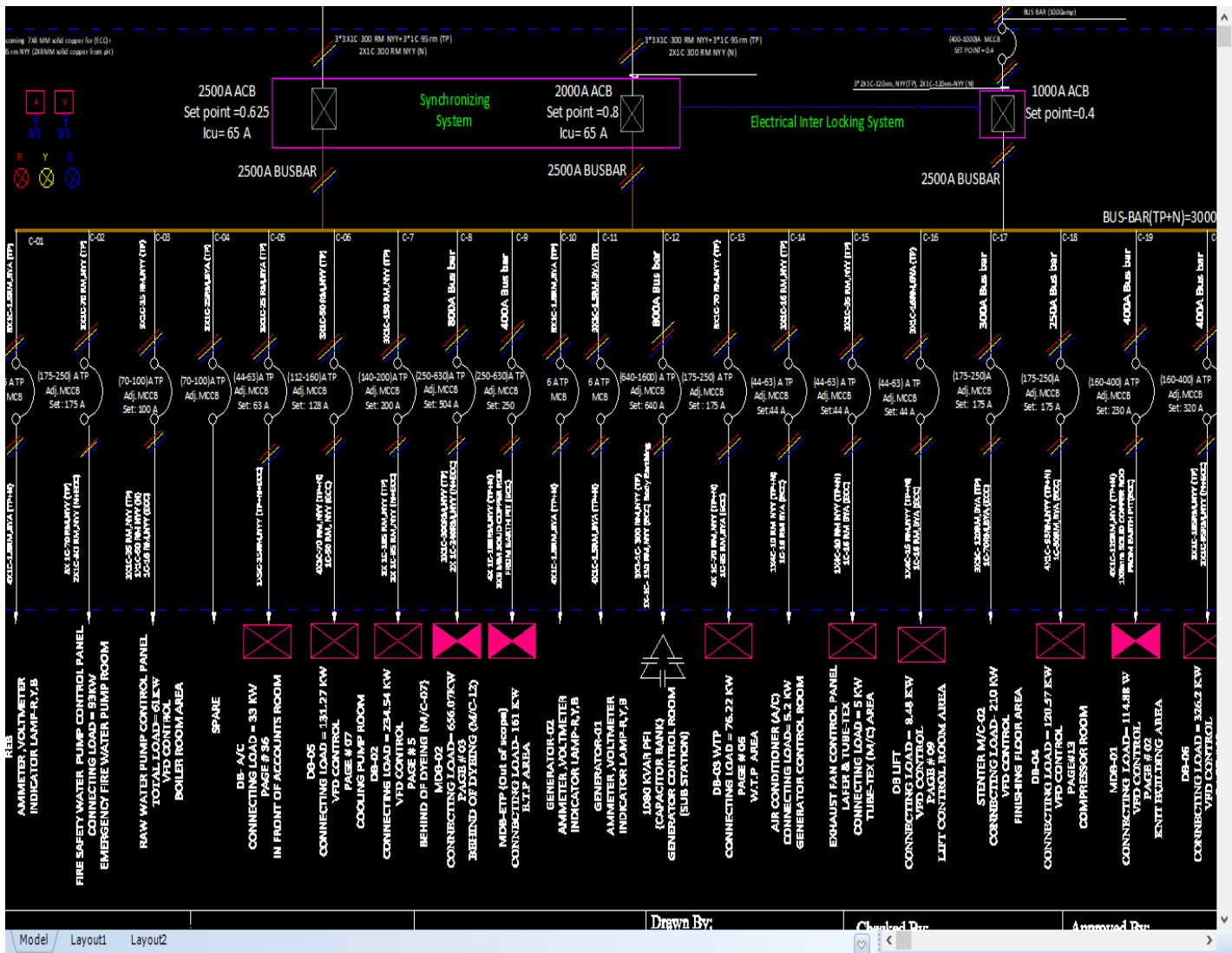


Fig: 2.1 Single Line Diagram Of BHDP





(Lower site)

2.2 Grounding

For protect the electrical system & device from any kind of internal fault or abnormalities grounding is the particular type of security system. Grounding is often used as a way of managing with flashbacks or separation

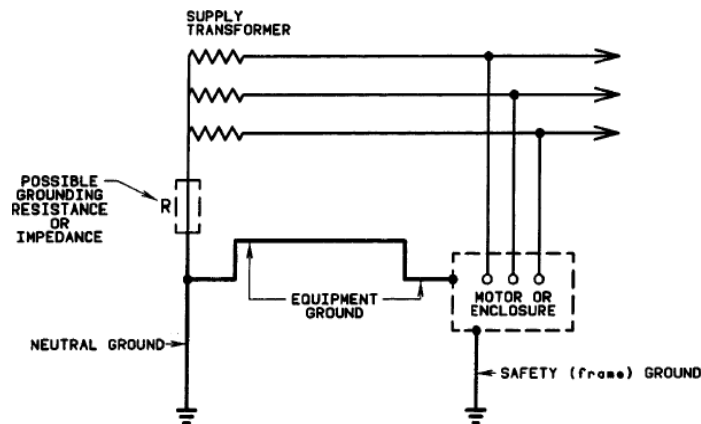


Figure 2.2: Grounding system

is often used as a way of managing with flashbacks or separation. Grounding is the common return path
Grounding are uses many type technique (sound, contact, smell, taste, and sight) to in a split second
interface individuals with the present time and place. For instance, tuning in to noisy music, clutching a
bit of ice, or gnawing into a lemon are for the most part establishing systems that produce.
impressions that are hard to overlook, in this manner straightforwardly and promptly interfacing you
with the ongoing minute. The establishing can be separated into three regions as for reason:

- a. Neutral Point
- b. Ground Safety Ground
- c. Equipment Ground

2.2.1 Neutral Point Ground

Nonpartisan point establishing is working in AC appropriation frameworks to confine the deficiency current which would spill out of the transformer or generator unbiased star point in case of an earth shortcoming in the frameworks. It is used when the fair-minded of supply transformer is available and its very own impedance isn't adequate to Compel inadequacy current.



Figure 2.3: NGR

For Grounding Neutral of Transformer or Generator, Resistors up-to 33 Kw are reachable for issue of brief length like 10 sec., 30 sec., 60 sec., relentless, etc. Material of resistor is normally Stainless Steel, Cast Iron, Copper Nickel .Temperature rise is generally 375 degree C/760 degree C or as required by customer. The object is to establish the ground reference of the framework. The unbiased ground generally made to the nonpartisan of gear like generators and transformers.

2.2.1 Safety Ground

This is made for shielding work force from damage. These associations are made to parts of the framework that are generally not stimulated but rather may end up under anomalous or deficiency circumstances.

2.3 Operation Mode

In Power Generation there are many type of generator are used. Diverse power plants utilize various kinds of Alternator permitting their needs. The determination of generator really relies upon the productivity, arrangement cost, support offices and numerous different causes. The operation mode is divide into three type:

1. Solo mode
2. Island parallel mode
3. Grid parallel mode

2.3.1 Solo mode

Just a single generator are used/work in these mode & generator capacity is depend on the demand of load. In these mode voltage and Frequency level is unfixed. There is not any sharing available in these mode, so that it is independent. Framework voltage is dictated by generators and their voltage control framework. Here the fundamental parameter is voltage and it is a steady framework. We utilize this mode in marine tenders, household exercises, a few enterprises and numerous different spots. In BHDP solo mode are used.

2.3.2 Island Parallel Mode

Here more than one generator are sharing typical burden anyway it isn't parallel with network. The limit of generator is autonomous yet the voltage and recurrence mark is stable. That implies among

the generator will be the same. Here in like manner the system voltage is steady by generators and their voltage control structure. In BHDP is also used Island parallel mode sometime.

