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3.2. Innovation Ecosystem

Sr. No.	Description
2.3.1	Student centric methods, such as experiential learning, participative learning and problem solving methodologies are used for enhancing learning experiences and teachers use ICT- enabled tools including online resources for effective teaching and learning process



Project Report On

“EV SMART REGENERATION USING SUPER CAPACITOR WITH BATTERY BANK”

Submitted in Partial Fulfillment of the Requirements For the

Award of Degree of

BACHELOR OF TECHNOLOGY

In

ELECTRICAL ENGINEERING

Under the Guidance of,

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DEPARTMENT OF ELECTRICAL ENGINEERING

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FACULTY OF ENGINEERING AND FACULTY OF MANAGEMENT,
TALSANDE.

SHIVAJI UNIVERSITY, KOLHAPUR

Academic Year- 2022-23





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Here a completed the Project work on “EV Smart Regeneration Using Super capacitor with Battery Bank” towards the partial fulfillment of Bachelor of Technology in Electrical Engineering course as per the rule laid down by SHIVAJI UNIVERSITY, KOLHAPUR, for year 2022-23. This report represents the bonafide work of students.

DATE: 07-06-2023

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PROJECT GUIDE

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ABSTRACT

Electric vehicles (EVs) are more efficient, less expensive, and release less pollution than conventional internal combustion engines (ICEs). However, they fall short of providing a good range since present charging infrastructure does not allow it. Because of their limited range, many people regard EVs as a gimmick rather than an effective means of daily transportation. To overcome these problems, solutions which can improve energy regeneration in the electric vehicle (EV) using the supercapacitor bank. It was built and evaluated to actively control the power sharing between a battery bank and ultracapacitor bank. Super capacitors are particularly well-suited as braking energy and renewable energy storage devices for electric and hybrid vehicles due to their rapid charge-discharge rate, long life, simple structure, and dependable performance. The circuit for the electronic control system was created, and a method for pattern identification and control of the electronic control system was proposed. The results of experimental vehicle tests demonstrated that the pattern identification and control technologies improved the micro EV's braking energy regeneration rate and boosted its continuous driving mileage.

CHAPTER 01

CHAPTER 03: BLOCK DIAGRAM

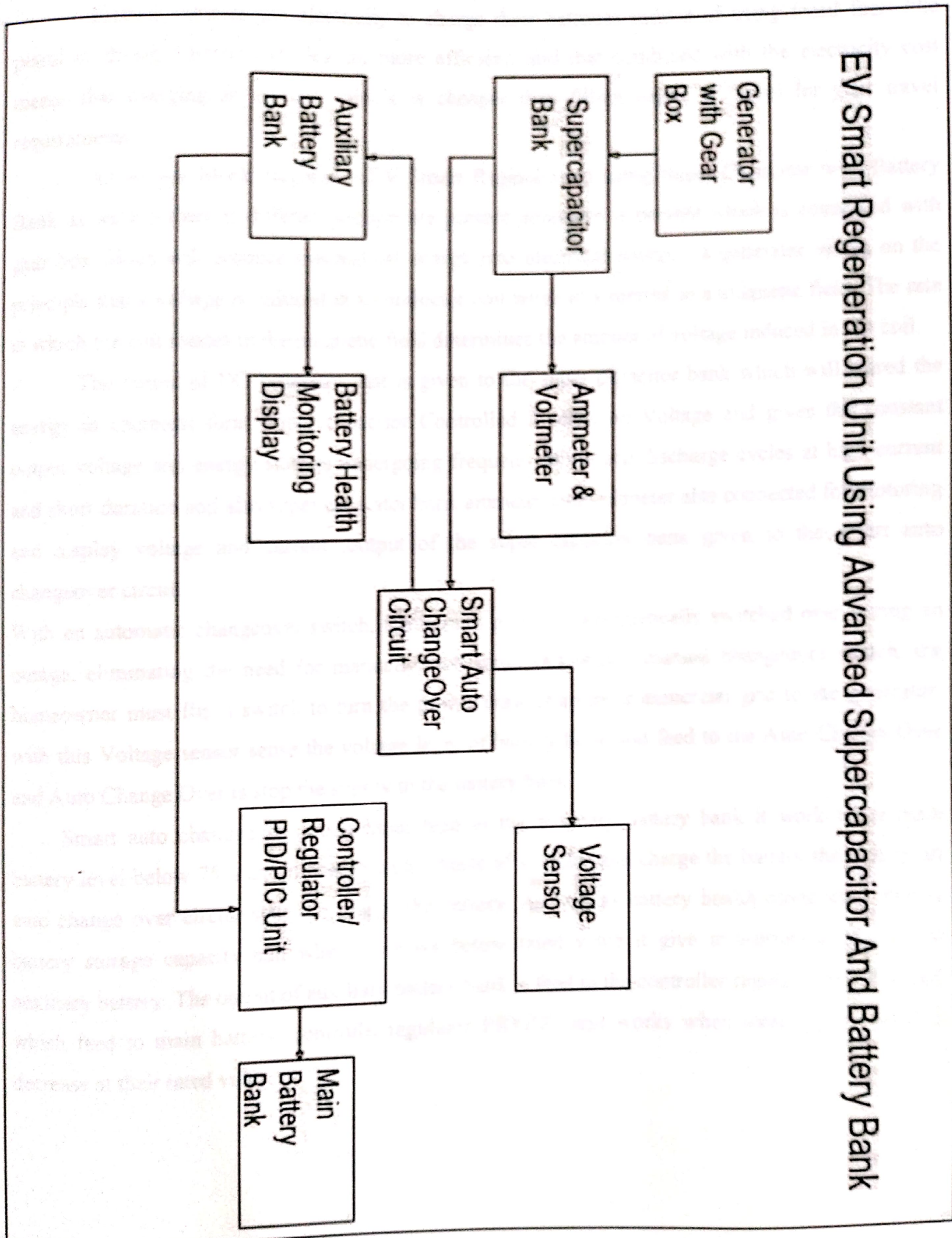


Fig 3.1:- Blok diagram of EV smart regeneration using advanced supercapacitor and battery bank.

4.1 Generator :-



Fig 4.1:-Generator

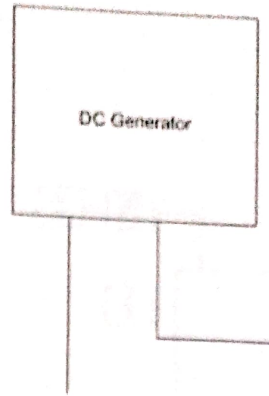


Fig 4.1.1:-circuit diagram

Specification:-

DC Generator
60 to 100 rpm,
15 to 18V

A direct-current (DC) generator is a rotating machine that supplies an electrical output with unidirectional voltage and current. The basic principles of operation are the same as those for synchronous generators. Voltage is induced in coils by the rate of change of the magnetic field through the coils as the machine rotates. This induced voltage is inherently alternating in form since the coil flux increases and then decreases, with a zero average value. The field current for the generator may be obtained from an external source, such as a battery or a rectifier. In this case, the generator is classed as separately excited. Alternatively, it may be noted that the output of the DC generator is unidirectional and therefore may be used as a source to supply its own field current, as shown in Figure 7B. In this case, the generator is referred to as shunt- excited. It has the advantage of requiring no independent electrical supply. Residual magnetic flux in the iron poles produces a small generated voltage as the machine is brought up to speed. This causes a field current that increases the flux and in turn the generated voltage. The voltage builds up until saturation in the iron limits the voltage produced. The stable value of generated voltage can be adjusted over a limited range by adjusting the value of a resistor placed in series with the field coil.

CHAPTER 06: OUTPUT

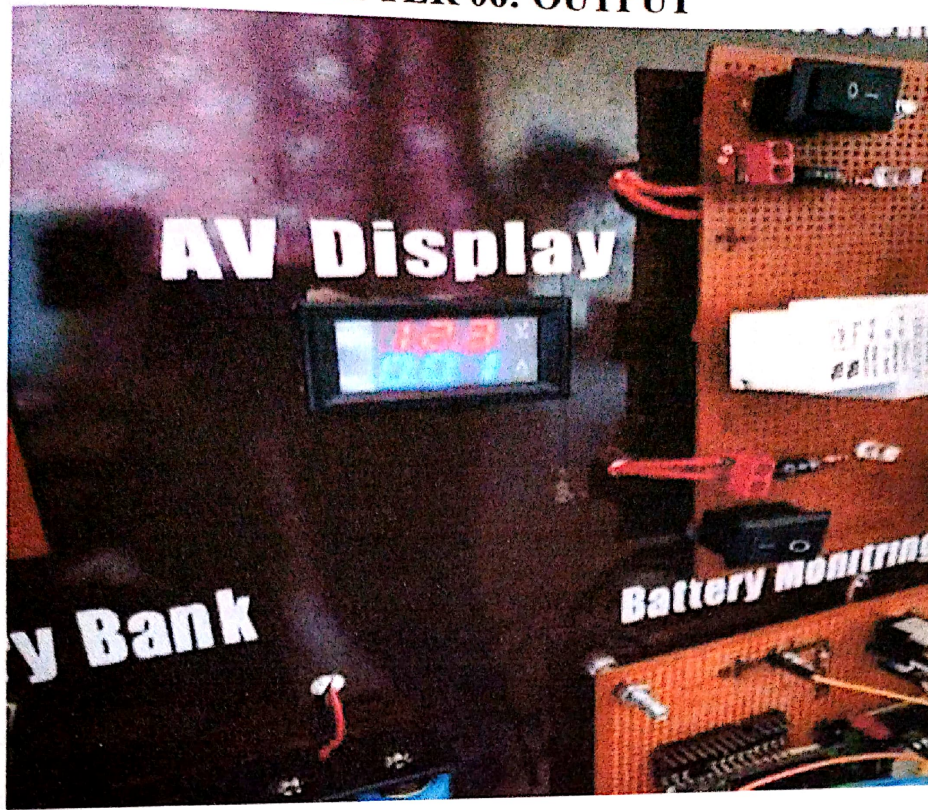


Fig.7 Voltage and Current Display

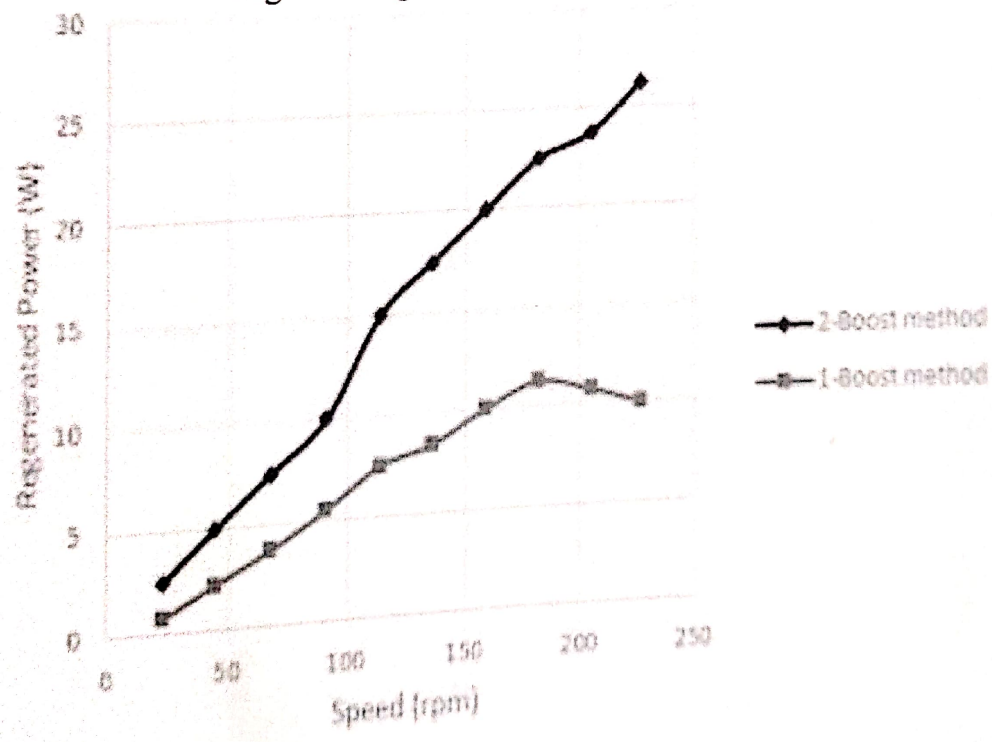


Fig.8 Regenerated Power and speed

A. Comparison of various Regeneration of EV

Regeneration methods	Speed (rpm)	Regenerated power (watt)
Plug in hybrid EV	60	10
Gravity force	65	10.5
Battery electric vehicles	75	13.5
Active control of hybrid source	70	13
Supercapacitor method	100	18

ADVANTAGES:

- a. Range Extension of EV.
- b. Backup or Reservoir system.
- c. Minimum losses due to Super capacitor.
- d. Easy maintenance.
- e. Convenient for customer's .
- f. Saving running cost.

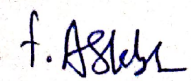
FUTURE SCOPE:

- It is system easily used in EV as well as in Hybrid Vehicle.
- In which added easily more new Technologies like PLC SCADA, DCS system etc.

CHAPTER 10: CONCLUSION

In this project we examined what is solution are currently available in order to increase the range of EV. This solution presents EV generation using its own wheels/front wheel and improving EV generation to store energy in batteries. Due to regeneration using this system the dependency on fossil fuel will be reduced. This system will minimize the running cost of electrical vehicle and improve the range of EV.


