CG POWER AND INDUSTRIAL SOLUTIONS LTD.

SUMMER INTERNSHIP REPORT

Submitted By

Name: Chaniya Raikar

Roll No: 2154

Under the Supervision of

Ms. Priyanka U. Naik

Assistant Professor of Management Studies

Goa Business School

Goa University

2021-2022

DECLARATION

I, the student of M.B.A. Part I of Goa Business School, Goa University, hereby declare that the internship project entitled "**CG POWER AND INDUSTRIAL SOLUTIONS LTD.**" has been prepared by me towards partial fulfillment of the degree of Master of Business Administration under the guidance of my faculty guide Ms. Priyanka U. Naik. This project is neither in full nor in part has previously formed the basis for the award of any other degree of either this University or any other University.

Date: 8th July 2022

Place: Goa University

Name: Chaniya Raikar

Roll No.: 2154

ACKNOWLEDGEMENT

This internship report has been completed under the guidance of Ms. Priyanka Naik. I am thankful for her guidance, support and suggestions during my internship.

I would also like to express special thanks of gratitude to Mr Asharaf Mulla (HR) for giving me an opportunity to work as intern and employees of CG Power and Industrial Solutions Ltd, Kundaim who helped me with all kinds of necessary information, suggestions, projects and assignments which helped me to understand the company and get better perspective of CG.

I would also like to express special thanks to all my faculties and officials of Goa Business School for supporting and helping me.

Name: Chaniya Raikar

CERTIFICATE

CG Power and Industrial Solutions Limited
Commercial Motors Division: Rotating Machines
Plot No. 196-198, Kundaim Industrial Estate, Ponda 403 115, Goa, India
T: +91 832 398 3200

Smart solutions.
Strong relationships.

Date: - 08th July 2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Miss. Chaniya Raikar a first year MBA Student from Goa Business School, Goa University - Goa has undergone Internship in our organisation from 16th May 2022 to 08th July 2022.

During this period she has studied an overview and working of all the departments and she was very punctual, committed and hardworking during the course of time.

We wish her all the best for her future.

For **CG Power & Industrial Solutions Ltd.**,

CG Power and Industrial Solutions Ltd.
M-4, Division
196-198,
Kundaim Ind. Estate,
Kundaim Goa 403 115

(Asharaf M.V.)
HR - Officer

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Corporate Identity Number: L99999MH1937PLC002641

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1.EXECUTIVE SUMMARY

As per the academic requisite for completing Masters of Business Administration (MBA) in Goa Business School, we are required to complete 8 weeks internship at an organisation (manufacturing/services) where as a student we must understand functioning of various departments in manufacturing unit. The 8-week summer internship started on 16th May 2022 and was successfully completed on 8th July 2022.

I did my internship at **CG Power and Industrial Solutions Limited, Kundaim**. This company is a large single-phase FHP commercial motors manufacturing company in Goa having various departments. This internship report will give us overview of this industry and motor manufacturing company. The report covers the detail of study of various departments of CG, where intern has to understand the working and functioning of each department and apply theoretical knowledge learned in class practically during internship and also derive learning. This report will also contain additional projects and assignments given by this company to me as an intern.

This internship has given me an opportunity to understand and learn how manufacturing company actually functions. The knowledge gained will be useful for me in my future education and career.

2.COMPANY PROFILE

CG Power and Industrial Solutions Ltd. is a part of Murugappa Group India. It was established in 1937 as wholly owned subsidiary of Crompton Parkinson. This Indian multinational company was earlier known as Crompton Greaves Ltd.CG is emerging as leader in Electrical generation, Transmission, distribution and utilization products and diversify into electronics and automation. Presently the company is offering wide range of products including power and industrial transformers circuit breakers, Motors, alternators, generators, lighting products, fans, pumps, railway signalling equipment, transmission and access products. It has 17 manufacturing units across India. The products of B2B segment of company are marketed under 'CG logo' while B2C (consumer products) is manufactured and marketed as 'Crompton' or 'Crompton Greaves'.

CG Power and Industrial Solutions Ltd, Kundaim Plant manufactures single phase FHP motors (commercial motors). The manufacturing range is from 20 watt to 5500 watts (7.5 HP). They offer custom-made single-phase motors suitable for variety of applications in Domestic, Agriculture, Medical, Construction and small Industrial sectors. The motors manufactured here has wide variety of applications like motors for chaff cutters, hullers, winnowing fans, lawn movers, air compressors, fuel dispensers, exhaust fans, vacuum pumps, wood working machinery, surgical pumps, floor polishing machines, needle vibrators, domestic grinders, cooler units etc. Majority of fuel dispensers in India are running with CG Flameproof motors and it is leading manufacturer of motors for decades.

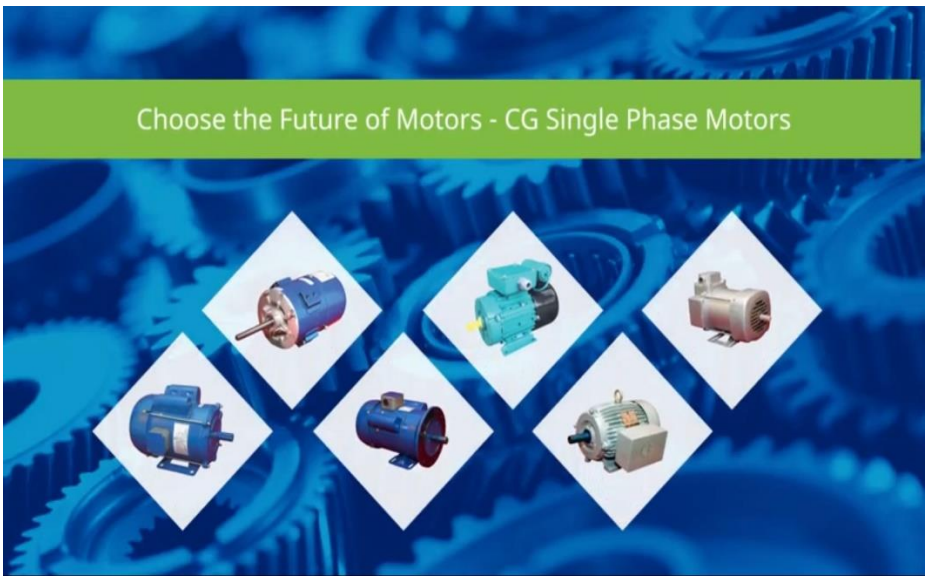
VISION AND MISSION

Vision: Transforming needs into smart solutions for enhanced quality of life.