2.3.3 Grid Parallel Mode

Here more than one generator is parallel with lattice in these mode. The point of confinement of generator is self-directing yet the voltage and recurrence level rely on the matrix. That infers it parallel with matrix. The structure voltage is constrained by the grid.

2.4 Switchgear

Switchgear Basic term is, used in link with the electrical power system, refers to the combination of electrical disconnects, fuse or Circuit breaker used to separate electrical apparatus. Switchgear is utilized mutually to de-empower gear to agree to work to be done and to clear blames downstream.





Figure 2.4: Switchgear of Substation

Commonly switchgear in substations is situated on both the high voltage and the low voltage side of vast power transformers. In the circulation type substation switchgear situated in low voltage side of transformer, now in a Power Distribution center are regularly situated that.

2.4.1 Function of Switchgear

One of the essential elements of switchgear is protection, which is break of short circuit and over-load issue flows while keeping up maintaining to unaffected circuits. Switchgear additionally gives isolation of circuits from power supplies. Switchgear also is used to develop system availability by allowing more than one source to feed a load.

2.5 Power Factor Control

In every power plant Power factor control is very important factor. At Power factor 0.8 the power grid company consumes power to the power station. Only active power has to pay for consumer. In every industry used power factor improvement (PFI) plant for control power factor and they have try to keep the power factor is 0.95.

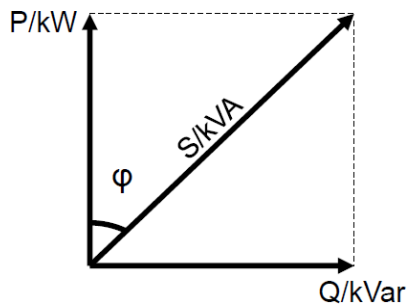


Figure 2.5: Power factor control

$S^2 = P^2 + Q^2$, where

- S = Apparent Power, kVA
- P = Active Power, kW
- Q = Reactive Power, kVar
- $\cos \phi = P/S$
- During normal operation we have to take care both:
 - active power
 - reactive power control

2.5.1 Power factor improvement plant (PFI)

Improving the Power Factor can maximize current-carrying capacity, improve voltage to device, reduce power losses, and lower electric bills. PF correction capacitors act as reactive current generators. They help balance the non-working power used by inductive loads, thereby improving the power factor.

There are three way that we are used for improving power factor.

1. Using capacitor banks in parallel with the system
2. Using an Synchronous condenser
3. Using phase advancers

In Bengal hurricane group Capacitor Banks system is used for Improving Power Factor

- **Capacitor Bank:** Improving PF means decreasing phase difference between voltage and current. Since common of loads are of inductive nature, they require some amount of reactive power for them to function. This reactive power is providing by the capacitor or bank of capacitors installed parallel to the load.



Figure 2.6: Power factor improvement panel



Fig 2.7: Capacitor bank PFI panel

2.6 Emergency generator

By using generator power plant create the power. All the charge is finished by its own generator. In back condition in view of any genuine sort of flaw happen, on the off chance that every one of the generators neglect to produce the power, at that point a substitute generator consequently begin to create a limited quantity of capacity to proceed with the power in the governor area and in office. These alternator is known as the Backup generator. In these plant it is arranged on the retrogressive side of the industry. In Bengal hurricane groups they have to used Diesel generator for backup generator

(fig: 2.13) and it is (110 kVA) 88 KW rated. It is started automatically and it is also control by a remote when the other electrical system become fault then it is used for backup.





Fig 2.8: Diesel generator for backup

In BHDP this generator also used for running emergency fire alarm, emergency light etc.

CHAPTER 3. GENERATOR AND ENGINE

Every generator has two part

1. Engine
2. Alternator

Elective current (air conditioning) generators are normally demonstrated to as synchronous generators or alternators. Every generator or motor works at synchronous speed, appealing field made by the field circle turns that at which the. Here an enunciation for the synchronous speed N_s in cycles each minute (rpm) as

$$N_s = 120f/p$$

Where f is the recurrence in hertz (Hz) and p is the quantity of posts in the machine. The stator part of a synchronous generator is phenomenally made as an armature, and the turning part (rotor) conveys the field twisting to give the vital flux.

3.1 General Description of Generator

This generator set has been structured as an entire bundle to give prevalent execution and unwavering quality. Every generator set is given a Rating Plate commonly appended to the generator lodging/board fenced in area. This name contains the data expected to distinguish the generator set and its working qualities. This data incorporates, yet isn't constrained to, the model and sequential numbers, yield attributes, for example, voltage, stage and recurrence, income rating in KVA and KW and rating type (premise of the rating). The model and sequential numbers remarkably distinguish the generator set. The Gas engine driving the generator set has been decided for its dependability and the manner in which that it has been unequivocally expected for filling generator sets. The motor is of the shake solid present day sort with 4 stroke weight start and is fitted with all partners to give a dependable power supply. The motor electrical structure is either 12 or 24 volts DC relying on the extent of the set. The motor cooling framework incorporates a radiator, a high most extreme pusher fan and an indoor controller. The fundamental AC

alternator has its own inner fan to cool the alternator parts. The yield electrical power is made by an alternator changed to the yield of this generator set. The engine and alternator are coupled together and mounted on an in-your-face steel base edge. The base packaging wires an organized or polyethylene fuel tank with the special case of the greatest sets.

3.2 Typical Rating Plate

The Rating of an electrical application shows the voltage at which the appliance is designed to work and the current consumption at that voltage. These figures are usually shown on a rating plate attached to the application.