Several super capacitor models are presented, whilst agreeing that the multi-branch model is able to describe both the super capacitor dynamic and long term static behavior by taking into consideration the redistribution effect. The voltage regulator is in idle state when the super capacitor is undergoing redistribution. However, the DC voltage gain ratio was limited due to the presence of parasitic. Therefore, the boost mode has to be activated when the buck-boost mode was unable to meet the DC voltage gain ratio requirements, typically when the supercapacitor voltage is low compared to the output voltage


PROJECT GUIDE

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A
REPORT ON
INDUSTRIAL TRAINING REPORT

DOMESTIC ELECTRICAL
INSTALLATION

SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR DEGREE OF
B.TECH (ELECTRICAL ENGINEERING)
OF SHIVAJIUNIVERCITY, KOLHAPUR
BY

Name: Mohammadsaad Shafikmahammad kazi.

Roll No.: 11



Department of Electrical Engineering

**D.Y. Patil Technical Campus, Faculty of Engineering & Faculty of
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DIST:KOLHAPUR**

Academic Year: 2022-2023

CERTIFICATE


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FACULTY OF MANAGEMENT, TALSANDE, KOLHAPUR.

DEPARTMENT OF ELECTRICAL ENGINEERING




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This is to Certify that Mr. Mohammadsaad Shafikmahammad Kazi Of B.Tech (Electrical Engineering) has successfully completed industrial training & submitted the report for the partial fulfillment of the award of bachelor technology degree as laid by shivaji university, kolhapur, during the academic year 2022-2023.


Guide


Prof. G.A. Bongale


HOD

Prof. M.S. Bijali

DECLARATION

I hereby declare that the Industrial Training Report on Name of the Ravi industries, Industry is an authentic record of my own work as requirements of Minor/ Major Industrial Training during the period from 09/08/2022 to 25/08/2022 for the award of degree of B.Tech. (Electrical Engineering), D.Y.Patil Technical Campus, Faculty of Engineering & Faculty of Management, Talsande under the guidance of G. A. Bongale.



(Signature of student)

Mohammadsaad Shafikmahammad

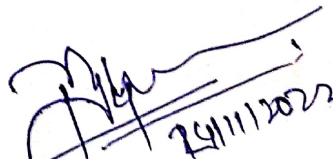
Roll No.11

Date: 23-11-22

Certified that the above statement made by the student is correct to the best of our knowledge and belief.


23/11/22
Guide

Prof. G.A. Bongale


24/11/2022
HOD

Prof. M.S. Bijali

I.C.9219

M.S.27274

M/s.D.B. & Son's Electricals

GOVT. LICE. ELECTRICAL, SUPERVISORS & CONTRACTOR

1286, "D" Shinde Lane, Uttareshwar Peth, Kolhapur.

Mob.No.: 9923069788

Date :- 02/09/2022

TO WHOM IT MAY CONCERN

This is to certify that, Mr.Kazi Mohammadsaad Shafikmahammad, D.E.E. students of Third year B.Tech in Electrical Engg. (D.Y.Patil Technical Campus, Talasande.)

Has been working as Trainee Engineer since a has as 9/08/2022 to 25/08/2022 . His performance was quite satisfactory. He wish him to all the best. In this Training in Line construction work & Installment of transformer center. And House Industrial wiring & Installment of Meter Bas Barr connection etc.

Kolhapur.

Date : 02/09/2022

Kand

M/s.D.B. & Son's

M/s D. B. & Son's Electricals
Govt Licenced Electrical Contractor
1286, 'D' Shinde Galli, Kolhapur.

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1. INTRODUCTION OF INDUSTRY

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Government licensed Electrical super wiser & Contractor

2. INTRODUCTION OF WIRING SYSTEM

Electrical Wiring system is a network of wires connecting various accessories for distribution of electrical energy from the supplier meter board to the numerous electrical energy consuming devices such as lamps, fans and other domestic appliances through controlling and safety devices is known as a wiring system

Electrical wiring is an electrical installation of cabling and associated devices such as switches, distribution boards, sockets, and light fittings in a structure.

Wiring is subject to safety standards for design and installation. Allowable wire and cable types and sizes are specified according to the circuit operating voltage and electric current capability, with further restrictions on the environmental conditions, such as ambient temperature range, moisture levels, and exposure to sunlight and chemicals.

Associated circuit protection, control, and distribution devices within a building's wiring system are subject to voltage, current, and functional specifications. Wiring safety codes vary by locality, country or region.

3. TYPES OF WIRING SYSTEM

1. Domestic wiring
 - I. Cleat Wiring
 - II. Batten Wiring
 - III. Casing- capping Wiring
 - IV. Conduit Wiring
 - i. Surface Conduit Wiring
 - ii. Council Conduit Wiring
2. Industrial wiring

1. Domestic wiring

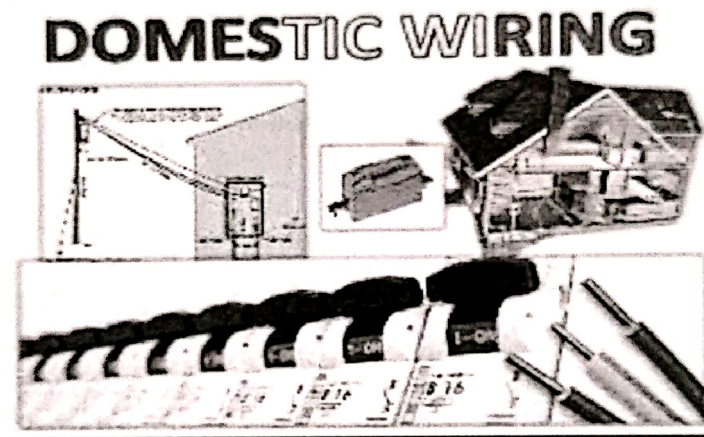


Fig. 3.1:-Domestic wiring

Domestic wiring may be defined as wiring done in domestic premises (house), for providing electrical power for lighting, fans and domestic appliances with all the safety precautions followed is called domestic wiring.

Homes typically have several kinds of home wiring, including electrical wiring for lighting and power distribution, permanently installed and portable appliances, telephone, heating or ventilation system control, and increasingly for home theatre and computer networks.

The typical house wiring types are the Joint box system, which is popularly known as the tree system of wiring, and the looping system type of wiring connection. Tree System of Wiring - When in electrical wiring, the appliances are connected through joints, is called a joint box or the tree system of wiring.

2. Industrial Wiring

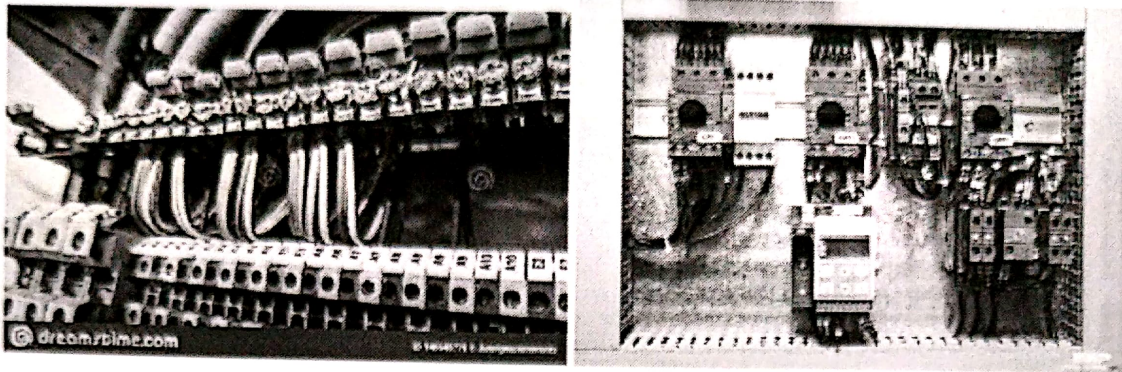


Fig.3.2 Industrial Wiring

Industrial wiring uses a three-phase design to create higher output to power high voltage equipment and multiple systems. Heavy-duty insulation protects industrial wiring from corrosive liquids or gasses. Sensitive and power-hungry machinery often require special, heavy-duty outlets.

As the process of powering by electricity and in many contexts the introduction of such power by changing over from an earlier power source.

Wiring devices provide proper control and connections in your electrical devices and wiring. Wiring devices are needed for efficient, reliable, and safe electrical wire connections in your home or business. They can protect circuits and prevent fire and shock hazards.

So availability of quality power is most important for industries

- i) It should produce sufficient illumination on the workingplane.
- ii)It should provide uniform distribution of illumination.
- iii) It should avoid glare and shadows.
- iv) It should be easy to dean.

I. CLEAT WIRING

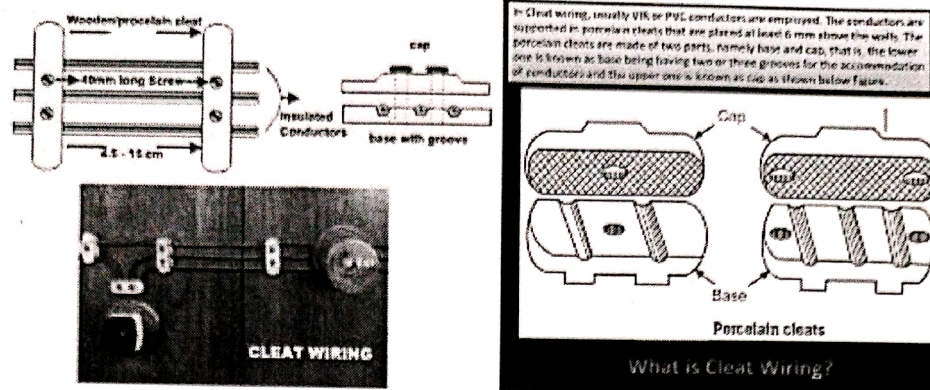


Fig.3.1.1:- Cleat Wiring

Cleat wiring is one of the cheapest wiring systems considering the initial cost and labor and it is most suitable for a temporary electrical wiring system. This wiring system is quickly installed, easily inspected and altered. In this type of wiring VIR or PVC insulated wire is used as a conductor.

This wiring system, All the cables are in open-air therefore fault is very easily found and replaced it very quickly and It is easy to fault detection. So nowadays cleat wiring used in most of the army Campus or festivals like marriage.

Cleat wiring is recommended only for temporary installment. The cleat is made in pairs having a bottom and top halves. So in the bottom, half is grooved to receive the wire and the top half is for cable grip. initially, the bottom and top cleat are fixed on the wall loosely according to the layout. Then the cable is drawn, tensioned and the cleat is tightened by the screw. The cleat is of the basic three types, having one, two or three grooves, so as to receive one, two or maximum three wires.

➤ Some precautions of cleat wiring:

- Cleat wiring is not suitable for those place where smoke, steam, dust, and risk mechanical injury is present.
- Do not install this wiring in as specially for stores and flammable places.
- The cap is not tightly screwed on the base because of cable is damaged and not as loosely screw that as a result, the cable is producing sag.
- The distance between branch circuits for single-phase supply is not less than 2.5 cm and for sub-main 4cm minimum.

➤ **Advantages of cleat wiring:**

- It is easy to fault detection.
- It is easy to repair.
- This is the temporary wiring system.
- It is the cheapest for internal wiring.

➤ **Disadvantages of cleat wiring:**

- It has a bad appearance.
- It is not looking good.
- This wiring system is not safe and durable.
- It is a chance to shock or fire.
- It is used only low-temperature places.

II. BATTEN WRING

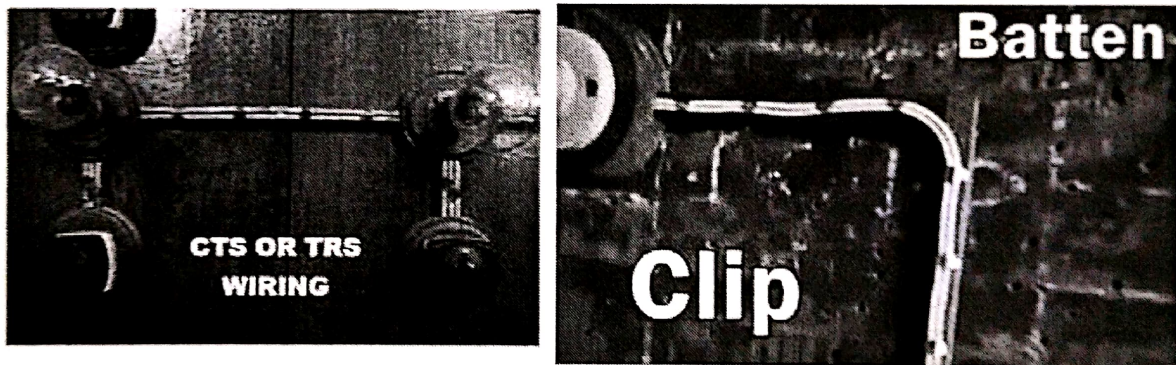


Fig.3.1.2:- Batten Wiring

This is when a single wire or some group of wire is laid over a wooden batten. These wires are held to the batten for using a brass clip and spaced at an interval of 10 cm for horizontal runs and 15 cm for vertical runs.

In this electrical wiring wooden batten wiring used. All the cable wiring is installed on the smooth batten steel clips and steels clip are installed on the surface of batten to equal to the wooden batten is installed on the wall with the help of a 1.5-inch screw. The batten available size 15,20,25,40 mm. Usually, PVC cable used for batten wiring. So you use proper wiring rules for how to used wires in-wall and put in an accessible junction box for the connected wires.

➤ **Precautions of Batten wiring:**

- Always installed the batten to the height of 5 above the ground.
- Use bridge joint when crossing of cables is required.
- Always varnish the batten before installation.

➤ **Advantages of batten wiring:**

- This is a simple wiring system.
- Batten wiring system is a better long life.
- Durable and have good strength.
- The chance of leakage current is very rare.
- It looks very beautiful.
- Wiring installation is easy and simple.