Mission: To become world class provider of integrated solutions in the area of power conversion and utilisation of electrical energy to consumers, industries and railways by offering energy efficient, intelligent, e-enabled products and services.

MOTORS MANUFACTURED BY CG POWER AND INDUSTRIAL SOLUTIONS LTD., KUNDAIM

- SINGLE PHASE NEMA B48 MOTORS
- NEMA 56 FRAME MOTORS
- SINGLE PHASE M50 FRAME MOTORS
- SINGLE PHASE 100S FRAME MOTORS
- SINGLE PHASE 100S FRAME WOOD WORKING MOTORS
- SINGLE PHASE CI BODY MOTORS
- FLAME PROOF MOTORS (EXPLOSION PROOF)
- SINGLE PHASE ALUMINIUM BODY MOTORS
- HVAC MOTORS



3.INDUSTRY ANALYSIS

3.1 PORTER'S FIVE FORCES ANALYSIS

COMPETATIVE RIVALRY: MODERATE

Competitors are Lawkim GODREJ, Marathon, Havells, Suguna, Vguard and local manufacturers. Since the product differentiation is very less from its major competitors, the sole factor of buying decision is price. It is less costly for buyers to switch to competitor's products due to low price difference. (people have strong brand loyalty towards CG due to its presence in market for decades, they hardly switch to another brand). Also, as local manufactures tend to produce low quality products at lower prices, they tend to sell good quantity of electric products, but in long term it is difficult for them to sustain in market at low profits.

THREAT OF NEW ENTRANTS-LOW

Since many big players are already present in electrical industry, it creates blocks in entry of new players. Also, there are high capital requirements for setting up operations and creating brand image i.e. High cost of entry.

BARGAINING POWER OF SUPPLIERS-LOW

Raw materials that is used in making electric equipment e.g. Copper, Aluminium, capacitors etc is easily available. There is large number of suppliers in India which fits requirements of this industry (Delivery, Cost, Quality). Cost of switching suppliers is also low because if the supplier doesn't provide raw materials according to the requirement even after negotiation, they can move to another supplier. The suppliers associated too tend to have longer term contracts with companies.

BARGAINING POWER OF BUYERS-MODERATE

Today's market is highly competitive. There are many competitors selling electric products at similar prices or less prices. Also, customers/Buyers are highly price sensitive and cost of switching is also low. (buyers can easily switch to competitor due to less price difference). Thus, if competitor lowers their prices, they too have to lower their prices at some extent to match the competitors. But their strong brand loyalty, presence, high quality and customisation contributes to customers loyalty towards this brand.

THREAT OF SUBSTITUTE-LOW

There is no substitution for electric equipment's. For electric motors are manufactured for certain application, no other product can be used in place of electric motors in that appliance. Till now there is no technology invented which can be used in place of Electric products.

3.2 PESTEL ANALYSIS

Political:

- Covid Lockdown has adversely affected its operations and sales negatively.
- Manufacturers of electric equipments are likely to face tough competition from importers of cheap electronic parts due to current high rate of GST.Higher GST rates also affect this business negatively.

Economical:

- Rising inflation in India has negative impact on prices of essential raw materials required for manufacturing electrical products. This results in delayed orders for crucial components which in turn impact production.
- The buyers also tend to delay purchase when the prices are high. Secondly, there is also no control on prices of Raw materials (Cu/Al) by them. It is affected by global supply chains and other factors (e.g. Russia Ukraine War) etc.
- GDP in India has also increased in FY2022 as compared to FY2021.Thus purchasing power of customers tends to increase which will contribute in increased sales of electric equipments.

Social:

- Since the customers include OEM's and dealers which resell to other industries and small businesses, the demand for electrical product would be depended on their end customers. Prior to festivals like Diwali, Dussehra etc people in India tend to buy more domestic appliances which creates demand for electrical products like motors. Same case occurs during summer as people tend to buy more of cooler units. (i.e. sales increase).
- In some southern regions like Hyderabad, Coimbatore, Bangalore people consider it unsuspicious to buy electric appliances during months of June, July so they reduce their purchasing at this time and eventually negatively affects the sales.

Technological:

- Some processes at plant are still done manually without automated technologies which increases defective output rate.

- There is lot of dependency on excel where we should enter data manually rather than technologically developed software.
- This is more time consuming, with automation products are manufactured in less time and are less defective.

Environmental:

- This industry can face serious implications if they do not follow Environment Health and Safety Guidelines
- This industry follows all Govt regulations specified for pollution control. The machinery used is designed in such a way that smoke emitted is minimum and also exhausts are used as specified by Goa State Pollution Board. (Hazardous waste and oil is disposed through govt authorised Treatment, Storage, Disposal Facility. Also, on occasion of World environment day it was observed that 450 trees were planted by workers in kundaim area.)

Legal:

- This industry should be legally compiled or else is liable. Safety regulations, labour laws, Changes in factory licence, shipping and transportation rule have effects on this industry.

4.COMPANY ANALYSIS

4.1 SWOT Analysis

Strengths:

- Major presence in Indian market, thus have strong brand image.
- Customization of motors according to the enquiry form in which dealers/Original Equipment Manufacturers mentions applications, parameters, mountings of motors which suits their requirements.
- Motors manufactured are of high quality and reliable having wide variety of applications in domestic, industrial, construction, medical equipment.
- Large network of after sales service centres across India. After sales service is quick and easily accessible to customers.
- Infrastructure: State of art machines are used in motor manufacturing (e.g. Winding M-50, hot roll dipping machinists die casting machine, CNC machine). They also have well equipped material testing laboratories.
- Inhouse coil winding for M-50 & B-48 is done in this unit of M-4 only in western India.
- World's leading Suppliers for critical components of motors.
- Marketing Infrastructure is well organised across India.
- Each division is self-reliant in its own activity of Research and Development, manufacturing and marketing.
- Low turnover rate of employees.
- Highly skilled workforce with years of experience in manufacturing unit of M-4. Blue collar workers are multiskilled and are trained to work in different sections.

Weakness

- It is difficult to trace inventory in storerooms and on system as location of materials is not defined in the system and coding is also not maintained properly on racks/blocks for some materials which results in confusion among employees. This results in delay of material on shop floor.
- Lack of storage space for materials in excess like Copper, stampings, capacitors, end shield, shafts. Materials like copper due to lack of space in stores are kept near loading point which creates obstacles during movement of man and materials. Copper can damage easily if kept open. Thus, during quality checks, it gets rejected and cannot be used in production.
- Breakdown of machines in winding section leads to production loss.