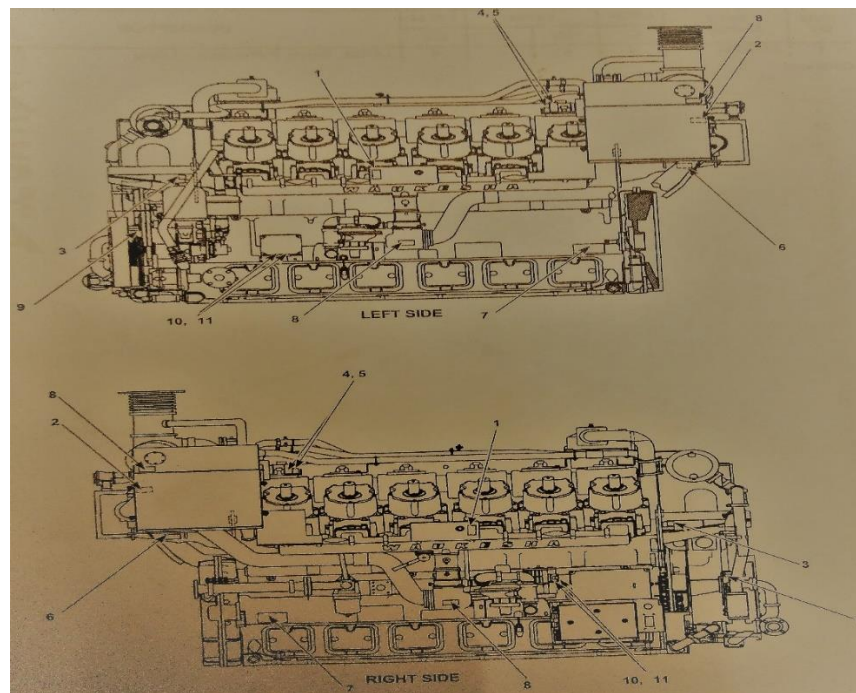


Figure 3.1: Engine overview diagram



Figure 3.2: Engine and Alternator normal rating plate

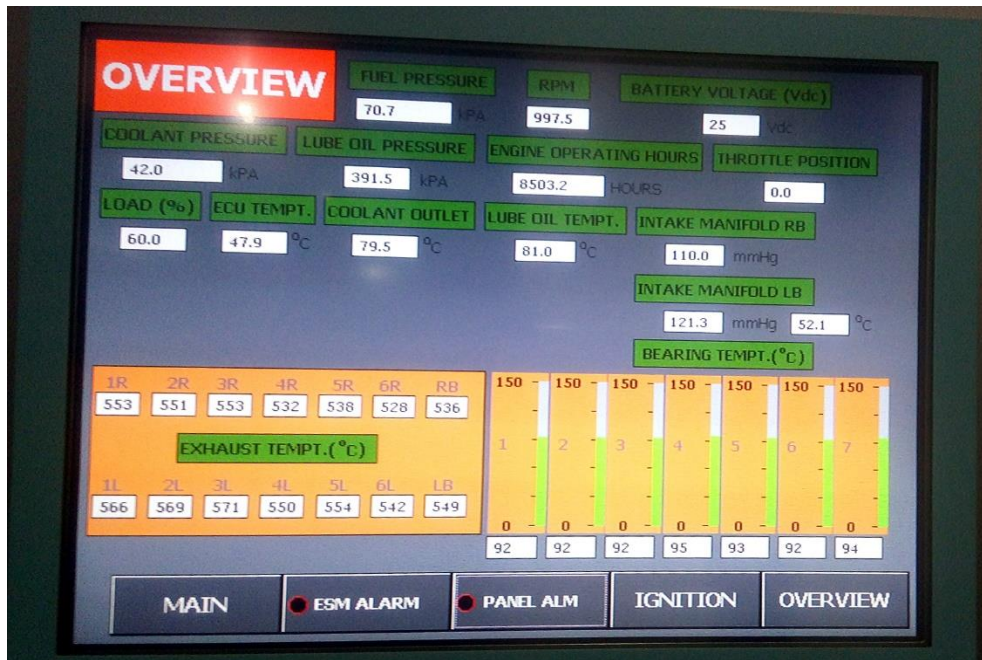


Figure 3.3: Engine overview, Ignition, Operating hour, Lube oil pressure, Oil temperature etc.

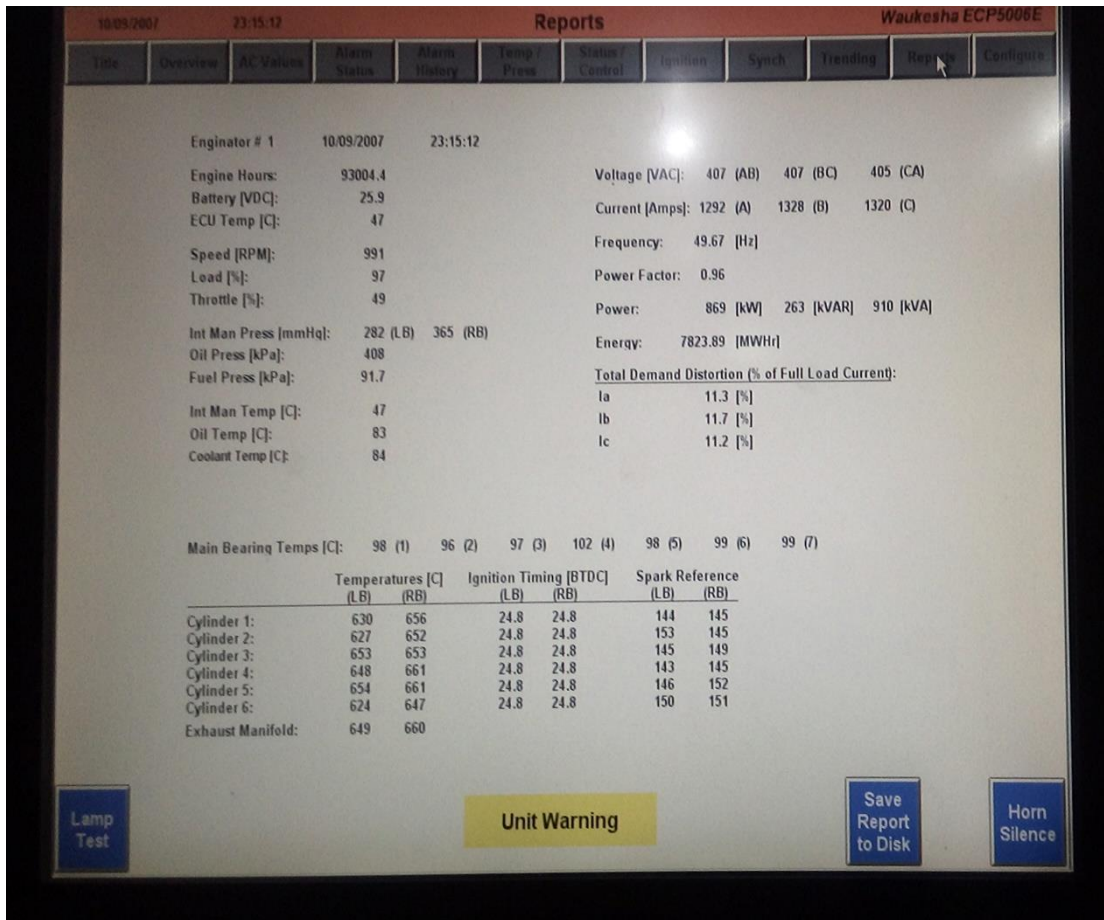


Figure 3.4: Report monitor, Voltage, Current, frequency, power factor, cylinder ignition timing, Temperature, Load, Speed etc.

3.3 Generator Set Specification

Through the main supplier of electricity to run the factory and office of Bengal hurricane dyeing & printing (BHDP) Pvt. Ltd. Is REB, but the electricity is insufficient and costly. That's why they has gas and diesel generators set.

Total electricity produce by gas and diesel generator – 1900 kW

Necessity of electricity to run the factory & office – 1250kW

Specification of generators are given below:-

Generator No. 1

Type of generator	Gas Generator
Brand name	WAUKESHA
Origin	United Kingdom
Model No.	VHP 5904 GSID
Capacity	900 KW
Volts	400 V
Phase	3-Phase
Power factor	0.8
Frequency	50 Hz
AMPS	1804 A
Governed speed	1200 rpm

Table 3.1: Specification of Generator No. 1

Generator No. 2

Type of generator	Gas Generator
Brand name	WAUKESHA
Origin	UK
Model No.	VHP 5904 LTDE
Capacity	900 KW
Volts	400 V
Phase	3-Phase
Power factor	0.8
Frequency	50 Hz
AMPS	1804/2020 A
Governed speed	1200 rpm

Table 3.2: Specification of Generator No. 2

Generator No. 3 (Backup Generator)

Type of generator	Diesel generator
Brand name	FG-WILSON
Origin	UK
Model No.	P110E
Capacity	3000 rpm, 140 HP
Volts	400/230 V
Phase	3-Phase
Power factor	0.8
Frequency	50 Hz
AMPS	158.8 A
Governed speed	1500 rpm

Table 3.3: Specification of Generator No. 3

3.4 Generator set Description

This is the description of diesel generator, it may be vary from the generator set you have received