➤ **Disadvantages of Batten wiring:**

- The risk of fire is possible.
- After maintenance of the beauty of this wiring system is nor maintain.
- It is installed only for 220V.
- The risk of mechanical injury is possible.

III. CASING-CAPPING WIRING:

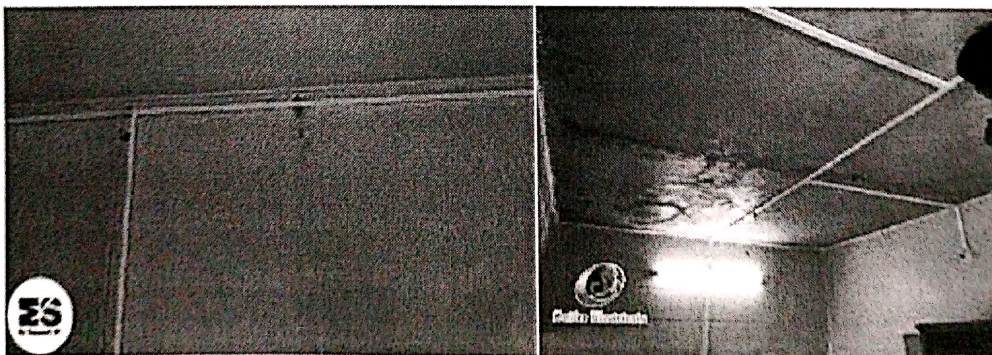


Fig.3.1.3:- Casing-capping wiring

This is one of the simple forms of electrical wiring systems. Casing capping is one of the oldest methods for the wiring system and it has been very popular is frequently used. In today's world, after post introduction of the conduit or sheathed wiring system, it is preferred for the wiring system.

As the name referred to in this wiring. the PVC insulated wires are placed in plastic casing and covered in with a cap. Hence its name is to be casing capping wiring. The process of connecting some accessories for distributing electrical energy from suppliers to home appliances such as lamps, fans, and other domestic appliances is known as the electrical wiring. It is one of the simplest forms of electrical wiring systems. When you have to use in casing capping wiring the best precaution of is that always use porcelain cleat or washed in between the wall and casing.

➤ **Advantages casing capping:**

- Stay for a long time in the field due to the strong installation of casing and capping.
- This wiring system is a strong and long-lasting Completely shockproof of wiring system.
- It is cheaper & Easy to use compared to a steel conduit and sheeted wiring system.
- It is considered as safe from smoke, dampness, and humidity.
- Customized installation can be done very easily & Fine finish for this system.
- Reduced risk of electric shock can be expected because all the cables are covered.
- This wiring system is cheap and durable.

➤ **Disadvantages of casing capping:**

- The humidity is directly effected by casing and capping, therefore, this wiring system is not used for humidity places.
- The initial cost of the system is high, so it is expensive..
- The place of acid and alkaline are present this system is not suitable.

➤ **Applications:**

- This wiring system can be used covering as well as protecting, unconcealed wiring
- Low voltage devices used in homes and offices

IV. CONDUIT WIRING:

The system of wiring in which all wires or cables from supply to load are passed through iron or PVC pipes is called a conduit wiring system. The objective behind passing wires through the pipes is to safeguard it against unpleasant consequences of weather conditions, physical breakdown, fire dangers, and atmospheric effects. It has to be kept in mind while passing cables through the pipes that its insulation does not get damaged. This type of wiring system is most widely used as compared to the rest of the wiring systems.

Types of Conduit Wiring According to Wiring method:

- i. Surface Conduit Wiring
- ii. Concealed Conduit Wiring

Types of Conduit According to Material/Structure:

The following two types of conduits are used in the conduit wiring system according to their structure.

- i. Metallic Conduit
 - ii. Non- Metallic Conduit
- i. **Metallic Conduit**

Metal conduits or pipes are fabricated from steel. These conduits are durable and also costly. Therefore, these are used only in high-standard construction. Technically, a number of merits have been observed in steel conduits e.g., at the time of fixing a conduit if there is a need to bend it, it can easily be done without any sort of breaking or rupture in pipes. Further, no cracks or hiatus occur in it. There are two types of metal conduit with respect to gauge.

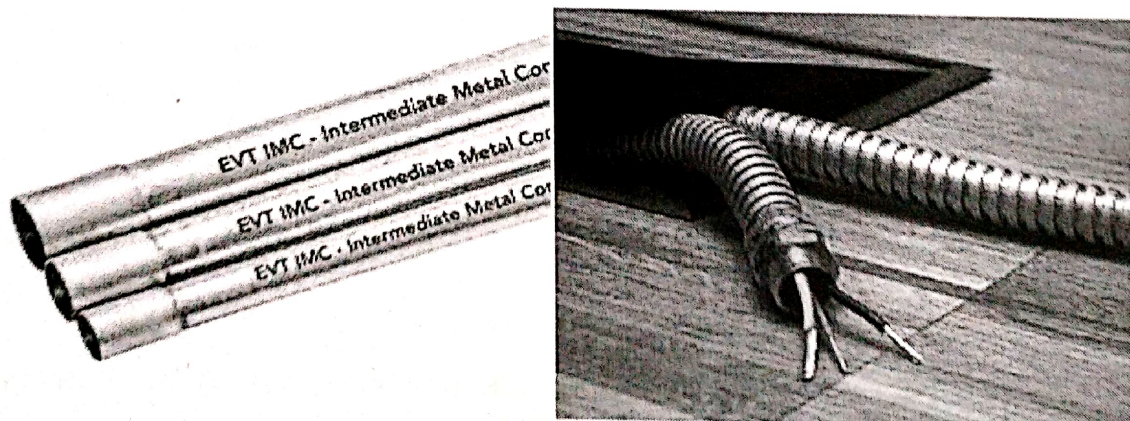
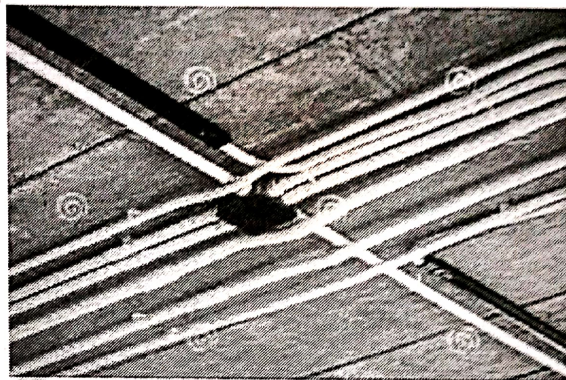
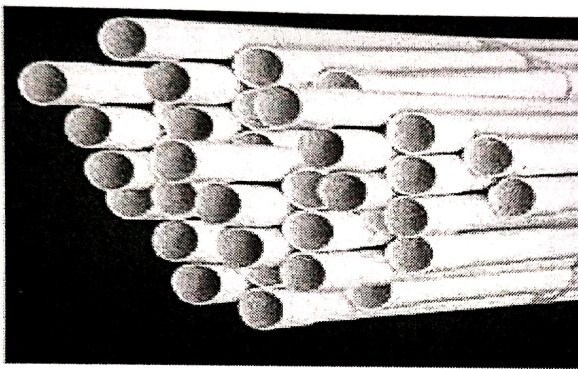


Fig. 3.1.4.1:- Metallic Conduit Wiring.

ii. **Non-Metallic Conduit**

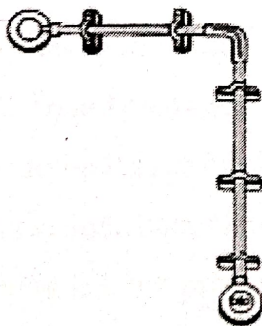
PVC conduits are abundantly used nowadays as a non-metallic conduits, because PVC pipes are quite flexible, and they can be twisted or bent quite easily. A hard PVC pipe can be bent according to ones' needs by means of providing heat to it through fire. The sizes of PVC pipes are also similar to metallic pipes and these pipes are available in coils. Whereas the length of every pipe ranges from 3 meters to 10 feet. As non-metallic pipes are being fabricated from insulator material, therefore the biggest issue in it is the electric continuity of the earth. That's why they are not earthed. As such, a separate earth system has to be devised for the purpose. Heavy gauge pipes are prepared in PVC form also, which are used in places where the probability of external pressure or concussion on wiring exists.



PVC Conduit Pipes

Fig.3.1.4.2:- Non-metallic conduit

i. **SURFACE CONDUIT WIRING:**



Surface mounting conduit system

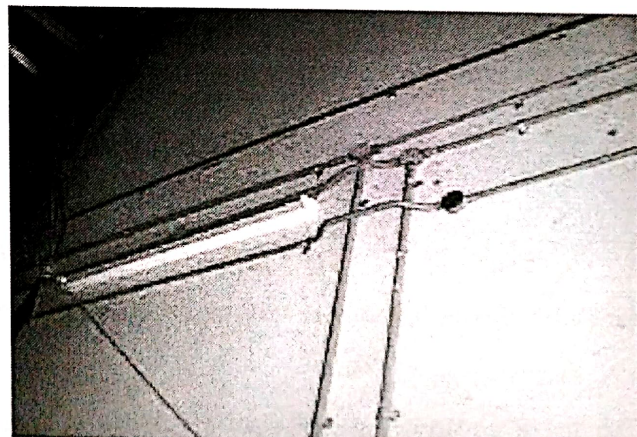


Fig.3.1.4.3:- Surface Conduit wiring

Surface Conduit Wiring When GI or PVC conduits are installed on walls or roof, it is known as surface conduit wiring. The conduits are attached to the walls with a 2-hole strap and base clip at regular distances. Electrical wires are laid inside the conduits.

If conduits are installed on the surface of a roof or wall, it is called conduit wiring. For this type of wiring, the first holes are made on the wall surface in a straight line at equal distances. Then rowel plugs are fixed into these holes and saddles are installed above these rowel plugs through screws. After this, conduits are installed above it. The size of the conduit used in this type of wiring depends on the number of wires going to be passed through it. Moreover, the size of conduit which is used in wiring, and fittings will also be used of the same size.

This type of wiring is extremely suitable for houses, factories, and industries.

➤ **Precautions in Surface Conduit Wiring**

1. Conduit fittings must always be installed on walls according to conduits weight
2. Wires should not be penetrated through the conduit in excess of the required numbers
3. Pipes should reach inside up to the metal boards and bushes should be installed on their heads or ends
4. PVC pipes must not be used in places where the danger of mechanical disruption or wear and tear persists
5. All bends on pipes should be in a rounded form so that wires insulation is not scratched at the time of dragging wires

➤ **Advantages**

1. Alterations or additions are possible in this system according to future needs
2. Its revamping, repairing, and maintenance is quite easy
3. In case wiring is performed in an expert manner, it seems relatively good-looking
4. It has a long life
5. It is a reliable and popular method for wiring purpose.

➤ **Disadvantages**

1. It tends to be less attractive as compared to the concealed wiring
2. It requires significant labor and skilled technicians
3. If earthing has not properly been done, then in the case of metal conduit, the risk of an electric shock lingers on
4. It is difficult to trace out fault and repair it quickly. Repair work involves a lot of time-consuming
5. If a metal conduit has been used in wiring, it becomes imperative to get it earthed, which obviously involves extra costs.

ii. CONCEALED CONDUIT WIRING:

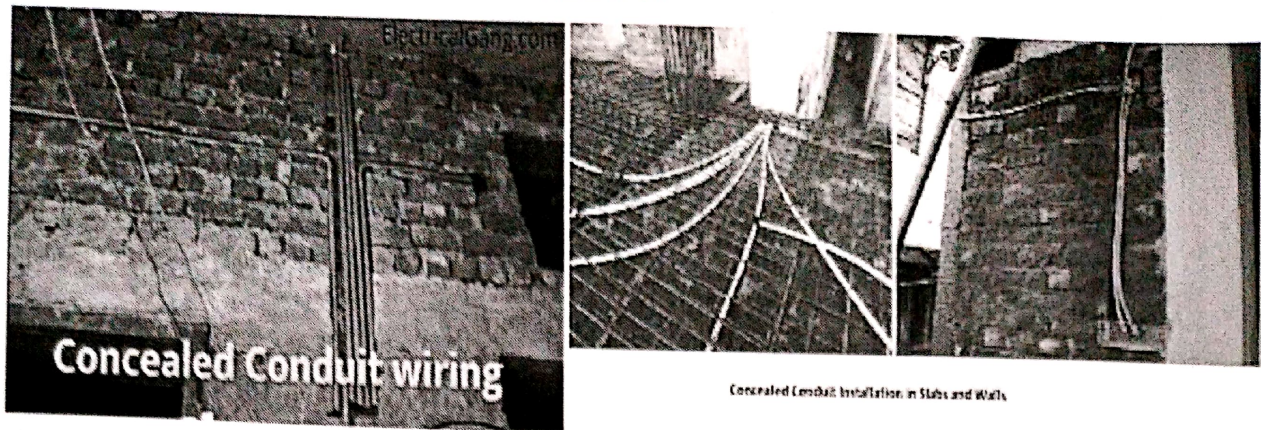


Fig.3.1.4.4:- Concealed Conduit Wiring

The concealed conduit wiring system is the most popular, most common type of house electrical wiring used. Conduit wiring is a professional way of wiring a building and domestic wiring. Let us talk about what is conduit wiring, materials and tools are used in conduit wiring and how to install, uses, precautions a concealed conduit wiring system.