- If they want to implement new systems and resources, they have to keep the plans on hold due to limited financing capacity.E.g. Computers used hang very often, but they could not replace those as it requires more capital than budgeted.
- They face technology development constraints as still many processes involved in production is manually done. While other competitors have achieved completion of this processes in automated manner reducing load on manpower. Also, ERP (Enterprise Resource Planning) software is not used at full extent and there is lot of dependency on manually entering data on excel sheets. They are fully depended on SAP software only.

Opportunities

- Customers who want their product to be customised according to their requirements thus there will be higher demand for their customised products
- Development of New customers/Manufacturers. (i.e. this will be the people who will use their motors e.g. Petroleum company if grow in market, their sale increases they will tend to buy more fuel dispenser motors)
- Expansion of their business in rural areas where there will be high demand for motors in domestic and agriculture sector. They should plan to set their dealers in this area too.
- As new new products launch in market, they can focus on more applications for which their motors can be used.

Threats

- Changes in raw material prices. If the price of raw material like Cu increases it will eventually affect CG business.
- Local manufactures selling low cost motors and increasing competition from Indian and international competitors can also reduce CG sales if not counterattacked/taken seriously.

4.2 VRIN Analysis

Valuable

- CG Power has established a strong brand image and its presence in Indian market since decades.
- The motors manufactured are customised and modified according to customer requirements.

- The motors produced undergo various quality tests during manufacturing and give performance output as specified, thus we can say CG provides best quality products at a reasonable price in market.
- The motors manufactured are of great value to small businesses as well as large industries as motors are used in almost all appliances.
- The FHP motors used in fuel dispenser is of great significance to petrol pumps.
- The blue-collar workers are multiskilled, highly trained and committed towards the company.
- They also have good network of distribution and after sales service across India.

Rare

- The designs and machinery used in manufacture of motors in CG is different from its competitors. The single-phase motors manufactured are not rare as similar products are manufactured by competitors.
- CG have bigger product range (Cast Iron, Aluminium, Sheet metal body, flameproof) which can be used for almost all domestic and industrial applications.
- The marketing and sales infrastructure is well established and have a great reach across India and requires lot of capital investment and time to set up.
- It has 16 warehouses and many manufacturing units in India, vast dealer network of 400 dealers across India which creates barriers for new entrants and tough competition for competitors.

Imitable:

- The designs of motors manufactured have copyright patents, thus competitors can't exactly imitate CG motors.
- The after sales network (300 authorised service network across India which offers to close customer complaints within 48 hours) and distribution network of CG is difficult to imitate by its competitors.

Non -substitutable

CG motors can be substituted with other motors, but these will not give customers high quality, reliability and service as CG.

5.DEPARTMENT ANALYSIS

Functions and Activities/Roles of Departments

A) Marketing and Sales Department

- Marketing and Sales department of CG consist of Department head (Management Representative),3 Divisional marketing team members and front team.
- This department take orders from dealers and Original Equipment Manufacturers (OEM) which vary according to requirements.
- At the start of year, they conduct momentum of understanding with the dealers, where team members discuss sales targets, incentives, orders and purchase and sale of motors to the market with dealers. They also set sales target for dealers by thorough understanding of their present business. They also conduct national sales conferences, dealers' sales conferences where dealers involved in selling of FHP motors across India are invited and shown presentations on company, product and policies to give them better overview of company and allow them to connect with company. This creates better engagement of company with dealers.
- The marketing team also visits OEM and markets to search for interested dealers in this segment, create awareness, discuss documents and sales with dealers interested in applying for dealership, convince them to opt for dealership in motors. If existing dealers require some improvements/changes then these are implemented, rectification is done to get better results. If dealers face issue in selling product, sales team support them by giving better discounts on next purchase in order to liquidate sales. So, their main function is to judge sales done by dealers and accordingly induce changes to achieve desired targets.
- They also do the branding of motors and improve awareness about the product among OEM and dealers by making technical literature, banners, boards for dealers to display at their place of selling. This gives walk-in customers an idea about availability, features and different variety of models which are available. Also, when they create new dealers, they give them hoardings with company logo, product photo, shop name, his name.
- This department keeps the customer informed about progress of his order and coordinates with internal activities so that order gets completed in allocated duration.
- Divisional team members discuss with front team members w.r.t to orders received (model wise and quantity wise), make future projections, compile and give entire requirement of motors needed to production planning and purchase department. They coordinate with these department along with production department so at the end of the month they should manufacture the required motors accordingly to the monthly plan.

- All India Marketing and Sales head makes a sales budget yearly(At start of year, for making particular sale, a certain fixed cost is required and a certain sales is to be made).So MR's role is to achieve whatever sales budget is taken, make and modify policies, give to market, visit the market, if team has problem with achieving sales target, analyse problem and take immediate action, take decisions support and help team so that the target is achieved.MR should also be alert in market, what is happening in the market and accordingly modify the policies,eg: Some motor company is selling at lesser price than this company, dealers will not purchase their motors which will cause problem in achieving monthly sales targets, so more discounts are given, better incentives are given so dealers purchase more quantity.MR also closely monitor the market, counter attack competitor's strategies and achieve sales.

B) <u>Design and Development Department</u>

- This department comprises of 2 lab technicians,2 mechanical and 2 electrical designers, Head of department.
- Do Mechanical and electrical designs of motor components,3D/2D samples, prototype testing, sample component development (by coordinating with purchase dept), retain drawings and documentation.
- Daily meetings with concerned departments wrt to motor requirements.
- After components are designed, material requirement is sent to purchase department, inspection is carried out by quality dept and if it is as per the set parameters, it is sent on the shop floor for manufacturing motors.
- Design validation is done by carrying out test on customers product or by simulating similar conditions to meet customers' expectations.
- Design motors according to customers' requirements. If customer wants change in designs of existing motors, then either reference of competitor motor is given (less cost) or customise motors according to enquiry form (i.e. enquiry handling from marketing dept, to make necessary changes) in which dealer mentions all the details like motor requirements, general motor assembly drawings and accordingly changes are made in motors. If customer wants further changes in motor after its production and delivery, then again through enquiry form he mentions changes required, sends the sample back, by first changes are made in drawings and sent for approval if approved, then the product is rectified and delivered to customers.
- Efforts are carried out by making internal changes in designs to ease manufacturing of motors, achieve cost reduction of raw material and reduction of cycle time.