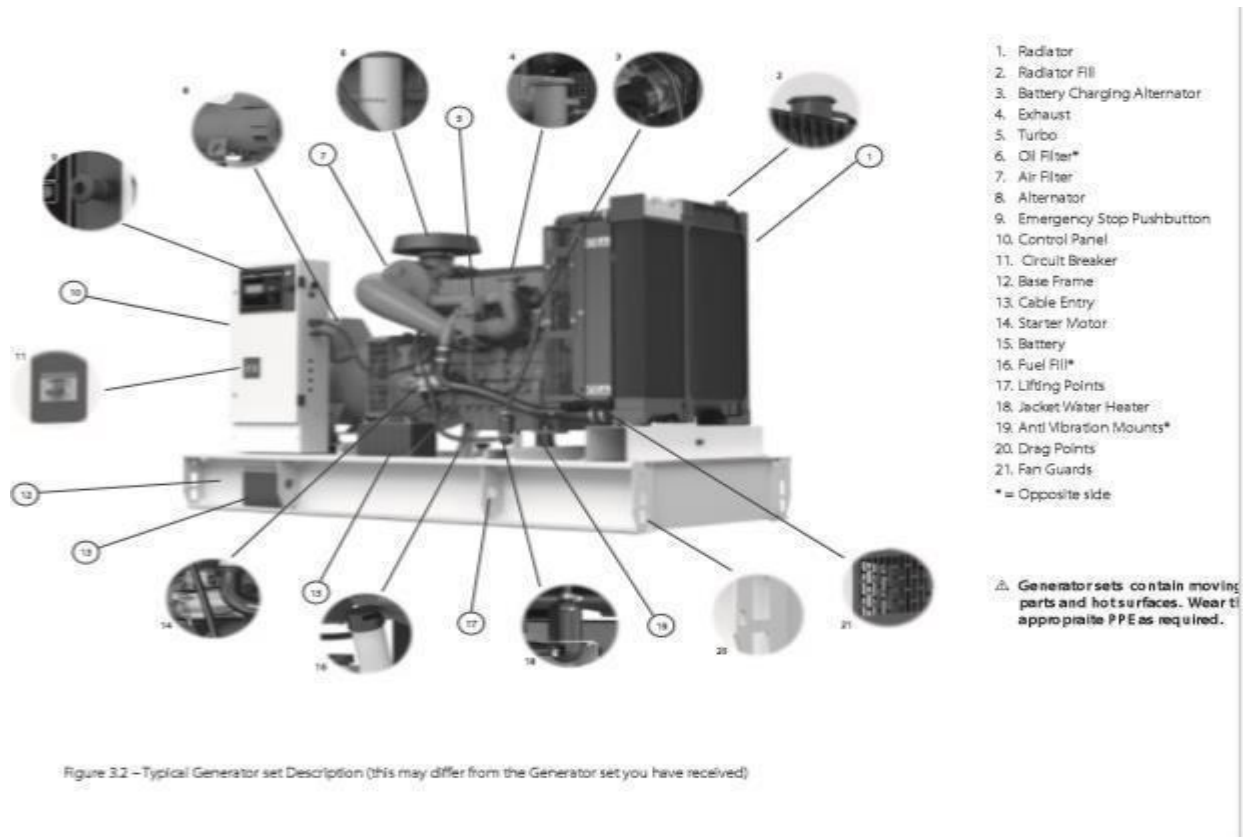


Figure 3.5 – Description of Diesel generator set (this may differ from the Generator set you have received)

3.5 Main component of Alternator

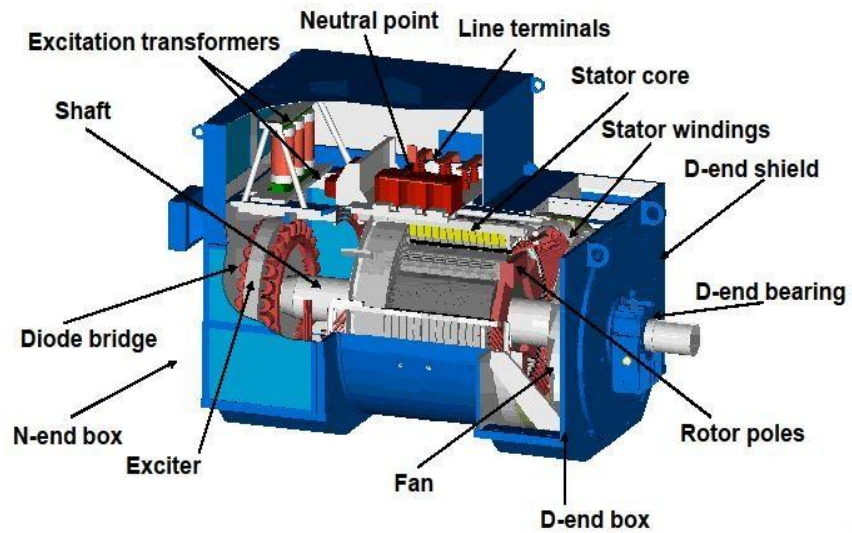


Figure 3.6: View of an alternator

3.6 Construction of a Synchronous machine

The Stator application is the fundamental section of a synchronous machine, the armature conductors, & a rotor which gives the significant field are houses here.

3.6.1 Stator center and Frame

In BHDP we seen the stator focus and packaging in generator. The stator focus is complete of ventured, fixed, high-grade, low-hardship silicon steel sheets. Sheet thinness is 0.5 mm (ensured on the different side). The stator overlays are mumbled together by a stator layout. The edge may be strong metal or made from smooth steel plates. The packaging is arranged not to pass on the progress but instead to pass on manual assistance to the synchronous generator. Inside the stator has a lot of openings that are required to suit thick armature conductors. The armature directors are in proportion organized to Edge a fair polyphase winding:

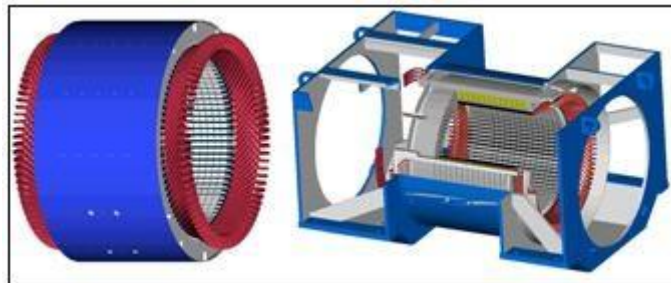


Figure 3.7: Stator Core and Frame

3.6.2 Rotor

We see the rotor of generator in BHDP. The rotor is expected to bear up the vibration achieved by the prime mover and tensions look like at 120 % of assessed speed. Here fundamental rotational speed is in any occasion 1.5 events the apparent speed. Shaft is made of delivered steel. By prime mover the rotor is exchanged at synchronous speed, for instance, a steam turbine given damper winding.

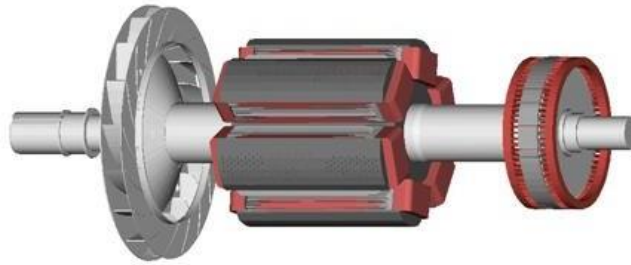


Figure 3.8: Rotor

The round and hollow rotor is working in a 2-or 4-pole, fast turbo-generator. It is made of a level solid designed steel chamber with different spaces on its outer periphery.

The round and hollow development offers the accompanying advantages:

- It results in a quiet operation at high speed.
- It provides better stability than the salient-pole rotor.
- It reduces the wind age loss.

3.7 Generator operation

In Bengal Hurricane Dyeing & Printing (BHDP), the generator producing voltage is 1250 KVA, 105°c is the winding maximum temperature and 1200A is the winding maximum current flow. In the full load condition generator provide 1200A.

Synchronous generator is a turning mechanism whose speed of revolution is stable to the proportion of the source recurrence and the quantity of pole sets.

$$n = 120 \times f / p \text{ speed (rpm)}$$

In BHDP, Generator rpm =1000 rpm

Frequency = 50 Hz

$$n = 120 \times f / p$$

➤ $P=120 \times f / n$

➤ $P=8(\text{pole})$

3.8 Design and Dimension

In BHDP generators are organized using following criteria.