If PVC conduit is concealed by means of carving grooves on the wall, and then plaster is done above it, this type of wiring is called concealed conduit wiring. As this type of wiring is not visible from outside, only switches and lamp holders are visible, therefore it is known as concealed conduit wiring. In other words, wiring carried out inside a pipe within a wall is called concealed wiring. In the concealed type wiring, grooves are formed on the wall, pipe fitted in it, and then covered with plaster. Only junction box spots remain visible, wherefrom wiring can be looked after and repaired. Conduit pipes are tightly fixed onto the walls through hooks prior to being plastered. Prior to putting concrete on a roof during a lintel, PVC conduit pipes are spread all over the roof, whereas prior to doing plaster on the building walls, grooves are dug onto the walls, and then conduit pipes are fixed in these grooves. It is then plastered. After the plaster has been completed on roofs and walls, wires are inserted into these fitted conduits with the help of steel wires. As conduits are not visible in this type of wiring, therefore it remains protected against fire, water, moisture, and other weather conditions. In the concealed wiring system, all switchboards are also fitted on walls and flush-type switches and sockets are used in this type of wiring. This type of wiring is commonly used in houses, offices, bungalows, and all other modern buildings, etc.

➤ **Precautions in Concealed Conduit Wiring:**

1. On a concrete roof, conduit must be spread before the roof is being concreted
2. At the time of putting conduits on a concrete roof, pipes of different points should be combined directly, and bends should be avoided as far as possible.
3. Mouths of conduits should properly be covered with some paper, so that cement does not freeze on it during plaster
4. If metal conduits have not been used for installing wires on an iron box, then the box should be earthed separately.
5. While passing wires through a conduit, wires must be dragged in such a fashion that their insulation does not damage.
6. The number of cables going to be passed through a conduit should be such that enough space or capacity remains available even after the existence of these wires.

➤ **Advantages of Concealed wiring**

1. This wiring seems pretty attractive due to the fact that the conduit is buried with the walls.
2. It is protected against all sorts of weather as well as chemical effects
3. There is no danger of conduits getting uprooted
4. It is one of the safest wiring systems
5. It is most popular as well as reliable as compared to the rest of the wiring methods
6. There is no menace of electric shocks or accidents.

➤ **Disadvantages of Concealed wiring**

1. Once the wiring has been completed, additions or alterations in wiring become difficult
2. It is more costly as compared to other types of wiring
3. It is difficult to find out the defect and remove it
4. Extra hard work is required for making grooves apart from being time-consuming.

4. TYPES OF WIRE

- I. V.I.R Cable
 - II. Weatherproof /Service Wire
 - III. Single Conductor Wire
 - IV. Multi-conductor Wire
 - V. Lead Sheathed Wire
 - VI. PVC wire
 - VII. Flexible Wire
- I. V.I.R.(Vulcanized Rubber) Cable

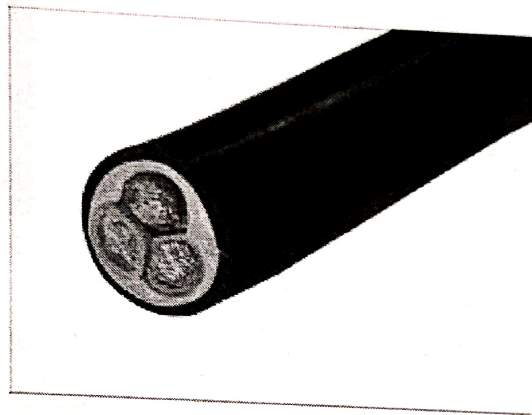


Fig.4.1:- VIR Cable

The VIR Cable is made up of a tinned conductor made with rubber tubings. These cables are widely used for insulating various applications in homes. These cables act as a protecting layer from various elements. The VIR Rubber Cable is braided to ensure the conductor is protected against moisture.

II. Weatherproof /Service Wire

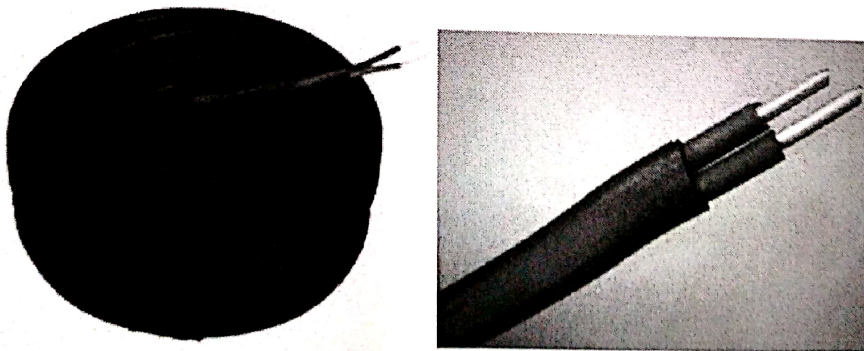


Fig.4.2:- Weatherproof /Service Wire

The conductors (electrical cable with multiple wires) that connect and carry the electrical current the service conductors (drop or lateral) above ground to the service equipment of the building. It can also be used as a panel feeder and in branch circuits.

Press fit aluminum service wires are ideally used for drawing mainlines to houses, buildings, and complexes. Due to their low volume density and excellent cost-efficiency, they are used as an alternative conductive material instead of copper for various commercial large systems.

III. Single Conductor Wire:

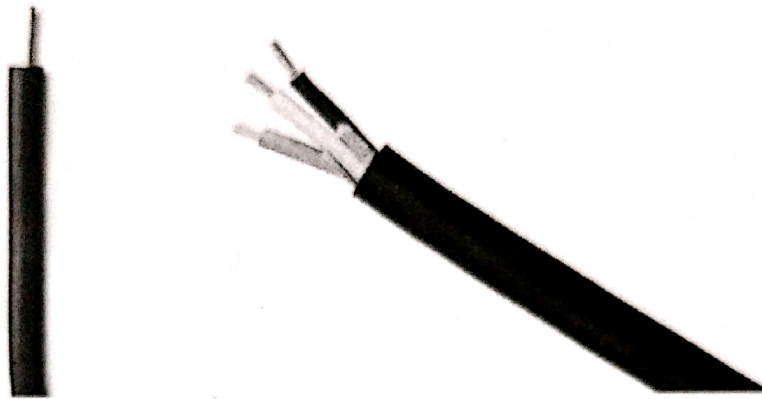


Fig. 4.2:- Single Conductor Wire

Single Conductor wire is the most popular choice for electrical layout inside a home. It is available in multiple gauges, color (for phase, neutral and ground identification) and solid or stranded conductors. A single solid wire provides better connections but single stranded wires are easier to route through conduits. Both of them are available in THW and THHN insulation. Single conductor wire or most commonly known as just wire, is made of a single insulated conductor. It is the most popular choice for residential wiring. It is available in multiple colors for phase and earth identification.

IV. Multi-Conductor Cable:

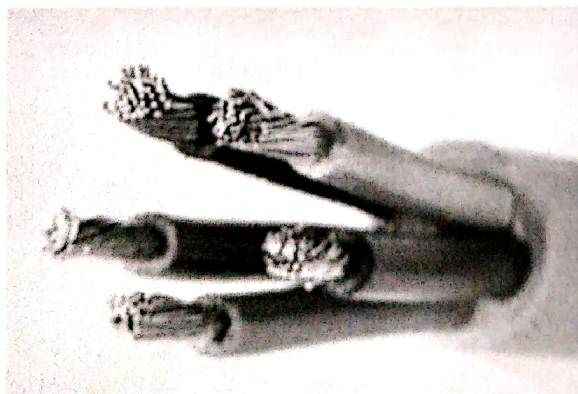


Fig.4.4:- Multi-Conductor Cable

Multi-core or multi-conductor cable has multiple conductors with insulated sheaths that are rolled into one jacketed cable. Its job is to avoid the messy connection by having one single cable instead of 10 or 20 separate wires and save time by connecting them one by one.

V. Lead Sheathed Wire:

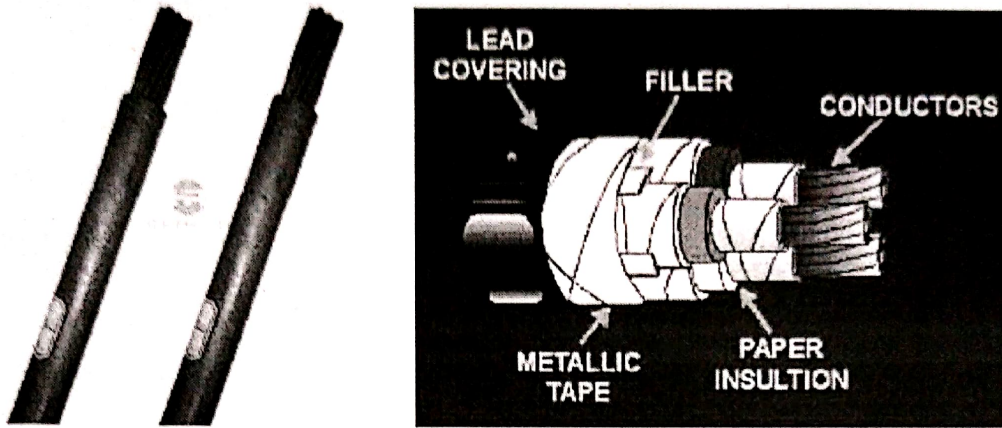


Fig.4.5 Lead Covered Wire

A lead sheath can be used as a chemical barrier in low, medium and instrumentation cables for all kinds of petrochemical projects. The advantages of lead sheathed cables are: Protection against the entry of hydrocarbons. Protection against moisture ingress. Can be used as an earthing or grounding system.

It is used in the places where dampness, exposing to run and rain etc. are there. It should not be used the places, where in chemical corrosion may occur.

VI. PVC (Poly Vinyl Chloride)wire:

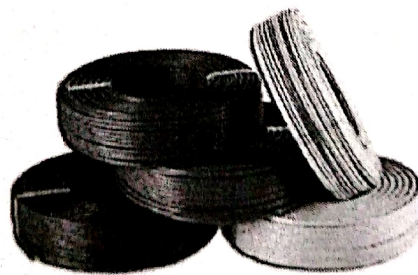


Fig. 4.6 PVC wire

Polyvinyl chloride and rubber are examples of insulators. They do not allow an electric current to pass through them, therefore even if we come into contact with the wires, we will not be shocked because the current will not pass through our bodies.

PVC wires and cables are commonly used for home appliances, wiring of circuits, instruments, house wiring, mining operations, power supply solutions, submarines, ship wiring, etc. they're even used in high temperature-sensitive environments like kitchen and related appliances.

VII. Flexible Wire:

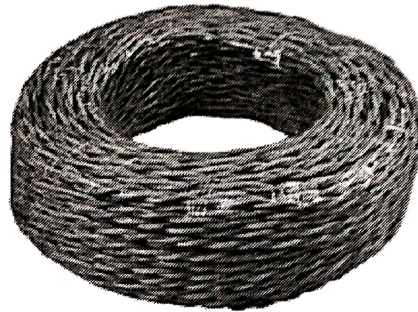


Fig.4.7:-Flexible Wire

Flexible cables are a type of electrical cables that can withstand continuous bending in moving applications. The flexibility is achieved by using stranded conductors. They are used in automation industries where the machines are continuously moving such as pick and place machines and CNC based machines such as engraving, milling machines etc.

Flexible Cable, also referred to as Flexing Cable, is a cable that provides extra flexibility and durability for applications with challenging cable positioning or motion. In most constructions, they have PVC or neoprene jacketing and insulation.

5. Tools Used In Electrical Wiring

1. Drill Machine:-

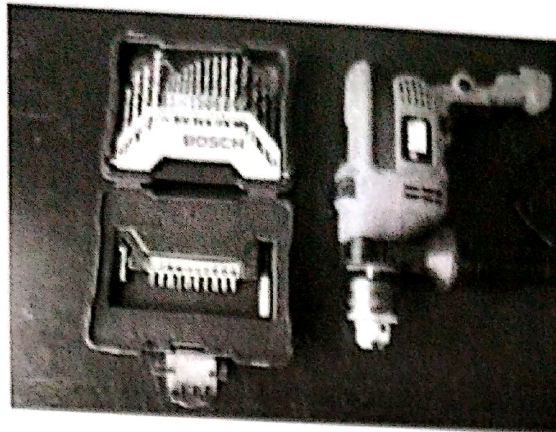


Fig.5.1:- Drill Machine

Drilling machines use a drilling tool that has cutting edges at its point. This cutting tool is held in the drill press by a chuck or Morse taper and is rotated and fed into the work at variable speeds. Drilling machines may be used to perform other operations.

2. Hammer:-



Fig.5.2:-Hammer

Hammers feature a standard hammer on one side of the tool, primarily used for inserting fixtures like nails, and a dual steel claw at the other end, which is designed to enable the easy removal of the same nails or similar fixtures by applying a robust grip.

Hammer, tool designed for pounding or delivering repeated blows. Varied uses require a multiplicity of designs and weights. Hand hammers consist of a handle and striking head, with the head often made of metal with a hole in the centre to receive a wooden handle.

3. Insulated Screw Driver:-

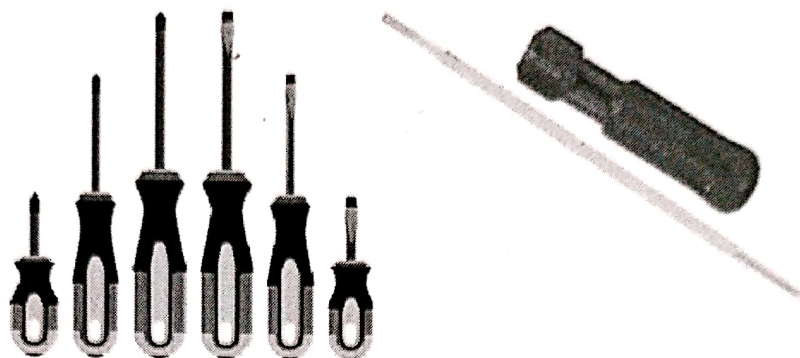
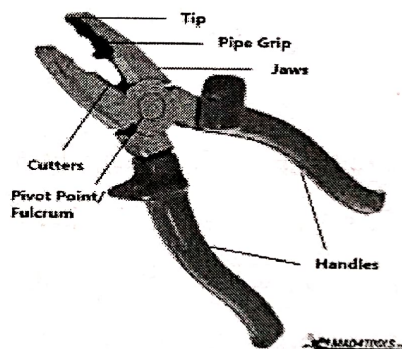


Fig.5.3 :-Insulated Screw Driver

Screwdrivers are one of the most traditional of tools but are still indispensable for most electricians who frequently require access to electrical containers sealed with screws. There are multiple sizes and shapes available for compatibility with the abundance of screw designs.