- Motor component drawing creation, Bill of material creation (list of components required according to SOP's, quantity required according to orders received) are issued to various departments to carry out further work as per design.
- If major changes are done in motor designs then change of reason, major component changed, expected results after approval from head of D and D, is communicated to all the departments through mail and then communicated to top management.

C) <u>Planning, Purchase, Procurement and Stores Department.</u>

Planning

- It is managed by Planning head, Senior executive and officer.
- Receive monthly production plan (Requirement of motors, location and time of delivery) from marketing. They then coordinate with purchase department to ensure that required material is bought and reaches on shop floor (specifying availability of material and quantity to be manufactured per shift to production Department). Motors are then manufactured and daily follow up is taken. Production gives feedback on the quantity of motors produced, after which they are dispatched.
- Set raw material requirements (monthly plan is made according to how many motors will be manufactured this month). Daily follow-up taken from production (winding, assembly, feeder). Take requirements of motors produced, how much is remaining(balance), how much material will be required for that number of motors, when it will be required. For e.g. check availability of stampings in Winding section and if stampings are less then make sure that it is provided.
- Discuss and give priorities of shortage materials to respective buyers.
- Give Vehicle planning list to marketing department based on production plan and review status of under dispatch delivery value and reschedule priorities to meet vehicle load.

Purchase and Procurement

- It consists of Purchase head,2 deputy managers and Senior executive.
- Purchasing is done as and when required whereas procurement (range of activities involved in obtaining goods) is a daily activity.
- Purchase the material as per production planning. Monthly plan is given by planning department in coordination with production and marketing to purchase department. As per the plan they buy the raw material as per the requirements, which after quality check is sent to stores, which is then sent on shop floor for manufacturing motors.
- Ensure purchasing raw materials from suppliers should be effective along with follow-up with suppliers, wrt to

a) Delivery schedule (bringing material on time).
b) Quality (match desired specifications to SOP's).
c) Cost (Match the cost that company can incur).

- According to production plan, discuss what material is required for that production, if some prioritised material is not available then ensure that material is bought by vendor(suppliers).
- Important functions involve: Vendor Development, negotiations, finalising cost of raw materials, terms and conditions, payment to suppliers, lead time. Prepare purchase order (legal order placed with supplier on the form), order acknowledgement (to get definite commitment from supplier about supply of items), follow-up the order, payment of invoice.
- Be alert about how raw materials move i.e. know when to purchase, market price of that raw material, where action should be taken to ensure that raw material cost should fit the range of motors to be manufactured (price of RM should not exceed price of manufacturing motors).

Stores

- It consists of Stores manager,3 operators and workers.
- Main functions include inventory management.
- Improve storage facility and traceability of raw materials stored.
- Accounting of materials and publish inventory status to management.
- Receive material from supplier after security. Check condition, physical quantity, size, supplier identification, expiry date for shelf life items and other details like PO No., Sr.No. of PO, Material code/Description, Schedule quantity and delivery date. Enter this data in SAP. If the material lacks any of the above specifications, it is rejected and shifted to designated area and disposed suitably. Rest material samples are sent for quality inspection and materials which fails quality tests are rejected. The materials which are ok are sent in stores.
- The raw material kept in stores are issued to production dept, according to plan made by planning department and records are maintained. (Coordinate with buyers, operators, production supervisors and quality inspectors.)
- If material shortages occur, stores inform buyers (purchase executives who gives PO, order quantity, rates at start of month to store). The buyer than informs the suppliers(vendors) to get the required material.
- Sale of scrap materials.
- Control of material movement.
- Providing physically safety stock.

- Stores manager oversee the daily operations of stores and ensure that it runs smoothly and effectively. He also provides required facilities to subordinates and does documentation. Stores supervisor is responsible for issue of materials to customers, manage workflow, verify stock and reporting to stores manager. Workers are responsible for material handling and safety.

D) <u>Production Department</u>

- This department is responsible to manufacture motors as per daily/monthly plans(targets). The single-phase FHP motors such as B-48 frame, M-50 frame,100 S frame, CI, Elite series motors are manufactured inhouse .This dept has Production head,Shift supervisors and workers.
- This department consists of 3 sections:
  1. Winding, Coil shop and dipping (Production of stators)
  2. Feeder and Die Casting (Production of rotors)
  3. Assembly (Final assembly of motor)

1.Winding and coil shop

<u>Process of winding and dipping</u>

<u>Winding</u>

- M-50 and B-48 coil windings (coil formation) are produced inhouse, while coil windings for other motors is outsourced. Copper and Al is used as raw material for producing coils.
- Stamping is outsourced. Then stamping is insulated in slot insulation. (liner)
- Coil insertion is process where auxiliary and main coil (Cu and Al are raw materials) is inserted in stampings. Coil is produced on i) Aux winding ii) main winding machine.
- Initial forming is used for expansion of coils and set overhang length of windings.
- Continuity test is conducted to check if there is any OC (open circuit) in coil.
- Paper separator is inserted between aux and main coil and insulation is removed. (overlap)
- Final forming is used for expansion of coils and set overhang length of windings.
- Again, continuity test is done to check if there is any OC after machining.
- Rayon tape is put on the coil to avoid damage to coils. Sleeve is inserted in the leads.
- Harness and cable connection is done after sleeving.
- Soldering (Al) and brazing (Cu) is done to join wires together.
- Resistance is checked for aux coils and main coils and dummy cables are attached.
- Lacing is done and then pressback is done to set closure paper.
- Windings are tested on surge testing machine and then sent for dipping.

Dipping

- Windings are sent for baking in auto temperature controlled electrically heated baking oven. (Hot roll dipping machine).
- Varnishing(binding) is done. Varnish viscosity is checked in every 2 hours. Viscosity is maintained as per the norms with the help of thinner.
- Windings are dipped for 5 mins and for other 2 minute it is drained.
- After 3 hours, it is completely baked and are removed from the machine and allowed to cool.
- This stator (core of motors) are then supplied to the respective assembly lines.

2. Feeder and Die Casting

- The metal which will be used for rotor formation is molten in furnace (720-740 C). Motor frames are dying casted on a vertical 120-ton die-casting press.
- Auto skewing is done for M50/B48/FLP while manual skewing is done for 100S.
- Impurities are removed through rissati machine.
- Shrinking (rapid cooling) is carried.
- Shaft is inserted in rotors.
- Turning (to maintain diameter and run out) of rotors is done on highly productive SPM and CNC with all sizes of snap gauges.
- Lacquer application(painting) of rotors is done to prevent its rusting.
- MS blank is used as raw material to manufacture shell. B-48/M-50 frame seam welding is done to create metal ring shape from rectangular metal strip.
- It is then expanded to remove ovality (get around shape) and maintain required diameter of shell.
- Trimming is done for sizing of shell.
- Rotors are then precisely balanced (to avoid humming voice) on balancing machine by weight addition and weight removal method.
- Rotors manufactured are then supplied to respective assembly line.