Power: The Generator must be dimensioned subsequently, that it can make the required self-evident (SN) control without warming too much.

Repeat and Speed: With proportionate power, the intentional the speed, the more noteworthy generator is required. As such, the required torque delineates the size and speed impacts similarly to the mechanical arrangement of the rotor. **Voltage level:** Defines the security class of the curving similarly as air insurance divisions. The more assurance in openings less space for copper.

3.9 Cooling

The pole mounted fan is used for generator cooling in BHDP. The freezing air is pulled in finished air channels and covered to nature on ordinary game-plan. As current streams in a conductor, heat is conveyed. A generator has a huge amount of electrodes and a lot of current fluid through the conductors, making a huge amount of warmth. The winding will be demolished if glow is not “ousted”. In totaling, in a synchronous generator there are high streams fluid in the rotor windings, which moreover make heat which must be removed. Air can be used to cool a generator, by spilling it through the generator to acclimatize warmth and a short time later crippling the air to another zone outside the generator. An endless movement of air from external the generator, through the generator, to an additional part external the generator will nice the generator and rotor.

3.10 Synchronization

Whenever at least two electrical generating sets or frameworks are paralleled to a similar power appropriation framework, the power sources must be synchronized appropriately. Control floods &

mechanical pressure will result without legitimate synchronization of framework, when the generator breaker is shut. In the event that there is no synchronization, at that point coursing current will stream. In BHDP generator Synchronization system are used.

3.11 Alternator Maintenance

Serial no.	Activity	Interval
1	Self-starting Motor sound check, Jacket water temperature check	Daily
2	Cooling tower check	Daily
3	Manual/auto operation check	Daily
4	Gas pressure check	Daily
5	Battery voltage check,	Daily
6	Cylinder temperature check	Weekly
7	Strainer check & clean of water line	Weekly
8	Panel board property check	Weekly
9	Cooling tower fan check properly	Weekly
10	Lubricate all lube points	Monthly
11	Air filter check & exchange	Monthly
12	Gas leakage check & Gas valve	Monthly
13	Heat exchanger plate check	Monthly

Table 3.4: Maintenance of Alternator

3.12 Protection Relay

The VAMP 210 is used for generator protection relay. Prior various kinds of hand-off were utilized for various security, however at this point multi day's VAMP 210 hand-off is utilized for a wide range of assurance. It is programming based.

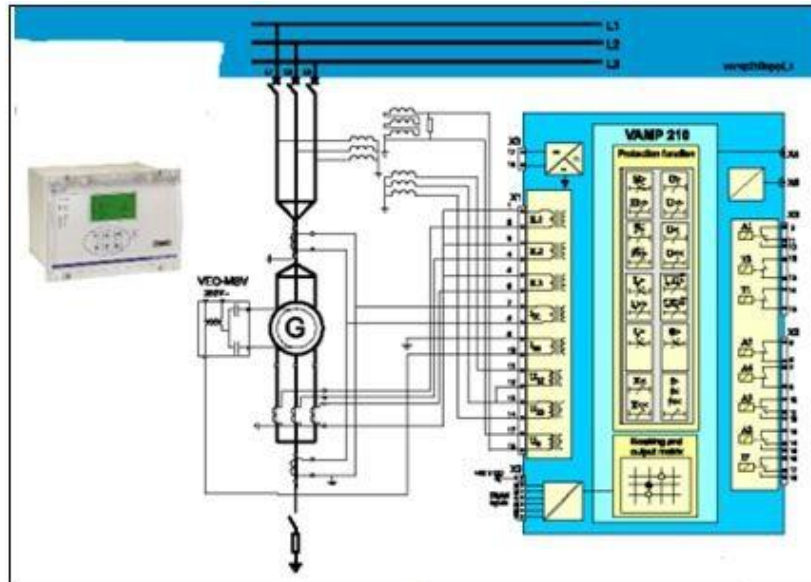


Figure 3.9: Generator protection relay VAMP 210

By using VAMP 210 relay following protections are delivered,

- Differential Protection
- Under & Over Frequency Protection
- Over Current Protection
- Thermal Overload Protection
- Loss of Excitation Protection
- Reverse Power Protection
- Earth Fault Protection

3.13 Engine

The primary normal for a motor is its ability to convey impressive mechanical power, as differentiated to a component, for example, a clock, whose critical yield is movement. By use a motor is commonly a machine that consumes or generally expends a fuel, as separated from an electrical engine that yields mechanical power short of modifying the issue. Correspondingly, a spring-driven system is talk to be fueled by a spring engine; a flywheel goes about as dormancy engine. By meaning a pressure driven turbine isn't a motor, despite the fact that it challenges with the motor as a prime wellspring of manual power.

3.13.1 Mechanical to electrical power

Mechanical vitality utilized each unit period is called mechanical power. Mechanical energy is the rate at which work is finished. By joules/sec (joules/s) or a watt (W) is the mechanical power will expressed.

$$P = \omega T, T = \text{Torque}$$

$$\omega = 2 \pi n, \omega = \text{precise speed, rad/s}$$

Here the 2 & Pi are constant commonly and the n (speed) we like to hold as steady as would be prudent. The objective obviously is the steady network recurrence (50 or 60 Hz) which prompts the steady motor speed (rpm $\gg 1/s$).

3.13.2 Control Module

A control unit when all is said in done is a focal piece of the hardware that controls its task, conveyed that a bit of apparatus is unpredictable and composed sufficient to cover any such part. One space in which the term is actually utilized is the territory of PC plan. In the car business the control unit keeps up numerous

elements of the engine vehicle. In motor there is a control framework in BHDP which is partitioned into three sections, these are

1. Engine safety module
2. Power distribution module
3. Main control module

3.14 Maintenance & Safety

3.14.1 Maintenances

- **Check fixing of the interfacing bar screw**

After the initial every 50 hour we need to check fixing of interfacing bar screw on another motor and, next inform those screw that have been released.

- **Check fixing of the stabilizer securing nuts**

We need to check fixing of the stabilizer securing nuts after the initial 50 working hours on another motor.

- **Check oil level in senator**

We need to checked oil level, and search for holes

- **Check weight drops**

The cartridges are to be changed when the weight contrast pointer indicates too high weight drop

- **Check oil level in sump oil/tank**

We need to checked oil level by methods for plunge stick. It is significant for a motor. The motor might be in threat without checking oil level in sump oil.

3.14.2 Safety

There are three important safety for engine protection. These are,

- Over speed shutdown
- Lubricating oil pressure shutdown
- High temperature shutdown

3.14.2a Over speed Shutdown

This security is significant for a engine. Regularly the motor keeps running at 1000 (rpm). There are two over speed closed down speed these are 1200.5 rpm (113%) and 1177.5 (117 %).When the speed of the motor increments from typical speed the motor will be closed down. At the point when motor speed increments by 113% then it gives a caution and when it increments by 117% then it will be closed down.

3.14.2b Lubricating oil pressure shutdown

Greasing up oil weight power cut is the essential security of a diesel motor Lube oil is required for engine as we need blood in our body. The weight are here is 6 bar (standard engine).When weight decreases and comes to 3 bar then it gives ESM alert. In any case, when weight lessens and comes to 2.5 bar the machine will stop normally.

3.14.2c High Temperature Shut down

High temperature shut down is another essential security for a motor. In BHDP engine greatest temperature rise is 105° C. In the event that the temperature of the engine will increment by any reason, at that point the engine will give alert at 115° C The engine will stop when the motor goes to 120° C. Its shut down levels are shutdown levels are 115° C, 110° C and 120° C.

Chapter 4: SUBSTATION

The piece of the power framework and utilized from producing points to load centers are the Electric Substation. The electrical Generation, transmission, & distribution system is the part of Substation. Substations convert voltage from high to low, or the invert, or play out any of a few other significant capacities. Electric power may development through a few substations between producing plant and buyer, and its voltage may change in a few stages. A portion of the significant parts of substation are talked about after.