Screwdrivers work through the simple application of torque – rotational force when the head of the screwdriver has been inserted into the slot on the screw. Electrician’s screwdrivers feature carefully designed, insulated handles to provide protective electrical resistance. This will be indicated by VDE approval.

4. Insulated Pliers:-



Fig, 5.4:- Insulated Pliers

Pliers are another tool that has been with us for a long time. Their versatility means they can be used to accomplish a multitude of tasks requiring ‘torque’, working in a much more robust manner than would be possible with the use of bare hands alone.

Nowadays pliers are usually made from steel to provide additional strength to the grip exerted by the jaws.

5. Electrical Tape:-



Fig.5.5:- Electric Tap

Electrical tape is used to insulate wires or other items that conduct electricity. Also known as insulation tape or electrical insulation tape, it is self-adhesive and pressure-sensitive, built to resist abrasion, heat and liquids in order to protect the sensitive conducting core within electrical wiring.

It is also made from different materials, including PVC, vinyl, copper foil and glass cloth. Different varieties feature varying colors, widths, thicknesses, temperature tolerance, adhesion strength and insulating capabilities.

The colours help electricians select the correct type and also enable them to colour code the wires they are working with.

Black tape is the most widely used colour - for general insulation and in order to indicate the low voltage neutral point in a circuit. Meanwhile, in the UK green and yellow tape typically indicate the protective earthing point. Blue tape is usually used to colour code low voltage neutral wires and red marks low voltage AC wires.

6. Hacksaws:-

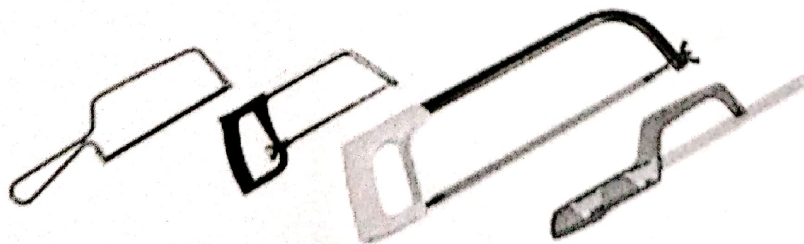


Fig.5.6:- Hacksaw

Hacksaws are fine-toothed saws designed primarily for cutting through metal. The thin blades are held at tension in an adjustable frame, between the head of the saw and the pistol grip handle. These blades can break or become blunt but are easily replaceable.

Full sized hacksaws typically feature 12-inch blades. Meanwhile junior hacksaws are typically much smaller, with even finer teeth designed for more precise work.

7. Cable cutters:-

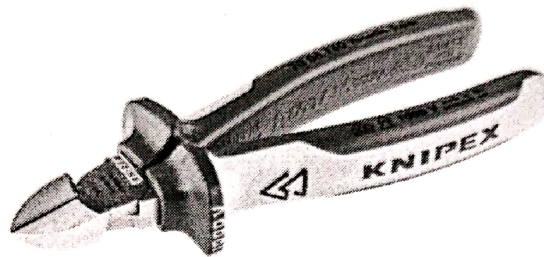


Fig.5.7:-Cable Cutters

Cable cutters are a staple of every electrician's tool kit. These versatile tools feature steel blades and cut through standard wiring easily. Stronger cable shears will make short work of even thicker cabling. They also provide a handy way to strip off insulation for crimping and similar operations quickly.

Different models enable cuts of different kinds, from straight multi-purpose designs to those made especially for flush cutting or diagonal slicing. Fully insulated models are suitable for use with high voltage wiring, electrical equipment and environments high in electrostatic discharge, making them an ideal choice for electricians.

8. Wire Strippers:-



Fig.5.8:- Wire Stripper

A wire stripper is a portable handheld tool used by workers, especially electricians, for removing the protective coating of an electric wire in order to replace or repair the wire. It is also capable of stripping the end portions of an electric wire in order to connect them to other wires or to terminals

Wire strippers are plier-like tools used to remove the insulating outer sheath from cables in order to attach terminals or connectors to the central core via crimping or soldering. Some strippers also allow electricians to cut right through the copper or conduit in a wire or cable.

9. Tester:-

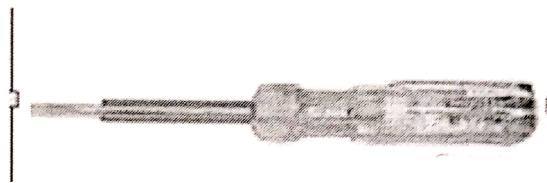


Fig.5.9:-Tester

A continuity tester is an item of electrical test equipment used to determine if an electrical path can be established between two points;^[1] that is if an electrical circuit can be made. The circuit under test is completely de-energized prior to connecting the apparatus.

10. Digital Multimeter:-

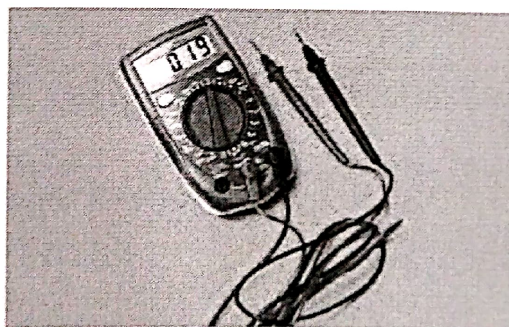


Fig.3.10:- Digital Multimeter

A digital multimeter, or DMM, measures and verifies multiple electrical stimuli, including voltage, current and resistance. It's a daily diagnostic tool used by technicians and electrical engineers and combines the features of a voltmeter, ammeter and ohmmeter.