3.Assembly

There are 6 assembly lines namely B48/M50/100S/CI frame/Elite/FLP. Every Assembly line involves below similar process:

- Shell expansion: Removes ovality of Shell.
- Shell stator pressing: houses winding inside shell.

- Drilling and Dowelling: fixes shell and stator together.
- Burnishing: removes varnish lumps.
- Spigot machining: Maintains ovality and concentricity of assembly
- Connection: Prepares electrical circuit of motor
- Endshield Rotors assembly: Rotor and motor are assembled and fastened.
- Motor testing is done in silence room, potential failures are detected, rejected or reworked. OK motors are sent for packing.
- Motors are either pre- powder coated or painted and packed in the carton.
- Packed motors are sent in Bonded store and Dispatched to warehouses

Functions of Production Department:

- Take plan of motor requirements from Planning team.
- Plan according to priority given and give store order for raw material requirement.
- Check material availability daily and plan quantity of coils, stators, rotors to be produced according to capacity of machine.
- Highlight raw material requirement shortage if any to Purchase Department.
- Ensure First Part Approval (FPA)i.e. Standards of final output (no. of coils, weight, resistance should be as per industry standards).
- Monthly scrap and excess coil windings are given to stores.
- If defect in any raw materials, inform to quality and is returned for rectification. Error might occur as only few items from batch is checked by quality department thus if faulty raw material e.g. Cu insulations is found then that batch is given to quality for rectification.
- Ensure workers follow SOP's, know manufacturing instructions e.g. Number of turns, speed of machines, testing procedure, set parameters and ensure workers safety at shop floor.
- Check required production rate at which motors are to be produced. Ensure motors are manufactured by workers according to daily/monthly plans to achieve specified targets.
- Supervision (Shift) on processes involved in production.
- Outsource Cu/Al for producing windings except M-50 and B-48.
- Synchronize between winding, feeder and assembly sections.

E) Quality Assurance Department

- This department consists of HOD, Shift supervisors, Inspectors, (patrolling, final, line), lab operators and testers.
- After the raw materials are unloaded from the truck into the stores, quality inspection is done to verify materials received are of appropriate quality
- Quality Dept ensure that the motors manufactured is as per specifications of CG. Motors manufactured are reliable, have same performance during its life cycle, there is no deviation in its working and should meet customer expectations.
- Ensure qualitied end product. For this, each component goes through rigorous quality control at every stage of manufacturing, so that motors manufactured are highly reliable. Control errors in manufacturing to minimize scrap/rejection on shop-floor. Final quality inspection of motors manufactured is also done before packing.
- Proactively improve capability and capacity of operations through new methods, tools and skills.
- Vigilance on internal processes and routine testing as per the SOP's.MR initiate various projects on cost reduction, coordinates with other depts (design, production, materials, finance, HR, maintenance) and conducts daily review meetings etc.

F) Maintenance and Engineering Department

Maintenance

- This dept prepare list of spare parts required and maintain it. They also issue purchase orders of spare parts to purchase department.
- They are also responsible for maintenance of machines. If breakdowns occur or repairs are required in production dept, they inform maintenance dept.

  3 types of maintenance: a) Breakdown maintenance: Repair the machine when it breaks.

  b) Preventive Maintenance: Maintenance done on scheduled time to prevent breakdown of machine.

  c)Predictive Maintenance: When machine shows minor faults (noise, slowing, indications that machinery parts will break), these parts are replaced based on prediction prior to actual breakdown.
- Layout Change: Plant layout is changed as per inputs given by production dept for smooth and efficient operations, maximize production at minimum cost, optimum utilization of men, machinery and materials, safety of workmen. (e.g. shifting of machineries for better space).

Engineering

- This dept performs functions of procurement of machinery.

- Aim to improve productivity of manufacturing by change of methods and optimization of equipments.
- Acts as Service Dept for customers i.e. Production dept.

G) Finance Department

- This dept consists of HOD, 1 Senior finance executive and 3 officers.
- Purchase and other departments raise Purchase Order (P.O), which after generation comes to finance Controller and then to Divisional head for approval. After approval material is received for which other depts issue invoice which is booked and subsequent payment is made by finance controller (HOD). Similarly rates of motors (Sales Orders) given by marketing dept is sent for approval to finance, after approval when sales is made and invoices are issued, realisation receipts are accounted by finance dept.
- Costing function involves calculation of production cost per unit and focus on minimize cost of production and help in pricing function with marketing department.
- Manage Statutory liabilities like monthly GST payments, return files calculations & payments.
- Employ Audits like internal audits, statuotary audits, tax audits, cost audits etc.
- Prepare financials (Profit & Loss, Balance sheet) by coordinating with auditors and submit to stock exchange reporting. Audited documents of Profit & Loss, Balance sheet is also sent to Ministry of Cooperate Affairs (MCA).
- Monthly MSR reports is provided to cooperates for monthly company review.

H) Human Resources and Administration Department

1) Administration: Involves security management, housekeeping, pantry, safeguarding surrounding area and providing office requirements. Security and housekeeping staff are hired on contract basis. Various contractors supply manpower for these. Agreement is also signed with pantry(canteen) and stationary in which terms, rates and duration of service is discussed.
2) HR: Main functions involve manpower planning, recruitment, blue/white collar hiring, contract basis hiring, training, performance management and appraisals, labour relations, employee benefits, employee engagement, health and safety and statutory compliances.

Daily Activities: Manpower reports(hired/onboard), year data reports (to finance Dept), service entry,safety of workers, maintain Personnel budgeting.