4.1 Transformer

Transformer is a static device which transforms convert electrical power from one voltage to another voltage keeping the frequency same by electromagnetic induction.

4.1.1 Classification

Transformer Based on Voltage level there are two type of transformer

- Step up transformer
- Step down transformer

The step down transformers are being used in BHDP

4.2 Distribution/auxiliary Transformer (step down)

During our internship period at BHDP, we have seen auxiliary transformers and acquired knowledge about these. The power station itself has a maintenance room beside it, so the power supply of that household is provided through this auxiliary transformer. It provides the supply to the auxiliary service which includes lighting, low voltage power supplies and ventilation. The auxiliary service is three-phase 415V (Typical voltage rating 11KV/0.415KV). The image of auxiliary transformer at BHDP power station is given in figure 4.1



Figure 4.1: Distribution Transformer in BHDP

4.3 Important Transformer Component

4.3.1 Conservator

It is a drum covering transformer oil and mounted at the top of the transformer and connected to the main tank by a pipe. As the volume of oil of transformer tank increases and contracts according to heat produced, this expansion and contraction of oil causes the level of the oil in conservator to rise and fall.

The aim of conservator is to:

1. Maintain the oil level in tank
2. Provide space for the expanded oil



Figure 4.2: Conservator tank

4.3.2 Silica Gel Breather

It is attached to conservator tank and contains silica gel. It is absorbed the moisture of air if the air is goes into the transformer. The sole motivation behind Silica Gel Breather is to get dried out (expel dampness) the air and to remove dust particles of the air took in by the transformer.



Figure 4.3: Silica gel breather

4.3.3 Explosion vent

A major fault inside the transformer effects instantaneous vaporization of oil, leading to extremely rapid buildup of gaseous pressure. If this pressure is not unconfined with in few milliseconds, the transformer tank can rupture, spilling oil over a wide area.

An explosion vent provides rapid releasing of such dangerous pressure and protects the transformer.

4.3.5 Cooling Tube

These tubes provide better and effective cooling of transformer oil by growing the surface area of tank to the atmosphere.

4.3.6 Tap changer

The tap changer is used to regulate the output voltage manually allowing to line voltage. The taps of transformer can be changed by the tap changer automatically. It is delivered on HV side so that the voltage on LV side feeding to the load can be sustained.



Figure 4.4: Tap Changer

4.3.7 Circuit Breaker

The circuit breaker is an equipment which repeatedly cut off power supply of the system when any fault or short circuit occurs in the system. It detect and isolate faults within a fraction of a second thereby minimizing the damage at the point where the fault has happened.

The circuit breakers are particularly designed to interrupt the very high fault currents, which may be ten or more times the normal operating currents.

There are many types of circuit breakers, e.g. Oil, minimum oil, Air blast, Vacuum, SF6, etc. being used at distribution substations. This list is generally in order of their progress and increasing fault rupturing capacity, reliability and maintainability.

In distribution substation, usually oil circuit breakers, vacuum and air circuit breakers are used.

4.3.7.1 Vacuum circuit breaker

A breaker which used vacuum as an arc extinction medium is titled a vacuum circuit breaker. In this circuit breaker, the fixed and moving contact is surrounded in a permanently sealed vacuum interrupter. The arc is extinct as the exchanges are separated in high vacuum. It is mainly used for medium voltage ranging from 11 KV to 33 KV.

Working of Vacuum Circuit Breaker

- When the breaker works, the moving contact isolates from the fixed contact and a bend is struck between the contacts. The generation of the curve is because of the ionization of metal particles and depends especially upon the material of contacts.
- The curve is quickly doused on the grounds that the metallic vapors, electrons, and particles delivered during circular segment are diffused in a brief timeframe and seized by the surfaces of moving and fixed individuals and shields.
- Since vacuum has an extremely quick rate of recovering of dielectric quality, the circular segment termination in a vacuum breaker happens with a short contact partition (say 0.625 cm). In BHDP Vacuum Circuit breaker is used

4.3.8 Current Transformer (CT)

At Bengal Hurricane Dyeing & Printing Pvt. Ltd. substation, I have observed three (3) current transformers (CT). These are connected in series with the bus bar. Current transformers (CT) are also used for reducing ac current from higher value to lower value for measurement, protection and control purpose. CT is also called instrument transformer which the secondary current is considerably related to primary current and varies in phase from it by preferably zero degree. A flow transformer (CT) is utilized for degree of electric flows. At

the point when current in a circuit is excessively high to legitimately apply to estimating instruments, a present transformer creates a decreased current precisely relative to the current in the circuit, which can be suitably associated with estimating © instruments.

Basically CT is the step up transformer

4.3.9 Potential Transformer (PT)

The potential transformer is also called the instrument transformer. At BHDP substation, I have observed three potential transformers (PT) in pole. These are connected in parallel with the bus bar. Potential transformer is also called voltage transformer, it is used for reducing ac voltage from higher value to lower value for measurement, protection and control purpose. Potential transformer are utilized in electrical power framework for descending the framework voltage to a sheltered worth which can be sustained to low appraisals meters and transfers.

4.3.10 Isolator

The isolator is a mechanical switch which isolates a part of the circuit from the system as when necessary. Electrical isolators discrete a part of the system from rest for safe maintenance works.

4.3.11 Bus Bar

In electric power distribution, a busbar (also bus bar) is a metallic strip or bar, typically housed inside switchgear, panel boards, and bus way enclosures for local high current power distribution.

4.4 Maintenance of Transformer

An electrical transformer is the most expensive and fundamental hardware bit of gear inside an electrical substation. All things considered it is alluring to perform different protection support exercises to guarantee the transformer keeps up an abnormal state of execution and a long utilitarian life.

A power transformer requires different routine support undertakings including estimation and testing of various parameters of the transformer. There are two fundamental sorts of upkeep of transformer. We perform one gathering on a standard premise (known as precaution upkeep), and the second gathering on an impromptu premise (for example as required).

On the off chance that any outside elements like slop, dust, dirt, dampness are infused into the transformer oil then those are being expelled by filtration utilizing silica gel breather.

- Bushings
- Periodic assessment of any free associations of the terminations of HV and LV side
- Breather examination. Lack of hydration of Silica gel if important
- Conservator to be cleaned from inside after at regular intervals
- Regular check of oil and winding temperature meter readings
- Cleanliness in the Substation yard

4.5 Protection of transformer

The principal relays and systems used for transformer protection at BHDP power station are described below.

- Buchholz devices providing protection against all kind of incipient fault i.e. slow developing faults such as insulation failure of windings, core heating, fall of oil level due to leaky joints etc.
- Earth-fault relays providing against earth-faults only.
- || Over current relays providing protection mainly phase-to-phase faults and overloading.

- Differential system (or circulating current system) providing protection against both earth and phase fault.

4.5.1 Oil temperature indicator

The Oil Temperature Indicator (OTI) measures the Top oil Temperature. It is utilized for control and insurance for all transformers. Oil temperature pointer conveys neighborhood temperature of top oil. Instruments are furnished with temperature detecting bulb, temperature recording dial with the pointer and most extreme perusing pointer and resetting gadget. Electrical contacts are given to give alert or trip at a fundamental setting (on slender cylinder type thermometer)



Figure 4.5: Oil temperature indicator

4.5.2 Buchholz Relay

Buchholz relay is a protective element of transformer. It is installed at the middle position of the transformer tank and the conservator tank. When gas is produced in the main tank due to a minor fault, oil volume expands and can enter to conservator tank via buchholz relay. If oil's motion is very rapid, then at 1st, it gives the signal to the control room. If the fault is very big then it trips the transformer. The image action of buchholz relay conservator.