6. CONNECTION DIGRAM

1. One Lamp Control by 1 Switch:-

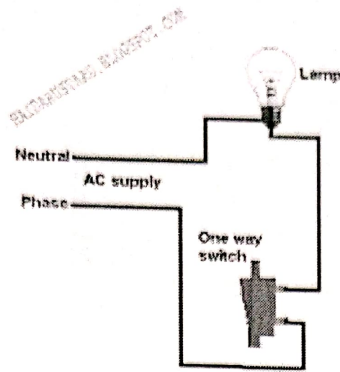


Fig.6.1:- One Lamp Control by 1 Switch

2. One Lamp Control by 2 Switch:-

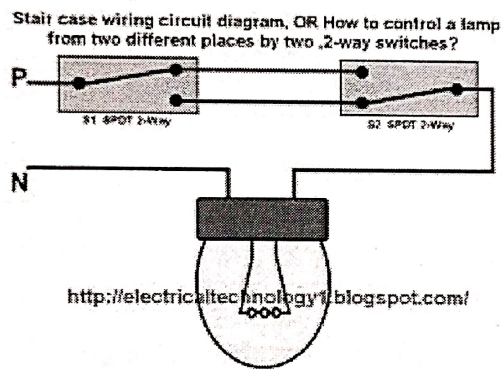


Fig.6.2:-One Lamp Control by 2 Switch

3. One Lamp Control by 3 Switch:-

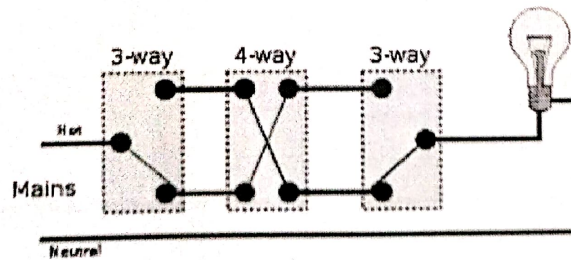


Fig.6.3:-One Lamp Control by 3 Switch

4. Stair-Case Wiring:-

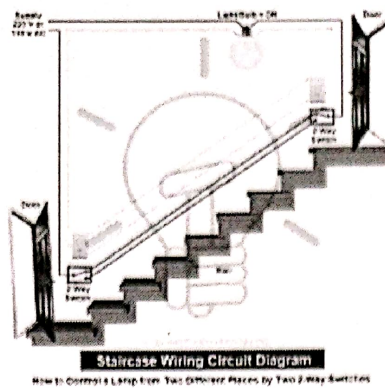


Fig.6.4:-Stair-Case Wiring

5. Godawun Wiring:-

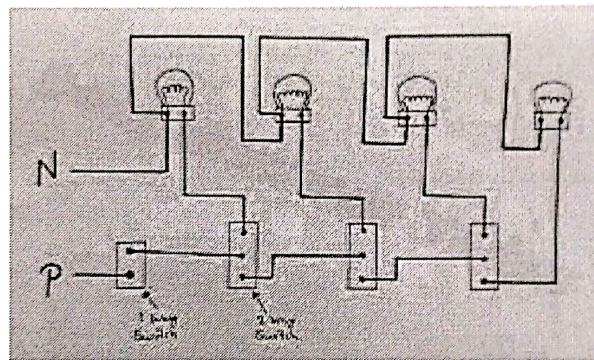


Fig.6.5:-Godawun Wiring

6. Single line diagram of electrical installation:-

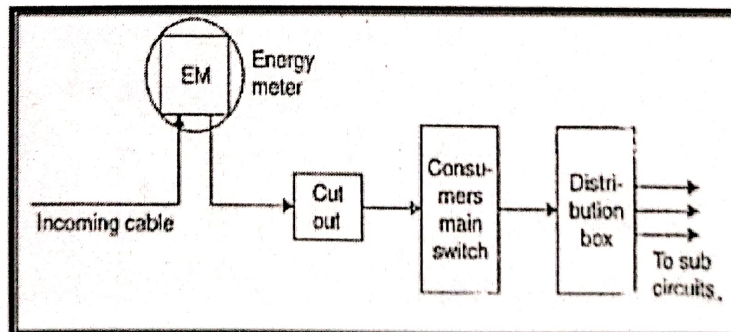


Fig.6.6:- Single Line Diagram Of Electrical Installation

7. Line diagram of service line to main switch connection

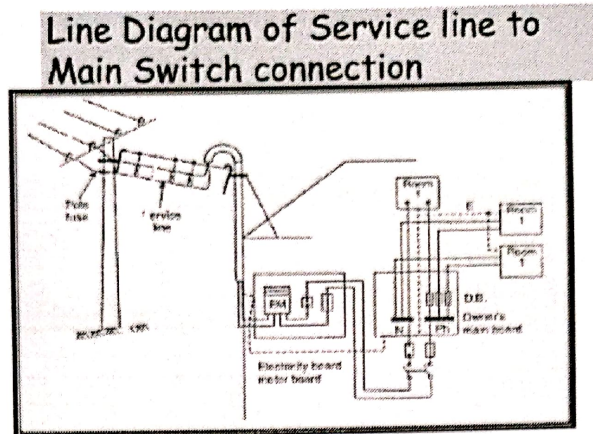


Fig.6.7:- Line diagram of service line to main switch connection

8. Single line 2-wire line diagram

Single Phase 2-wire line diagram

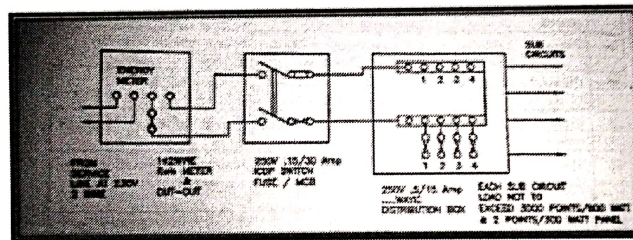


Fig.6.8:-Single line 2-wire line diagram

9. 3-phase ,2-wire ,load up to 6kw

3-phase, 2-wire, load up to 6kw

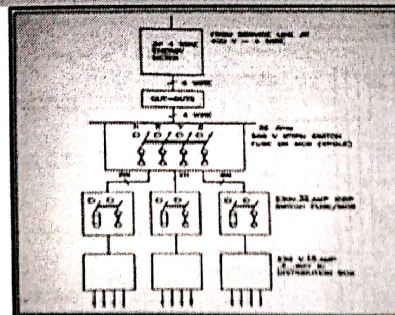


Fig.6.9:-3-phase ,2-wire ,load up to 6kw

10. House Distribution Panel:-

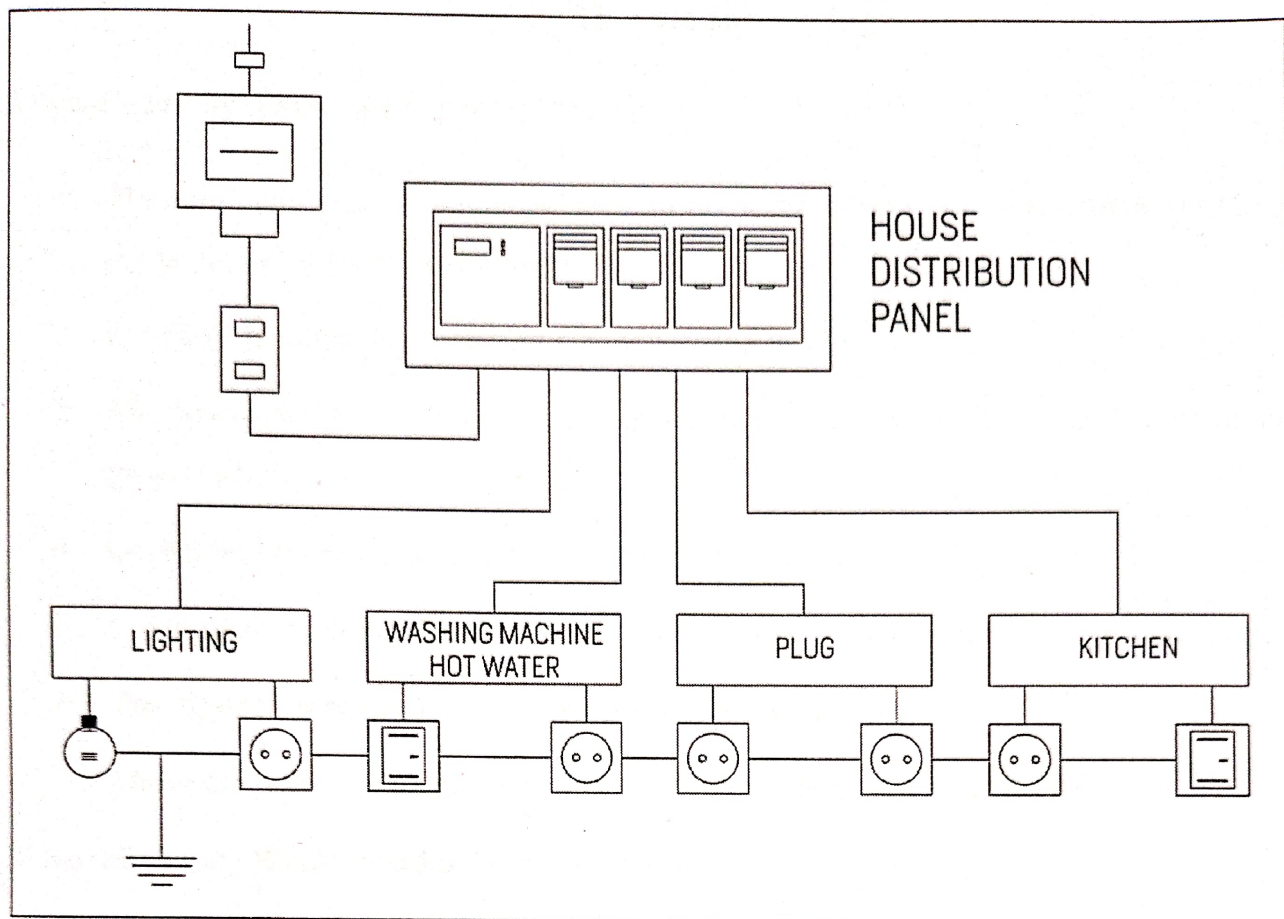


Fig.6.10:- House Distribution Panel

7. IE rule for wiring

Indian electricity rules regarding to internal wiring:

1. The minimum size of conductor used in domestic wiring not be less than 1/1.12 mm in copper or 1/1.40 mm in aluminum wire.
2. For flexible wires the minimum size for wiring is 14/0.193 mm.
3. The height for meter board, Main switch board are to be fitted 1.5 meters above the ground level.
4. Casing will be run at a height of 3.0 meters from ground level.
5. Light brackets should be fixed at a height of 2 to 2.5 meters above the ground level.
6. The number of points in a sub circuit is not more than 10.
7. Maximum load in a single sub circuit is 800W or not more than 1000W.

Indian electricity Rules regarding to power wiring:

In a power sub circuit the load is normally restricted to 3000 watts and number of outlets is two in each sub circuit.

All equipment used in power wiring should be iron clad construction and for wiring use armoured cable.

The length of flexible conduit used for connections between the terminal boxes of motors and starters not more than 1.25 meter.

Every motor, shall be provided with a switch fuse placed near it.

8. SAFETY & PRECAUTION

1. The first step of electrical safety, avoid water at all times when working with electricity. Never touch or try repairing any electrical equipment or circuits with wet hands. It increases the conductivity of the electric current.
2. Never use equipment with frayed cords, damaged insulation, or broken plugs.
3. If you are working on any receptacle at your home then always turn off the mains. It is also a good idea to put up a sign on the service panel so that nobody turns the main switch ON by accident.
4. Always use appropriate insulated rubber gloves and goggles while working on any branch circuit or any other electrical circuit.
5. Be Careful You Touch, Never touch plumbing or gas pipes while working with electricity they are often used to ground electrical systems.
6. Never splice wires together and conceal them within a wall without a junction box — an accessible junction box should always be used to join wires.
7. Replace Old Wiring That Shows Signs Of Deterioration or Fraying
8. Fix Fuse and Breaker Problems
9. Don't Overload Overloaded outlets or extension cords can create a fire hazard.
10. Always use insulated tools while working.
11. Electrical hazards include exposed energized parts and unguarded electrical equipment which may become energized unexpectedly. Such equipment always carries warning signs like "Shock Risk". Always be observant of such signs and follow the safety rules established by the electrical code followed by the country you're in.
12. Never try repairing energized equipment. Always check that it is de-energized first by using a tester. When an electric tester touches a live or hot wire, the bulb inside the tester lights up showing that an electrical current is flowing through the respective wire. Check all the wires, the outer metallic covering of the service panel, and any other hanging wires with an electrical tester before proceeding with your work.

9. CONCLUSION

Training At "D.B.& Son's Electricals & Contractor", This Helps Me To Gain Knowledge By Experiencing Various Work In Domestic Electrical Installation.

Being A Student, One Can Acquire Industrial Experience. & At The Same

Time Familiarize With The Real Working Environment At The Industrial

Training Site.

We are made aware of save energy & reduce the wastage energy &safty precautions of electrical shock in electrical work. We think that our training was successful. Which may be quite useful for our fore coming studies.

INDUSTRIAL TRAINING REPORT

MECHANICAL ENGINEERING DEPARTMENT MANUFACTURING INDUSTRY

Submitted to



Shivaji University, Kolhapur
In partial fulfillment of the Requirements for the award of

Degree of Bachelor of Technology in Mechanical Engineering

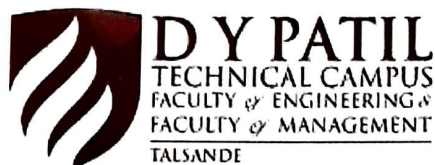
Name: OM ABHAY UGAVE

University Roll No.: 2020078790

Semester/Branch: 7TH / 8th MECHANICAL ENGINEERING

SUBMITTED TO:

MECHANICAL ENGINEERING



**D.Y.Patil Technical Campus, Faculty of Engineering & Faculty of
Management, Talsande.**

CERTIFICATE

This is to certify that Mr. / ~~Ms.~~ Om A. Ugave has partially completed / completed / not completed the Minor/ Major Industrial Training during the period from 10/8/22 to 26/8/22 in our Organization / Industry as a Partial Fulfillment of Degree of Bachelor of Technology in Department Name. He / ~~She~~ was trained in the field of Mechanical.

Signature & Seal of Training Manager

Note: Xerox copy of the certificate issued from the Training company need to be attached instead of this page.

SRC INDUSTRIES

Mfg. of All Types of Precise Automotive & Machine Components

Gat No. 549, Nerli - Tamgaon Road, MIDC, Gokul Shirgaon, Kolhapur 416234

Email ID - srcindustries@gmail.com

Ref No - 05 /2022

Date : 27/08/2022

To WHOM IT MAY CONCERN

CERTIFICATE

This is to certify that Mr . Om Abhay Ugave is the student of 4 th year B.E. Dr D.Y.Patil Collgege of Engineering , Talsande Kolhapur has successfully completed his vocational In - Plant Industrial Training at our Organization from 10 /08/2022 To 26 /08 /2022.

He shown keen interest and eagerness in his work, his performance and conduct was found to be Satisfactory during training period.

Yours Faithfully,

For SRC INDUSTRIES



Authorized Signatory
S.R.C. INDUSTRIES
Gat No. 549, Nerli,
Nerli-Tamgaon Road, M.I.D.C.
Gokul Shirgaon,
Kolhapur - 416 234

DECLARATION

I hereby declare that the Industrial Training Report on Mechanical engineering / Manufacturing Industry is an authentic record of my own work as requirements of Minor/ Major Industrial Training during the period from 10 /08/2022 to 26/08/2022 for the award of degree of B.Tech. Mechanical engineering, D.Y.Patil Technical Campus, Faculty of Engineering & Faculty of Management, Talsande under the guidance of prof. T.C.doijad


(Signature of student)

(OM ABHAY UGAVE)

(University Roll No. 2020078790)

Date: 28/12/22

Certified that the above statement made by the student is correct to the best of our knowledge and belief

Examined by: Prof. T.C.doijad


(Signature)

Name of Faculty Facilitator: Prof. T.C.doijad


(Signature)

Head of Department: Prof. Manan Faras

ACKNOWLEDGEMENT

First and foremost, I wish to express my sincere thanks and gratitude to my esteemed Mentor “**Mr.amit chougale**” who has contributed so much for successful completion of my Industrial Training by his thoughtful reviews and valuable guidance.

Next I would like to tender my sincere thanks to “**Prof. Manan Faras**” (Head of Department) for his co-operation and encouragement.



(Signature of student)
(OM ABHAY UGAVE)
(University Roll No. 2020078790)

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About company

Business name	SRC industries
address	Gate no.549 M.no.784 , nerli tamgaon Road,MIDC gokul shirgaon kolhapur
Pincode	416223
Entity type	proprietorship
Registration type	Regular
Deparment code & Type	KOLHAPUR,MH004,UE0304,RANGE-IV
Nature of business	[u'others'],others
Registration date	01/07/2017
Email	srindustries@gmail.com

Details of SRC industries :

SRC Industries is registered in Maharashtra state only as per our database. As per information available with us owner of this business do not have business in any other state. If you think our information needs to be updated, please verify GST number that you have.

PRODUCTS

SRC Industries are manufacturing and supplying machined casting, assemblies which includes mainly Cylinder Head, Cylinder Block (Single to Six cylinder), Case Transmission, Flywheel Housing, Clutch Housing, Differential Housing, Engine Bed Frame, Rear Axle Housing, Brake Drums, Front Axle Support, Crank Shaft, Hubs, Bogie Anchorage, King Post etc. to aforesaid industries.

SRC Industries is a manufacturer of proprietary products for use in various industries, including oil & gas, manufacturing, agriculture, mining, and more.



VALVE DIG.A

DIG.A



AXEL HOUSING

DIG.B



GEARBOX HOUSING

DIG.C

COMPANY CUSTOMERS

GPI produces dependable valves and equipment used by the top corporations in the industrial sector. From oil & gas equipment to earth-moving and agriculture transmissions, we offer a wide range of solutions for increasing the efficiency of operations

GPI is a trusted name with 60 years of industry experience. Through the decades, we have continued to embrace the latest technologies to deliver superior precision engineering products around the globe



INTRODUCTION

In Industry it is not efficient or profitable to make everyday products by hand. On a CNC machine it is possible to make hundreds or even thousands of the same items in a day. First a design is drawn using design software, and then it is processed by the computer and manufactured using the CNC machine. This is a small CNC machine and can be used to machine woods, plastics and aluminum. In industry, CNC machines can be extremely large.

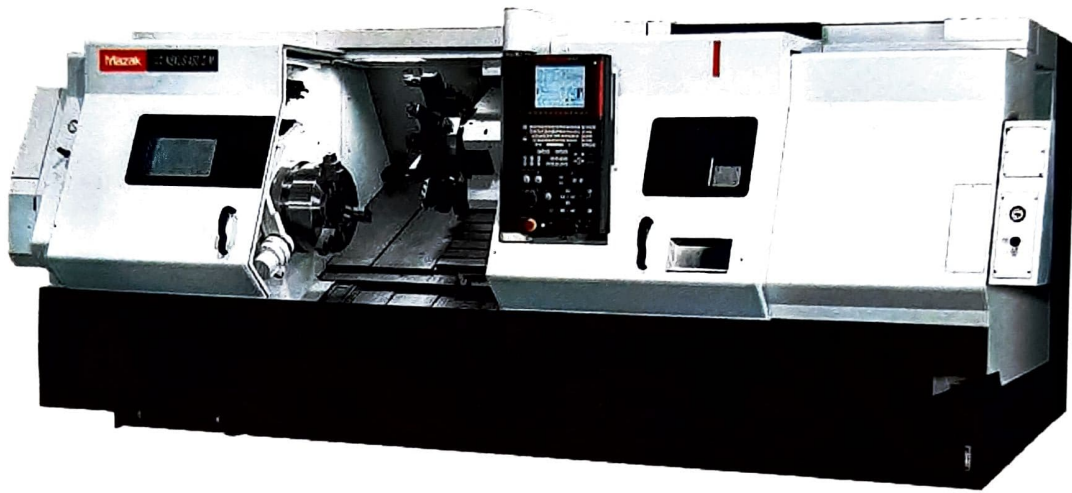


Fig. 1.1

MEANING OF CNC

CNC means Computer Numerical Control. This means a computer converts the design into numbers which the computer uses to control the cutting and shaping of the material.

USE OF TYPICAL CNC MACHINE

1. The design is loaded into the computer which is attached to the CNC machine. The computer changes the design into a special code (numerical) that controls the way the CNC cuts and shapes the material.
2. The material to be shaped is taped on to a block with double sided tape. This must be done carefully so that it does not come off the block during machining.
3. The block is then placed in the vice, inside the CNC. It must be tightened up carefully. If it is not secure when the machine starts to cut the material it can come away from the vice. When the machine starts working, the vice moves up, down, right and left according to the design.

4. The guard is placed in position. It protects the machine operator in case the material is pulled out of the vice by the power of the cutter. For safety reasons, if the guard is not in position the motor will not start.

5. The CNC is turned on and the shape is cut from the material. When the cutter has stopped the shaped material can be removed from the vice.