Recruitment:

a) Personnel Requisition: PR is raised by HR after budget is discussed in march. From this we come to know if we can recruit candidates for that vacancy.
b) Searching suitable candidate:
    - White Collar Executives: Against the PR, consultancy is informed that there is requirement of candidate for this particular vacant position, job description is given according to which consultancy searches for candidates which matches requirements specified and that list of candidates is then sent to HR.
    - Blue Collar workers: Are recruited through college recruitment from ITI colleges in Goa. Blue collar workers are also recruited through contractors.
c) Selection Interview: Interview is scheduled for this candidate. It is conducted by HR head, unit head and head of resp. dept. It involves questions related to Job description.
d) Registration of finalised candidates and screening: The candidate who passes the interview, with his PR no. has to upload his/her details and documents on company site (CG Pulse) and register online. Once registration is complete, employee code is generated, documents are verified.
e) Offer is made: After verification, job offer is sent to the candidate.
f) Appointment letter: If the candidate accepts the offer, appointment letter (contains designation, details, date of joining, terms and conditions, CTC) is given to him/her.
g) Onboarding of employee

Induction: Induction process is planned by HR given to new employee by HOD.After the employee comes onboard, he/she is given brief about the company, departmental functions and introduced to his subordinates. Later job training is given.

Training:

- Basically 3 types of training are given depending on training needs as follows:

  a) Machine training b) Behavioural training c) Technical Training

- Skill matrix is one of the criteria which determines requirement of training for blue collar workers. From this we can identify skills the worker has/lacks. If the workers lack a particular skill in his line, training is provided to him accordingly.
- For executives, training is provided according to requirement given by resp. Dept head.

Statutory Compliances:

All labour laws (48 Goa state and central laws) applicable to this company e.g. Minimum wages act, The Factories Act, The Contract Labour Act. The HR must ensure that there is no violation of labour laws at workplace.

Performance Appraisal and Goal setting:

For blue collar workers appraisal is done on basis of their performance, punctuality (absenteeism record) and work experience acquired in CG.

CG uses 4 goals system method as goal setting method. White collar employees/trainees after onboard are given 4 goals as follows:

- Finance (How candidate contributes in cost reduction of company.)
- Customers (how they maintain relations between workmen and management)
- Process (how they increase efficiency of processes)
- People (How you manage people under you for better performance, growth of company).

So, candidates add the goals they achieved in the system (CGHR4U). Yearly, their bosses evaluate candidates based on goals achievement and accordingly are liable to promotion/demotion/rewards and recognition.

6.WORK DONE & LEARNINGS DERIVED

6.1 MAIN WORK DONE

- **Stock take**: Stock take means counting and recording inventory items, the company has on hand. Thus, at month ends of May and June I took data from production line wrt physical stock remaining on the line. (Yellow card was given which had material description, code &quantity). Then I entered this data on excel. For purchase file which consists invoice material sheet, V-lookup function was applied & physical stock remaining data obtained was subtracted. The balance quantity should be available in stores. (system stock should match physical stock).

- **Service Entry:** I also learnt and did service entry in SAP system (HR dept). Service entry sheet is used to record services which are performed by vendors/contractors. Service entry was raised against various administrative services like manpower supply contractors, transport, pantry etc. First create Purchase Order (PO) on SAP. Details of services procured (As given on bills/invoice) is to be provided in PO. Then this is sent to finance dept for approval. After approval actual service entry is raised by entering details like PO number, service number, quantity, price. This is sent to finance department for subsequent payment.

- **Entering Quality Performance Records on System:** I also entered data manually from *B56 motor performance test reports book* daily for 1 month on excel. These reports had motor performance records (Year 2021) of different ratings of B-56 motors in which various details like Torque, Resistance, motor rating etc was given. So, this data was scattered on reports (e.g. 1 motor data on 1 page). So, I entered all motors data on single excel sheet so they can compare performance of different ratings of B-56 motors at once.

- **Skill Matrix of CG Power & Industrial Solutions Ltd. employees**

This project was given to me by Quality and HR Department. Skill matrix is a tool to map skills and levels of workers in an organisation. It is one of the methods to determine training requirements. List of names and employee codes of permanent blue-collar workers was given to me. This skill matrix has to conducted for **79** workers. First step is to identify which worker belongs to which section/line. Thus, I went to supervisor of each section (Assembly, Feeder &Die casting, quality, stores, winding B-48/M-50) to collect this data of workers. Second step was to identify skills each

worker has within the line & within the company i.e. overall skills. Criteria of rating per skill is as follows:

Need Help	1
Need help sometimes	2
Can work independently	3
Expert	4

This is given on skill card. This data was obtained from workers by surveying them & rating them according to above criteria, which was later verified and corrected if needed by supervisors. The skill score of individual workers is calculated by adding all the skill scores he/she obtains within his/her section/line & then within the company.

Third step was to set range for each section. The ranges set by me are as follows: (Follow same criteria for all sections as shown in Assembly section.)

E.g. of Skill Range obtained:

In assembly line, there are 18 skills. Multiply score per skills with No. of skills in the line(18x1=18,18x2=36,18x3=54,18x4=72). Thus, highest skills for assembly line is 72.

Assembly
Ranges
0-18=A=0-25%
19-36=B=26-50%
37-54-Target=C=51-75%
55-72 =D=75-100%

Feeder & Die casting
Ranges
0-16
17-32
33-48
49-64

Quality
Ranges
0-5
6-10.
11-15.
16-20.

Winding
Ranges
0-30
31-60
61-90
91-120

Dipping
Ranges
0-2
3-4.
5-6.
7-8.

Store
Ranges
0-3
4-6.
7-9.
10-12.

Overall(men)
Ranges
0-81
82-162
163-243
244-324

% Range for all sections

0-25%

26-50%

51-75%=Target

75-100%

WOMEN OVERALL
Ranges
0-53
54-106
107-159
159-212

Formula for % calculations

% skills(line)=(Score per line/Highest score per line)*100

%Skills (overall Men)=(Total Score of all skills of worker/324)*100
% Skills(overall Women)=(Total Score of all skills of a worker/212)*100

Name [redacted]			Section:-	Assembly
Work Area	Skill		Target (Jun'2	Jun-22
Common	5 "S"		3	1
	KAIZEN		3	1
	7 Wastes		3	1
	Reading Manufacturing Order		3	1
	Safety		3	1
	Quality Parameters		3	1
Feeder	Rotor broaching		3	1
	Shrink fitting		3	1
	Cold shrinking		3	1
	Rotor turning		3	1
	Balancing		3	1
	End Ring Cutting		3	1
	Shell welding		3	1
	Shell expansion		3	1
	Shell trimming		3	1
	Pad welding		3	1
	Co2 Welding-Foot		3	1
Die casting	Skewing-Auto		3	1
	Skewing-Mannual		3	1
	TCS machine		3	1
	Risatti testing		3	1
	Die Change over		3	1
Assembly	Shell Expansion		3	2
	Winding Pressing		3	3
	Winding shrink fitting		3	3
	Dowell Pin fitting		3	4
	Burnishing		3	3
	Spigot turning		3	1
	Capacitor fitting		3	3
	Bush Fitting		3	1
	TB fitting		3	3
	OC switch Fitting		3	3
	Rotor Assembly		3	3
	Motor assembly		3	3
	Motor testing		3	4

E.g. of skill matrix of 1 employee in Assembly line:

	Digits
Within the operation line	46
Within the company	183

	Percentage
Within the operation line	64%
Within the company	56%

Fourth step was to grade them based on sores.