The Buchholz relay operation may be actuated without any fault in the transformer. For instance, when oil is added to a transformer, air may get in together with oil, accumulated under the relay cover and thus cause a false Buchholz relay operation. That is why mechanical lock is provided in that relay so that one can lock the movement of mercury switches when oil is topping up in the transformers.

This mechanical locking also helps to prevent unnecessary movement of breakable glass bulb of mercury switches during transportation of the Buchholz relays.

4.5.3 Lightning Arrester

Lighting arrester is a device, utilized on substation to shield the protection on the substation from the harming impact of lighting. The run of the mill lightning arrester otherwise called flood arrester has a high voltage terminal and a ground terminal. At the point when a lightning flood or exchanging flood goes down the power framework to the lighting arrester, the current from the flood is redirected around the ensured protection as a rule to earth. At the point when a lightning flood or exchanging flood goes down the power framework to the arrester, the current from the flood is redirected around the secured slacking much of the time to earth. However, a surge arrester does not consume and stop the lightning.

4.5.4 Earthen Switch

Earthen switch append the live parts/line conductors and earth. This switch is typically open.

Earthen switch is utilized to earth the live parts during support and during attempting. During upkeep despite the fact that circuit is open still there are a few voltages on line, because of which capacitance among line and earth is charged. Before continuing to support work the voltage s cleared to earth, by shutting the earth switch.

4.5.5 Magnetic Oil Level Gauge

A Magnetic Oil level Guage (MOG) is a device used to indicate the position of transformer insulating oil level in conservator of a transformer. This is a mechanical device. It is measuring the oil level in transformer and it is attach with conservator tank.



Figure 4.6: magnetic oil level gauge

Chapter 5: Boiler

A boiler is a device which burns gas, oil, electricity, or coal in order to provide hot water, particularly for the central heating in a building.

5.1 Boiler types and Classification

There are two common types of boilers: "fire-tube" and "water-tube". Boilers are classified as "high-pressure" or "low-pressure" and "steam boiler" or "hot water boiler."

- A hot water boiler, similarly speaking, is not a boiler. It is a fuel-fired hot water heater. There are many way to a steam boiler the period hot water boiler are used because of its similarities.
- Hot water boilers that have temperatures past 250° Fahrenheit or weights higher than 160 psig are called "high temperature heated water boilers".

Hot water boilers that have temperatures not above 250° Fahrenheit or weights not surpassing 160 psig are called "low temperature high temp water boilers. Warming boilers are likewise delegated to the procedure of creation, for example by tossing or creation (steel boilers). Those that are tossed normally use iron, bronze, or metal in their advancement. Those that are envisioned use steel, copper, or metal, with steel being the most outstanding material

5.1.1 Steel type boiler

The fire tube boiler & water tube boiler are the general type of steel boiler.

In BHDP Water-tube boiler are used

5.1.1.1 Water-tube Boiler

These type of boiler the water is into inside & combustion gases pass through the external of tube. The lower unit weight-per-pound of steam generated, less time required to raise steam pressure, a greater elasticity for responding to load changes, and a greater capability to actuate at high rates of steam generation are the great advantages os water tube boiler.



Fig 5.1: Water-tube Boiler in BHDP

5.2 Major Component of Water-tube Boiler

The water tube boiler can be built with boiler shell, burner, mud drum or mud ring, furnace, safety valve, strainer, sight glass, feed check valve, steam stop valve, etc.

5.2.1 Steam Drum

A steam drum is ordinary piece of a water-tube boiler. It is a reservoir of water/steam at the bottom end of the water tubes. The drum stores the steam formed in the water tubes and acts as a phase-separator for the steam/water mixture.

5.2.2 Feed-water Heater

Feed-water heaters are vitality recovery apparatuses by and large discovered uniquely in enormous steam creating plants where the majority of the steam produced isn't decreased to condensate by the steam user. This "waste steam" is diminished to condensate for come back to the kettle in the feed-water radiator. The kettle feed-water is utilized as a cooling medium to diminish the steam to condensate, which expands the temperature of the feed-water and, accordingly, builds the warm proficiency of the heater.

5.2.3 Economizer

An economizer is an energy release device that uses the hot exhaust gases from the boiler (waste heat) to heat burning air or feed-water. This increases the temperature of the boiler feed-water, lowering the needed energy input, in turn decreasing the firing rates desired for the rated boiler output. The efficiency of a boiler can be increased with an economizer.

5.2.4 Burner

This is one type of device for the start of air and fuel into a boiler at the preferred velocity. This is the most important apparatus for the firing of gas or oil.

5.2.5 Strainer

This is a type of device as a filter to hold solid elements letting a fluid to supply.

5.2.6 Boiler Fan

For burning of fuel in the boiler furnace air is drawn from the atmosphere and pushed through the ducts with forced draught fan to furnace where air reacts with fuel and become flue gas, the flue gas is then removed from the furnace with the help of Induced draught fan. The fan cast-off in large water tube boilers are FD fans, ID fans, Primary air fans, Secondary air fans and Gas recirculation fans.

5.3 Preventing Maintenance

Routine maintenance is acute to ensure a boiler system remains reliable, safe and efficient. Below are agreements for daily, weekly, monthly, semi-annual and annual tasks. As always, follow your manufacturer's authorizations for routine maintenance.

Check the Water Gauges – Confirming the boiler has correct water level, that is the fundamental maintenance of a good boiler.

Clean the Water Gauges – It is the important maintenance of a water tube boiler. After operation

of boiler every seven days latter clean the water gauge.

Clean Piping and Float Chamber – Proper water level resistor is main and it is the float chamber and close piping that confirms water levels are correctly maintained. Remove all sludge or deposit from pipes and flush the float chamber.

Check Condensate Recovery System – Boilers that utilize a condensate recuperation framework can trap, gather, and reuse steam as feed-water, strongly expanding proficiency since the water does not need to be warmed from as low a temperature. Checking and keeping up the condensate recuperation framework holds usable expenses down.

Check and Maintain the Economizer – For preheating economizer pass heat from the stack back to the boiler feed water, avoiding heat loss and increasing boiler efficiency. Watch that the economizer is great working way during heater surveys to guarantee most extreme advantage.

Chapter 6: Safety of Power Station

6.1 General

The alternator set is intended to be sheltered when utilized in the right way. Duty regarding security, be that as it may, rests with the work force who utilize the set. Prior to playing out any methodology or working system, it is the client's obligation to guarantee that it is sheltered to do as such.

Caution:

- Read and see all wellbeing safety measures and admonitions before working the generator set.
- Failure to adhere to the directions, strategies and security safeguards in this manual may build the likelihood of mishaps and wounds.
- Never begin the generator set except if it is protected to do as such
- Do not endeavor to work the generator set with a known risky condition
- If the generator set is dangerous, fit peril notification and separate the battery negative (–) lead with goal that it can't be begun until the point that the condition is revised.
- Ensure the generator set is shielded from any unapproved use, use signs were fitting

6.1.1 Emergency Stop Button

The crisis break catch in the Outplace for ordinary motor task. Push the crisis stop catch.

The motor won't begin when the catch is bolted. Turn the catch clockwise so as to reset.

Caution

- Acclimated yourself with the zone of the Emergency Stop Button. Emergency shutoff controls are for

EMERGENCY use in a manner of speaking. Do not utilize crisis shutoff gadgets or controls for ordinary ceasing system.

- Do not begin the motor until the point when the issue requiring the crisis stop has been found and revised



Figure 6.1: Emergency Stop Button in generator

6.2 Personal Protective Equipment



Figure 6.2: Personal Protective Equipment to be worn by an operator

- When work is performed around a motor that is working, wear protected gadgets for ears so as to help parity harm to hearing
- Do not wear free vestments or pearls that can jump on controls or on different bits of the motor
Ensure that every defensive monitor and all spreads are anchored set up on the motor.
- Never put upkeep liquids into glass holders. Glass compartments can break.
- Use all cleaning arrangements with consideration
- Report every single essential fix.