Parts of CNC Machines

The following stated below represent the various CNC machine parts:

Bed:

These parts on CNC machines carries all the machine load, this is to say all other components are mounted on it. The bed component is made of hard material like cast iron because in CNC lathe machines the tool turret travels over them.

Headstock:

The headstock is one of the main components of CNC lathe machines due to the fact that the workpiece is fixed to it. The CNC lathe features a motor to help drive the main spindle.

Tailstock:

This lathe CNC machine part provides extra grip to the workpiece when performing operations like knurling, threading, turning. The support is provided at the end surface of the workpiece.

Tailstock quill:

The tailstock quill helps to centralize the workpiece between the headstock and tailstock.

Footswitch or Pedal:

The pedal is used to open and close the chuck when trying to grip the component, just as the tailstock quill is taken forward and reversed position

Chuck:

The chuck is mounted on the main spindle which gives space for fixing the tool.

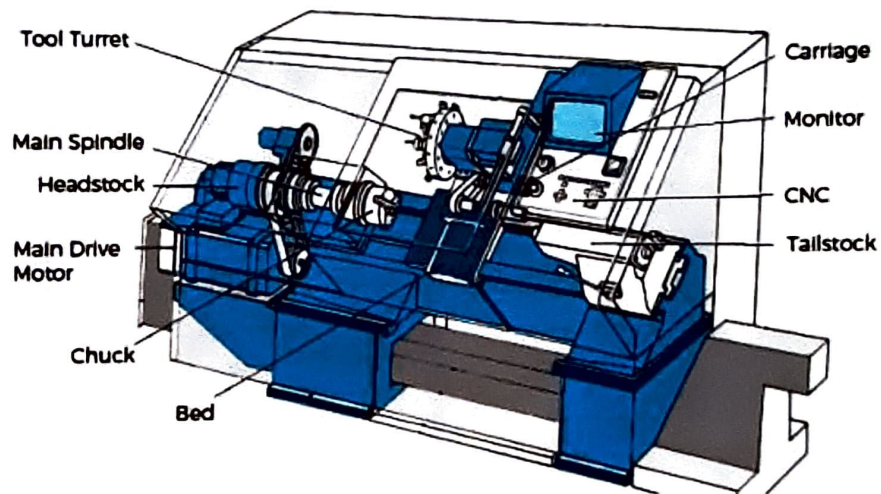
Control panel:

The control panel is also one of the important parts of CNC machines which are used to set or feed the program for the operation to be performed on the workpiece. It is also called the brain of the CNC machine.

Tool turret:

In this part, the tool is mounted on it and allows the operator to be carryout. Tool turrets vary in shapes and a number of tools that can be used on them.

Now let's discuss on the CNC machine system



Diag. Main parts of a CNC lathe machine

Fig.1.2

CNC MACHINE - INPUT, PROCESS, OUTPUT

CNC production facility needs three pieces of equipment:

A Computer: The computer is used to draw the design. However, the design is only a picture and the CNC machine cannot use this to manufacture the product. The computer software must also convert the drawing into numbers (coordinates) that the CNC machine can use when it starts to cut and shape the material.

An Interface: A computer cannot be directly connected to a CNC machine. The computer is connected to an interface. This converts the signals from the computer to a form that the CNC machine understands. The signals are in the form of digital signals when they are sent to the CNC machine.

CNC (Computer Numerical Control) Machine: The signals from the interface control the motors on the CNC machine. The signals determine the way the vice moves. The vice moves in three directions X, Y and Z. (Horizontally, vertically and depth). The signals also control the speed of the cutting tool.

CNC Router Accessories

Software:

The basic software suite for CNC Router users generally consists of the following:

CAD Software: Use it to design the parts you want to make with your router.

CAM Software: Feed it the CAD model of the part and CAM software will produce a g-code program your CNC Router can run to make the part.

Feeds and Speeds Software: Every cutting tool, material, and situation demands a different recipe for feeds (how fast the cutter is fed into the material) and speeds (what rpm the spindle

is running). Make sure your Feeds & Speeds software is setup for CNC Routers. You can't use just any old Feeds and Speeds program because routers have different needs.



Dig 1.3

CONTROL PANEL OF CNC

A CNC machine is normally controlled by a computer and software. However, most CNC machines have a range of controls for manual use. It is rare for a CNC machine to be used manually as simple operations are best carried out on cheap/basic/manual machines. When a CNC machine is used manually it is been used well below its capability and specification.

RESET BUTTON:

The most important control button is usually the reset button. When the CNC machine is turned on, the reset button is pressed by the machine operator. This zeros the cutter, moving the cutter to coordinates 0, 0, 0 on the X, Y and Z axis. In simple terms, the reset button moves the cutter to the corner of the machine, above the work table. If the reset button is not pressed, it is possible that the CNC machine will start cutting the material in the wrong place or even miss cutting the material and plunge into the work table.

MANUAL CONTROL:

The cutter can be controlled manually although this is rarely needed. The X and Y buttons control the movement of the cutter along the horizontal surfaces. The Z buttons control depth and up / down movement.

STOP BUTTON:

Most control panels have stop buttons. When pressed these stop the machine very quickly.

SPEED AND FEED:

On some CNC machines it is possible to manually vary the speed and feed of the cutter.



Fig 1.4 CONTROL PANEL OF CNC MACHINE

CNC MACHINES AND SAFETY

CNC machines are very safe to use as they are designed to be as safe as possible. One of the main advantages of CNC machines is that they are much safer than manually operated Machines.

1. Most modern CNC machines are designed so that the cutting tool will not start unless the guard is in position. Also, the best CNC machines automatically lock the guard in position whilst the cutter is shaping material. The guard can only be opened if the cutter has stopped.
2. It is essential that pupils / students / machine operators receive quality instruction before attempting to use any CNC equipment.
3. CNC routers, used for shaping materials such as woods and plastics, have built in extraction. Dust can be very dangerous if inhaled and can also cause eye irritation. The CNC Router shown above has an outlet for an extraction unit. As the router is fully enclosed, dust cannot escape into the atmosphere. If an extraction unit is attached the dust is removed automatically. Most manually operated machine routers have very limited extraction systems which leave some dust in the air.
4. The CNC router above has a single phase electrical supply. Older machines such as manually operated milling machines and center lathes have three phase supplies. A single phase electrical supply can be plugged into any available socket. The electrical supply for the machine comes through a residual circuit breaker (RCB). If an electrical fault develops the RCB will cut off electrical power immediately.
5. Single phase CNC machines can be moved more easily because they are simply unplugged and relocated. Three phase machines are specially wired by an electrician into the electrical supply and cannot be unplugged.
6. Most CNC machines work behind a guard or even a closed, transparent safety door. This means that the operated cannot be hurt by 'flying' pieces of sharp/hot material.
7. Commonsense applies to the use of all machines including CNC machines. Basic safety training regarding working in a workshop and with other machines applies to CNC machines as well.

ADVANTAGES AND DISADVANTAGES OF CNC MACHINES

CNC (Computer Numerical Control machines) are widely used in manufacturing industry. Traditional machines such as vertical millers, center lathes, shaping machines, routers etc. operated by a trained engineer have, in many cases, been replaced by computer control machines.

COMPUTER NUMERICAL CONTROL MACHINE ADVANTAGES

1. CNC machines can be used continuously 24 hours a day, 365 days a year and only need to be switched off for occasional maintenance.
2. CNC machines are programmed with a design which can then be manufactured hundreds or even thousands of times. Each manufactured product will be exactly the same.
3. Less skilled/trained people can operate CNCs unlike manual lathes / milling machines etc... Which need skilled engineers?
4. CNC machines can be updated by improving the software used to drive the machines
5. Training in the use of CNCs is available through the use of virtual software. This is software that allows the operator to practice using the CNC machine on the screen of a computer. The software is similar to a computer game.
6. CNC machines can be programmed by advanced design software such as Pro/DESKTOP, enabling the manufacture of products that cannot be made by manual machines, even those used by skilled designers / engineers.
7. Modern design software allows the designer to simulate the manufacture of his/her idea. There is no need to make a prototype or a model. This saves time and money.
8. One person can supervise many CNC machines as once they are programmed they can usually be left to work by themselves. Sometimes only the cutting tools need replacing occasionally.
9. A skilled engineer can make the same component many times. However, if each component is carefully studied, each one will vary slightly. A CNC machine will manufacture each component as an exact match.

MANUALLY OPERATED CENTRE LATHE DISADVANTAGES

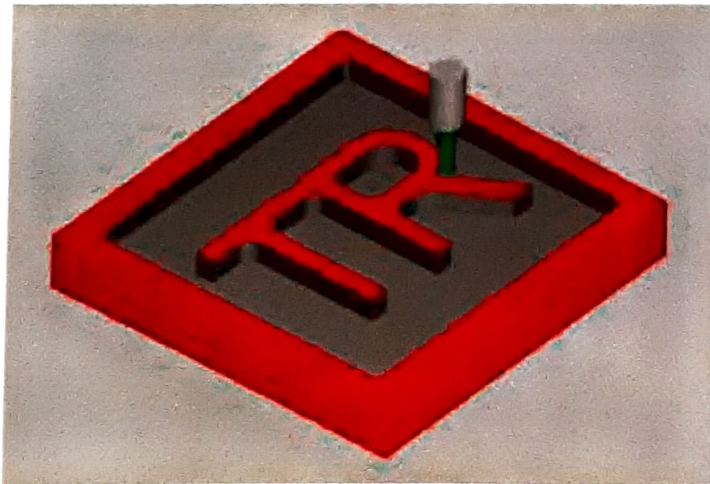
1. CNC machines are more expensive than manually operated machines, although costs are slowly coming down.
2. The CNC machine operator only needs basic training and skills, enough to supervise several machines. In years gone by, engineers needed years of training to operate centre lathes, milling machines and other manually operated machines. This means many of the old skills are been lost.
3. Less workers are required to operate CNC machines compared to manually operated machines. Investment in CNC machines can lead to unemployment.
4. Many countries no longer teach pupils / students how to use manually operated lathes / milling machines etc... Pupils / students no longer develop the detailed skills required by engineers of the past. These include mathematical and engineering skills.

2D COMPUTER AIDED DESIGN AND MANUFACTURE

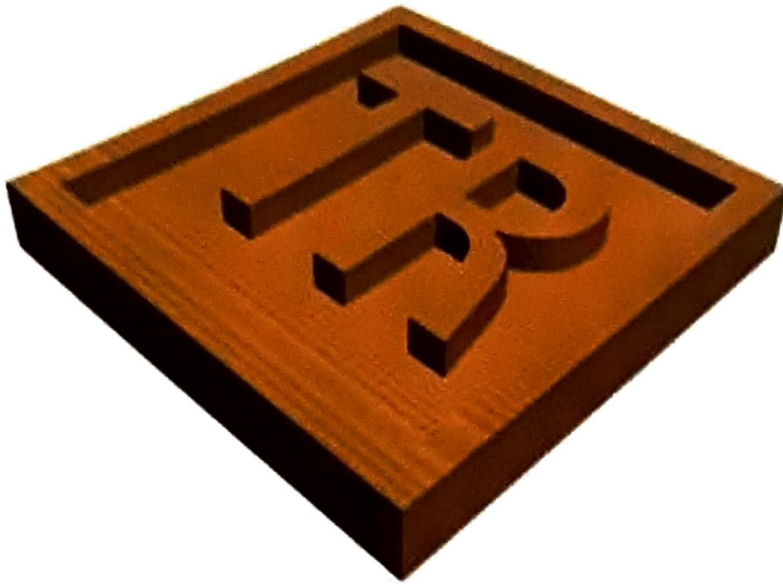
There are two types of computer aided design software. 2D design software allows the designer to design shapes with very limited three dimensional properties. Do not underestimate the designs that can be achieved through 2D software.

1. The design is drawn using software such as Tec Soft 2D Design. At first appearance this software looks basic but, depending on the skill of the designer, quite complex designs can be produced. The example shown is a simple block of material with initials.
2. When the design is complete the drawing is processed. This converts the drawing into a detailed series of X, Y and Z coordinates. Processing must take place before the CNC machine can cut the design from material. When the CNC machine shapes the material the cutter follows the coordinates, in sequence, until the shape has been manufactured.
3. Most CAD/CAM software allows the designer to test the manufacture of his/her design on a computer rather than actually making it. This saves time and materials. Testing designs is carried out using simulation software. When the design is run through simulation software the computer displays the manufacturing on the screen. It also checks whether or not the design can be manufactured successfully. Many designs have to be altered before they can be made by a CNC machine.

DIG 1.5



4. After all the testing and improvements to the design, it can finally be manufactured on a CNC machine.



DIG 1.6

3D COMPUTER AIDED DESIGN AND MANUFACTURE

3D Design software allows the designer to produce three dimensional representations of his/her ideas. When completed the design can be viewed on the screen and it can even be revolved and examined at any angle. 3D software is much more complex than 2D software such as Tec Soft 2D design. It requires specialist training before it can be used competently.

1. The designer draws up the design using software. The design can be examined in detailed and if modifications/alterations are needed they can be made on the screen. Software of this type allows the designer to model his/her idea on the screen rather than make/manufacture an expensive model. Good 3D software allows the designer to design almost any item.