GRADES

D-EXPERT =76-100%
C-CAN WORK INDEPENDENTLY=51-75%
B-NEED HELP SOMETIMES=26-50%
A-NEED HELP=0-25%

Findings:

- In assembly line there are 39 workers. Out of them, 4 worker was graded D,27 workers were graded C(Target),8 were graded C and none were graded A.
- In Feeder & Die casting Section, there are 20 workers. No worker was graded D,9 workers were graded C,11 were graded B while none were graded A.
- In Winding section, there are 6 workers.4 workers were graded D,2 workers were graded C, while none were graded A & B.
- In dipping section there are 5 workers. All were graded D.
- In quality section, there are 7 workers.3 were graded D,4 were graded C,while none were graded B & A.
- In stores, there are 2 workers. Both were graded D.
- For multi skills grading (Overall skills within company): In case of men (perform all skills) there were 68 men workers. None were graded D,58 workers were graded C while 10 were graded B.In case of women(Winding,Assembly,Quality section skills are considered),1women was graded D,while remaining 10 were graded C.

Thus, from findings obtained through skill matrix projects, the company aims to migrate workers from A to B to C to D grade to overall skills by taking suitable measures like training & workshops.

❖ How to improve traceability of inventory in stores on excel

This project was given to me by Stores Manager. He told me to do a project to make tracing materials in store easier on excel file in case of storeroom 1,2 and cartons stores. The items kept in storeroom 1 & 2 were difficult to trace on the system as on system their exact location was not shown (only list of items was shown on system before.) In case of cartons stores codes were mentioned only on materials which were kept at different locations and not on compartments.

Thus, for storeroom 1(Harness cables, Polyester tape, rayon tape, Copper & Aluminium) and storeroom 2(Run/Start Capacitors, OC switch, Termattri, Shaft key, Terminal Base, rubber component, conduit plug etc). *List of items with material code, description & quantity was given to me.* I observed the racks & then assumed storeroom to be one excel sheet. Then I labelled racks as A,B,C and so on. I named Sub racks as A1,A2,A3 in Rack A and similarly say B1,B2 in Rack B and other racks. This I entered in excel. (E.g. of Picture shown below for reference).

HARNESS

RACK-A

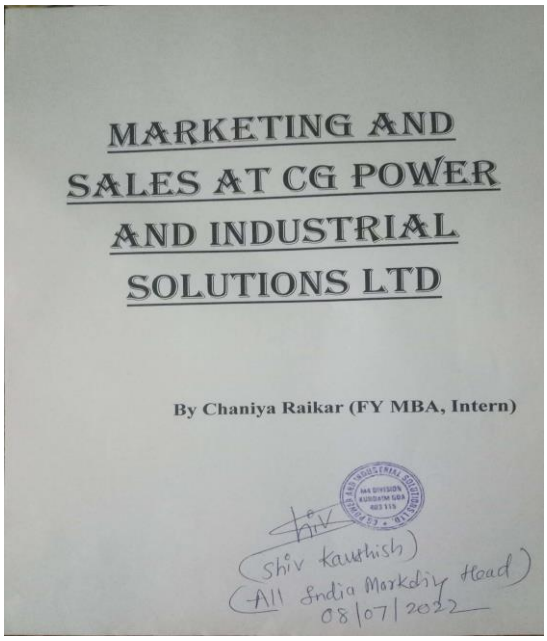
Sr.No	Material Code	Material Description	Quantity
A1	120095346	HARNESS RED .5SQMM 155DEG 200L G282680/1	700
	120095347	HARNESS BLK .5SQMM 155DEG 200L G282680/2	700
	120095348	HARNESS BLU .5SQMM 155DEG 200L G282680/3	700
	120095349	HARNESS YEL .5SQMM 155DEG 200L G282680/4	700
A2			
A3	120095199	HARNESS ORANGE 18AWG 185L GE282618/12	20
A4	120095154	HARNESS ORANGE 24/0.2 GE282188/6	20
A5	120095339	HARNESS RED 16/.2 2.5D 180L G282664	1000
	120095340	HARNESS BLACK 16/.2 2.5D 180L G282664	1,000
	120095341	HARNESS BLUE 16/.2 2.5D 180L G282664	1,000
	120095342	HARNESS YELLOW 16/.2 2.5D 180L 282664	1,000
A6	120095331	HARNESS RED 16/.2 2.5D 250L G282664	100
	120095332	HARNESS BLACK 16/.2 2.5D 250L G282664	100
	120095333	HARNESS BLUE 16/.2 2.5D 250L G282664	100
	120095334	HARNESS YELLOW 16/.2 2.5D 250L G282664	100
A7	120095335	HARNESS RED 16/.2 2.5D 335L G282664	100
	120095336	HARNESS BLACK 16/.2 2.5D 335L G282664	100

A1	A2	A3	A4
A5	A6	A7	A8
A9	A10	A11	A12
A13	A14	A15	A16
A17			
A18			
A19			
A20			

In case of Carton stores, firstly I named the Compartments as Block A,B,C,D.Then sub compartments as A1,A2 in A Block and similarly named subracks.Then I mentioned codes on sub racks according to space available & quantity.(i.e. I with the help of workers placed cartons of more quantity in sub racks which are large & fitments,liners,cartons of small quantity in sub racks which are small).Next I entered this data of cartons location on excel.

Thus, now we can easily locate materials in stores with the help of this excel file.

❖ **Marketing and Sales at CG power and industrial solutions Ltd.**



This assignment of 5 pages was given to me by Marketing department. The aim of this assignment was to make me understand how is Marketing & Sales Network of CG across India, how it operates as B2B business and how they achieve their sales targets.