6.3 Disposal of Waste

Ill-advised transfer of waste can compromise the earth. Conceivably destructive liquids ought to be discarded by neighborhood controls. Continuously utilize sealed compartments when you deplete liquids. Try not to pour squander onto the earth, down a deplete, or into any wellspring of water.

6.4 Fire and Explosion

All empowers, most medications, and some coolant mixes is ignitable. Burnable liquids that are spilling or spilled onto hot surfaces or onto electrical segments can cause a fire. Fire may cause individual mischief and property hurt. Pick if the motor will be worked in a situation that engages ignitable gases to be drawn into the air gulf framework. These gases could make the motor over-speed. Individual damage, property wickedness, or motor harm could result. In the event that the application fuses the nearness of burnable gases, counsel your neighborhood Dealer for extra data about reasonable affirmation contraptions. Try not to enable any combustible materials to collect on the motor. Store energizes and oils in appropriately checked holders from unapproved people. Store sleek cloth as and any combustible materials in defensive holders. Try not to smoke in zones that are utilized for putting away combustible resources. Wiring must be kept in extraordinary condition, each and every electrical wire must be properly controlled and securely associated. Check each and every electrical wire step by step, search for appropriate support for any wire that are free or frayed from your neighborhood, before you work the motor. Arcing or beginning could

cause a flame. Secure affiliations, endorsed wiring and suitably kept up battery connections will abstain from arcing or beginning. Certainly not check the battery charge by putting a metal inquiry over the terminal posts. Use a voltmeter or a hydrometer.

- The batteries must be kept clean, the spreads (whenever arranged) must be kept on the cells. Use the endorsed connections, affiliations, and battery box covers (where fitted) when the generator set is worked.
- Do not charge a cemented battery, this may cause an impact.
- Confirm the generator set room is accurately ventilated
- Always keep clean the generator set and generator room. Exactly when slicks of fuel, oil, battery electrolyte or coolant occur, they should be cleaned up quickly
- Never store combustible fluids close to the motor.
- Do not smoke or permit sparkles, blazes or different wellsprings of start around fuel or batteries.
- Avoid refilling the fuel tank while the motor is running.
- Do not endeavor to work the generator set with any known breaks in the fuel framework.
- Do not utilize airborne sorts of beginning guides, for example, either. Utilizing these sorts of things could result in a blast and individual damage.

6.4.1 Fire Extinguisher

Powers and vapor related with generator sets can be combustible & conceivably dangerous. Appropriate consideration in dealing with these materials can drastically restrain the danger of flame or blast. Be that as it may, wellbeing directs that completely charged BC and ABC fire dousters are had close by. Faculty must be comfortable with the task of the fire quencher. Investigate the fire douser and benefit the fire quencher frequently. Comply with the suggestions on the guidance plate.



Figure 6.3: Fire extinguisher

6.4.2 Fire Alarm



Figure 6.4: Fire alarm

All Fire Alarm Systems basically operate on the same principle. If a sensor detects smoke or heat, or someone operates a break glass unit, then alarm sounders operate to warn others in the building that there may be a fire and to evacuate.

6.5 Exhaust Gases

Continuously begin and run the motor in a well-ventilated region. On the off chance that the motor is in a limited region, vent the motor fumes to the outside.

Warning

- Engine fumes contains results of burning which might harm your wellbeing.

6.6 Mechanical

The alternator set is organized with gatekeepers for security from touching parts. Care ought to regardless be taken to shield staff and rigging from other mechanical risks at what time active around the generator set.

Alert:

- Do not effort to work the generator set with prosperity watches cleared. However the generator set is running don't effort to touch in or around the guards in any way, shape or form
- Keep hands, arms, long hair, free clothing and embellishments from pulleys, belts and other moving parts. Some moving parts can't be seen clearly when the set is running.
- Keep get to passages on fenced in zones, whenever arranged, shut and blasted when not essential to be open.
- Escape connection with hot oil, hot coolant, hot vapor gases, hot surfaces, sharp edges and corners.

- Uniform protected clothing with gloves and top when in work around the generator set.

6.7 Chemical

Energizers, oils, coolants, salves and battery electrolyte utilized in this generator set are regular of the business. Be that as it may, it can be dangerous to work force if not treated legitimately. The transfer of powers, oils, coolants, greases, battery electrolyte and batteries ought to be completed as per nearby government laws and directions.

6.7.1 Oils

Hot oil and hot lubricating segments can cause private damage. Try not to enable hot oil to contact the skin. Additionally, don't enable hot parts to contact the skin.

6.8 Electrical

Before the generator set is run please look into your nearby vendor to build up whether a NEL has been fitted. As more than one NEL per site might be risky, it is essential to establish whether one has just been introduced nearby.

6.9 First Aid for Electric Shock

Caution:

Do not contact the injured individual's skin with uncovered hands until the wellspring of power has been killed.

Turn off the power, if possible, generally pull the connection or power the connection a long way from individual being referred to

On the off chance that this is inconceivable, stay on dry securing material and draw the harmed individual clear of the conductor, in a perfect world using protected material, for example, dry wood.

OPEN THE AIRWAY:

- Tilt the harmed person's head back and lift the button upwards.
- Remove articles from the mouth or throat (checking false teeth, tobacco or gnawing gum).

Relaxing:

- Watch that the unfortunate casualty is aware by looking, tuning in & sensation for the breath.
- Checked for heartbeat in the injured individual's neck or wrist.

If NO BREATHING BUT PULSE IS PRESENT:

- Pinch the sad loss' nose emphatically.
- Take a full breath and seal your lips around the sad loss' lips.

If NO BREATHING AND NO PULSE:

- Call or telephone for restorative assistance.
- As seek after give two breath & start chest
- Place foot underside region of hand 2 fingers broadness above ribcage/breastbone convergence.
- Place other hand to get done with everything and interlock fingers
- Keeping arms straightforward, push down 4–5 cm (1.5–2 inch) on different occasions at a rate of 100 each moment.
- Repeat cycle (2 breaths, 30 compressions) until the moment that restorative assistance accept

control.

- If situation recovers, attest heartbeat and continue with breaths. Check for heartbeat after every breath
- When breathing restarts, put the disastrous setback into the recovery position
- Do not have any kind of effect weight over the ribs, cut down tip of the harmed person's breastbone or the stomach zone.

Chapter 7: Problem & Recommendation

7.1 Problem

- We felt in problem when we work in engine section, we do not practical knowledge about mechanical section and engine is mainly operate according to mechanical principle.
- We did not touch and see closely some equipment because they did not give to touch all equipment for safety purpose.
- We didn't able to take photographs according to our wish Because of company limitation.

7.2 Recommendation

- At least some other mechanical course and some other lab class should offered in our university. It will help the students to improve their performance in internship.
- In our University lab we did not found some instrument , if the lab facilities are improve it will help student there practical life.

CONCLUSION

We have spent some remarkable days at BHDP during our internship program. It is one of the better practical grounds for the Electrical and Electronic Engineers. We must say the theories that I have learned at my University was practically observed by us at BHDP. We consider our self very much lucky to have out internship program with a reputed private industry. It gave us an opportunity to implement our theoretical knowledge in practically. Our achievements from BHDP are as follows:

The friendly environment in Bengal Hurricane Groups encouraged us to co-operate with each other. We have learned a lot and obtained practical knowledge during my internship at BHDP which will help me in future life.

We learnt to draw single line diagram of any power plant and also learnt how to read an electrical drawing of any equipment. At last we think BHDP is very good place for internship program.

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