So, in order to understand marketing, I first related the 4P's of marketing to CG company. I also studied what is the product they are selling and who are the customers. (i.e. Single-phase motors, it's applications, its customers are dealers & OEM's who further sell to end users.). Then I also learnt about sales structure in chart format. (AIMM decides about plant, price, products and policies of

single-phase motors which they pass forward. There are four regional headquarters in India i.e. Delhi (North), Kolkata (East), Mumbai (West), Chennai(south). This constitutes of regional sales team. These further have 24 sub sales branches which have 30 team members which then receive orders from dealers/OEM's).After this I learnt about how actual sales is done at CG.(Done through 2 ways: Direct customers i.e. OEM's & Dealers).Later I learnt about dealership process, how they search dealers, how they select their dealers, how they plan sales targets with them, mode of receiving payments & discounts offered on motors. I also learnt how motors are actually sold in market by this dealers & OEM's and steps involved in selling motors to customers.

In this assignment I have explained all this in brief and also understood Marketing & Sales Infrastructure of a large company like CG.

6.2 LEARNINGS DERIVED

Through this internship, I learned and understood how various departments at company functions and coordinate with each other to achieve their goals in reality. I learned about various processes involved in manufacturing of single-phase motors, marketing, sales and distribution network of manufacturing unit. I also got great learning from business ethics and values observed at CG.

The concepts thought in the class was actually observed at my workplace. This helped me better understand these concepts. But few concepts (e.g. HR processes) was standard in books but in reality, was found to be different.

The various concepts learned/observed & applicable to company from theory are as follows:

Production and Operations Management (POM)

CG M-4 plant uses Process & Product layout to manufacture single phase motors on daily basis. Process layout is where all machines perform similar function and are grouped in one location. Product layout is where machines are located according to processing sequence of product. In Winding, Feeder & Assembly sections machines, materials are arranged sequentially according to operations performed, whereas in dipping section only dipping of stators is done by all machines.
Material management functions such as planning, purchasing, stores management and inventory control was also observed. (This is explained above in dept analysis).
Vendor Development: Manufacturing units like CG requires to find best vendors who will provide them components/raw materials for their products.CG Purchasers work along them so they supply them according to their daily requirements.
For inventory control & management besides following Material Requisition plan, they use following techniques: a) *Minimum Order Quantity* which is specified by Purchase Department.
b) Under *ABC analysis* (Always Better Control) method items are classified into 3 classes i.e. Class A (highest value items which require accurate control e.g. Copper, Stampings etc). Class B (moderate value & control e.g. endshields, motor shells etc). Class C (low value items which require minimum control e.g. hardware). Class A items are physically checked at gate, while class B & C, sample checking is done. Class A & B items are not overstocked as they are costly.
c)Safety Stock: Safety stock is the extra stock stored for emergency in case market requires more motors than forecasted and to prevent out of stock situation during production. More of class C items are kept as safety stock.

I also observed 3 types of maintenance which were preventive, predictive and breakdown. (explained above under dept analysis).

I also learnt about how they try to eliminate *seven wastes in production processes* and how production department deals with it by giving examples. The seven wastes are:

Transportation: Process of moving things from one place to another. The plant layout of CG is designed in such a way that it reduces time taken for movement of material Stores is near Shop floor, Winding and Feeder sections are near assembly section.

Inventory: This involves idle inventory. For this shop floor sections take requirements according to capacity of machine. E.g. Polyester film was kept excess in winding section which consumes more space, thus they are planning to keep only buffer stock on shop floor as emergency and excess to be kept in stores.

Motion: This involves operator motion. They aim to continuously upgrade layout to lessen movement and avoid obstacles. But in order to conduct certain operations on shop floor operator motion can't be reduced.

Waiting: It involves waiting by staff & machinery to complete the targets. Copper which is raw material, if during First part approval some issue occurs or resistance issue occurs, time is wasted in checking or replacement of these. Sometimes machine breakdown or absence of crucial materials leads to increased wait time which results in production loss. For this purpose, they keep safety stock for machines they doubt.

Overproduction: Leads to more storage consumption and depleted raw materials. But sometimes they have to overproduce to prevent line to stop. They are still finding measures to improvise. For critical machines that can breakdown (e.g. slot insulation machine), overproduction is done. Since 2^{nd} shift operators are less, the stators to be manufactured in 2^{nd} shift is thus manufactured in 1^{st} shift to avoid production loss. They also look forward to deploy more manpower in 2^{nd} shift to balance production.

Over processing: If processing is not done proper by people in starting stages, faults are found in later stages.eg. Connection not done properly, during testing this fault is identified and again they have to remove and do connections properly.

Defects: To minimize defects they try to take control measures in that step only and work on giving proper instructions to employees. Thus, their defective outcome rate is very low.

Lean Movement was practiced to eliminate these wastes. In lean movement, takt time (rate at which market requires product) was calculated and lead time of different processes were identified. Lead time of different products should match the takt time for this production dept have taken effective measures.

Human Resource Management (HRM)

I learnt how to make organisation chart of a company in reality. Through organisation chart, it's easy to understand departments, chain of command, line and staff authority. (who reports/communicates to whom in a particular Department). I also learnt about recruitment (processes & sources this company uses which is explained above under dept analysis). They use interview method for selection of employees. The interview is framed in accordance to vacancy generated. Manpower planning (according to requirement on shop floor/executives given by management) was also observed. Job rotation and job enlargement was also observed on shopfloor. There are 3 shifts in this company, shift schedule is decided by supervisor at end of week. I also learnt different process of Training and Development, Goal setting and Performance Appraisals that this company uses for betterment of this employees. (Discussed above under dept analysis). The worker union consists of 79 permanent employees who discuss issues faced by them with HR on weekly basis. Incentives to workers are given according to their incentive policy.

Marketing

The *4 P's* of marketing w.r.t CG are as follows:

Pricing: 1000-18,000 (approx.)

Place:CG Power and Industrial Solutions Ltd, Goa

Product: Single Phase FHP Motors

Promotion: Advertisements, Website, Seminars, Sales Conferences (where dealers across India are invited and given information about the product), Team member visits at Dealers.

Segmentation, Targeting, Positioning:

Segment: Electrical & Electronics

Target Customers: Dealers, Industries requiring electric motors, Construction companies, Distributors.

Positioning:CG provides end to end solutions to its customers helping them to use electrical power effectively & increase productivity of industries with sustainability.

Branding:CG has positive brand equity. Indians have good perception about CG (Crompton Greaves) since it is a well known and trusted brand by its customers. I also have CG motors in many appliances at my home. I also learnt how CG created a strong brand image in this segment. (Discussed above).

IT skills:

I used various excel features like merge & centre, Sum function lookup, Table formatting, Conditional formatting etc.

7. REFERENCES

- https://www.cgglobal.com
- CG POWER AND INDUSTRIAL SOLUTIONS LIMITED Annual Report 2020-21
- https://www.the hindu.com