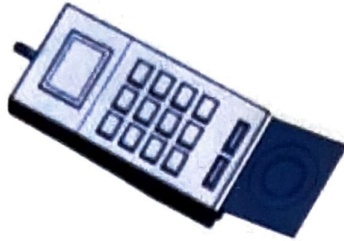
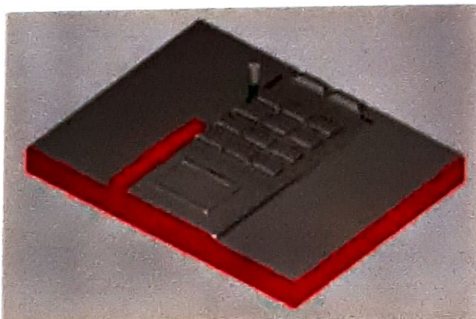


FIG 1.7

2. The design is processed. When the design has been completed using software it must be exported as a stereo lithography file. This type of file can be imported into processing software which converts the drawing into a long list of coordinates. Each set of coordinates is called a G code & M code.
3. Most CAD/CAM software allows the designer to test the manufacture of his/her design on a computer rather than actually making it. This saves time and materials. Testing designs is carried out using simulation software. When the design is run through simulation software the computer displays the manufacturing on the screen. It also checks whether or not the design can be manufactured successfully. Many designs have to be altered before they can be made by a CNC machine.

FIG 1.8



4. An advanced CNC machine can be used to manufacture the three dimensional product. This CNC is both fast and accurate making suitable for school and industrial use.

CNC Setting

Start	Start the Machine
Load the raw material	Load the raw material on machine/Hold by chuck. Touch the tip of tool (Master tool) on face of the work piece and
Set offset/work co-ordinate	Set the Z value Zero. Again touch the tip of the tool on OD of Work piece and set X value as OD value. (G54 X_Z_.)
Set tool Geometry	Same like master tool set offset for all other tools.
Run the program	After Offset setting run the program for rough Cut with high feed.
Finishing cut program	After rough cut measure the job and give the finishing cut.
Measure Workpiece	After finishing cut measure the workpiece. If the material Not removed Completely then we have to set Tool wear.
Tool wear	Set tool wear if material not removed completely. After set the tool wear Again run finishing cut program.
Stop	Again measure the job and remove from chuck

Method of making Geometric offset

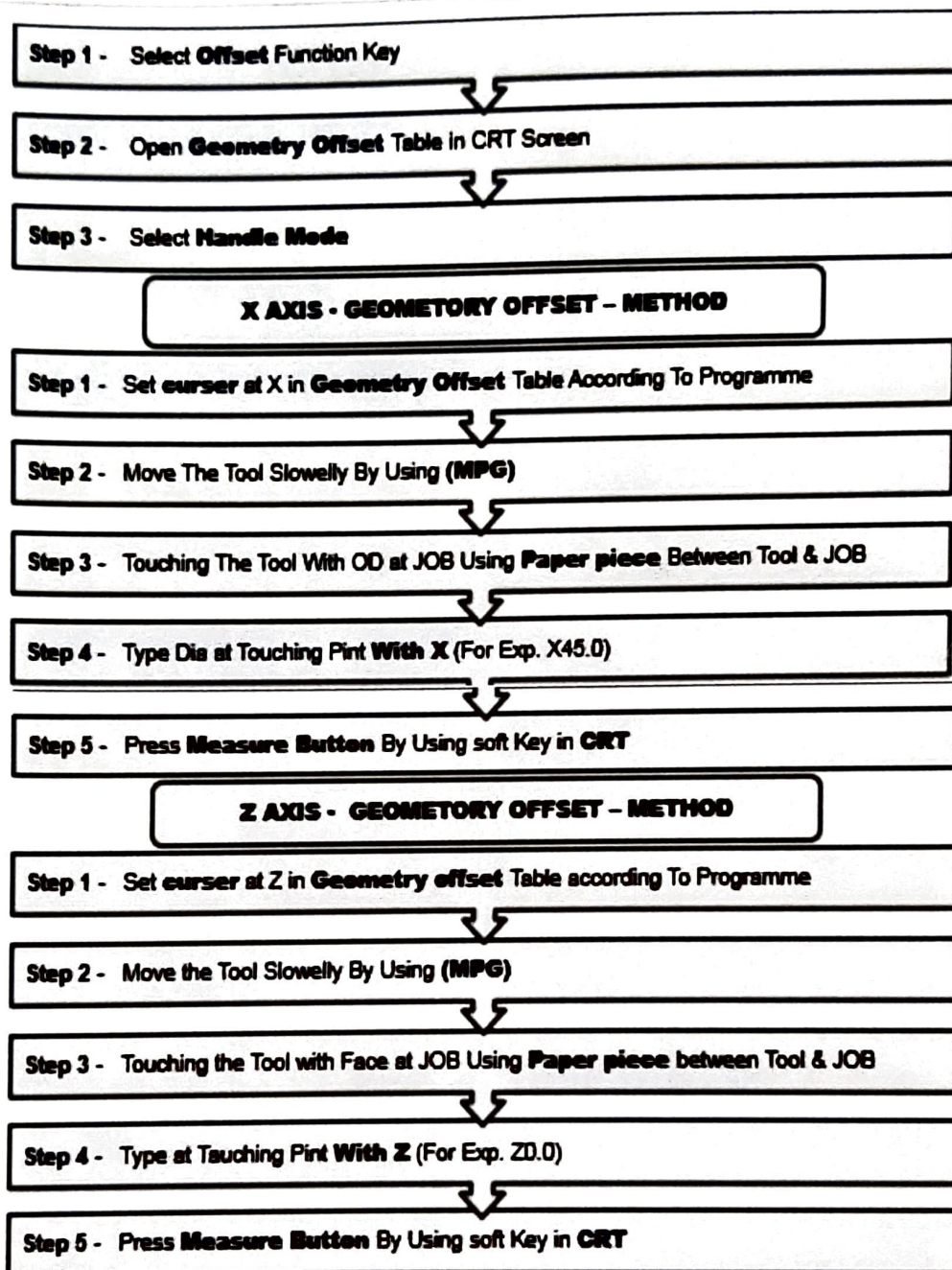


FIG 1.9

CASE STUDY ON TAKING GEOMETRY OFFSET

The edge finder: Is one of those tools that are so commonplace in manual machining. It's just a shaft with a precision ground stub on the bottom of it that is free to float around laterally (with some spring tension on it)

Diagram showing basic principle of an edge finder.

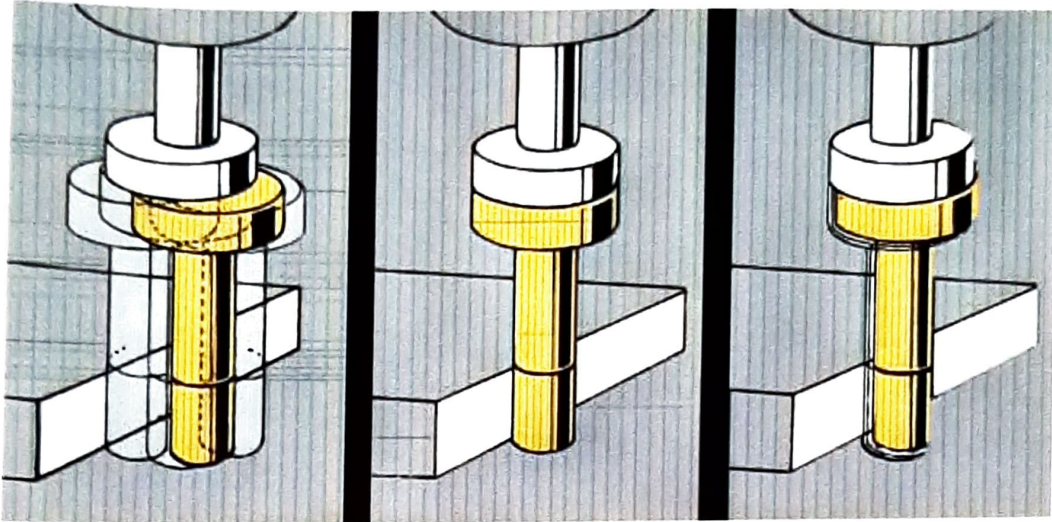


FIG2.1

In principle, when the wobbling end is precisely touching the surface, the edge finder tool will be running perfectly concentric. However that's pretty much impossible to see by eye. If it's close-but-not-quite concentric, you won't be able to tell. To get around that, the spring tension holding the wobbling end is calibrated such that the spinning surface will "grab" the part and gain traction right as it becomes concentric, causing it to kick off to the side as it tries to roll along the surface. This is visible as the wobbling end "kicking-over" to one side.

Once you've found that edge, you know that the edge of the tool and the edge of the material are in the same place. However, what you want is for the center of the tool (and thus your spindle) to be on that edge. This step is easy, because as we said earlier, the diameter of the edge finder's tip is known. Simply raise the tool clear of the work, and continue moving in that direction by the radius of the tool (as shown on your hand wheel)

You can now set your DRO or hand wheel to 0 in that dimension and repeat in the other dimension. You've now got an origin in a known location, and by extension a coordinate system across the whole part. There are many types of edge finders but basic cylindrical wobbling type is common, inexpensive, and precise

Result & Conclusion

- Hence I have successfully studied about the CNC machine tool and their function. With their G & M codes and operation performed on these type of machine tool.
- The importance of lathes and milling machines even if they are conventional cannot be undermined. These machines have played a real important role in bringing about industrial revolution and have laid the foundations. But the bringing about of the new technology in the present era is very important. The conventional machines are required in small quantities whereas the CNC machines must be increased to improve the quantity and quality of production

References

1. About **SRC Industries**
2. Auto CAD Software - <https://www.autodesk.com/products/autocad/free-trial>
3. Power mill Software - <https://www.autodesk.com/products/powermill/overview>
4. Figure are Created by Me through Various Designing Software's also downloaded from google website
5. Faculty Members of Mechanical Department DYPTC Talsande 416112

INDUSTRIAL TRAINING REPORT

MECHANICAL ENGINEERING DEPARTMENT MANUFACTURING INDUSTRY

Submitted to



Shivaji University, Kolhapur
In partial fulfillment of the Requirements for the award of

Degree of Bachelor of Technology in Mechanical Engineering

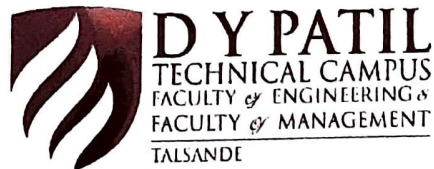
Name: Adarsh Vijay Navalgunde

University Roll No.: 2019084405

Semester/Branch: 7TH / 8th MECHANICAL ENGINEERING

SUBMITTED TO:

MECHANICAL ENGINEERING



**D.Y.Patil Technical Campus, Faculty of Engineering & Faculty of
Management, Talsande.**

DECLARATION

I hereby declare that the Industrial Training Report on Mechanical engineering / Manufacturing Industry is an authentic record of my own work as requirements of Minor/ Major Industrial Training during the period from 10 august 2022 to 26 august 2022 for the award of degree of B.Tech. Mechanical engineering, D.Y.Patil Technical Campus, Faculty of Engineering & Faculty of Management, Talsande under the guidance of Prof. R. S. Powar

(Signature of student)

(ADARSH VIJAY NAVALGUNDE)

(University Roll No:- 2019084405)

Date: 29/12/2022

Certified that the above statement made by the student is correct to the best of our knowledge and belief

Examined by: Prof. R. S. Powar

(Signature)

Name of Faculty Facilitator: Prof. T.C.Doijad

(Signature)

Head of Department: Prof. Manan Faras

ACKNOWLEDGEMENT

First and foremost, I wish to express my sincere thanks and gratitude to my esteemed Mentor **“Mr.Uday Sarnobat”** who has contributed so much for successful completion of my Industrial Training by his thoughtful reviews and valuable guidance.

Next I would like to tender my sincere thanks to **“Prof. Manan Faras”** (Head of Department) for his co-operation and encouragement.



(Signature of student)

(ADARSH VIJAY NAVALGUNDE)

(University Roll No:- 2019084405)



Enriching Lives

THE KOLHAPUR STEEL LIMITED
A Kirloskar Group Company

TKSL/HRM/ CER/2022-23/23)

Date- 16th Nov, 2022

[To whom it may Concern]

This is to certify that, Mr. Adarsh Vijay Navalgunde student of D.Y. Patil Technical Campus, Talsande, Tal Hatkangale Dist: Kolhapur Industrial Internship Training has satisfactorily completed 13 days in our organization from 23rd August, 2022 to 04th September, 2022.

He has shown keen interest in the subject relating to Internship Training.

To the best of our knowledge, his character and conduct during the said period was good.

We wish him all success in his future endeavors.

For The Kolhapur Steel Limited.

Sushil Mhalunge
Manager -HRM&C



Subsidiary company of Kirloskar Brothers Limited

Pune Bangalore Highway, Shirol (Pulechi), Tal. Hatkanangale, Dist. Kolhapur, Pin - 416 122. Maharashtra (India)
Ph.: +91-230-246 8061 / 62 / 63, Website : www.kolhapursteel.com
CIN - U27106MH1965PLC013212

SR.NO	TITLE	PAGENO.
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1. INTRODUCTION

1.1 Details of the company

Name: The Kolhapur steel Limited

Address: Pune Bangalore Highway, Shirol (Pulachi), Tal.Hatkanangale, Kolhapur, Maharashtra

The Kolhapur Steel Limited (TKSL) entered the steel foundry industry in 1965 and was then taken over by the Kirloskar Group (Kirloskar Brothers Limited) in 2007. It is located at the Pune – Bangalore highway (NH4). TKSL was founded with a goal of providing high quality steel castings. The company is currently producing 6000 MT steel castings per annum in the weight range from 300 Kg to 14000 Kg (single piece). In the process of expansion and to keep up with customer requirements, new machineries like LRF (ladle refining furnace) of 14 MT capacity, Induction furnaces of 12 and 8 MT, EOT cranes, Automatic Rapid Quenching Heat Treatment Furnace are installed and commissioned. Our motto is to have a timely supply of products with consistent quality and satisfying customer needs.

2. Core Competency

2.1 Manufacturer of Steel Castings

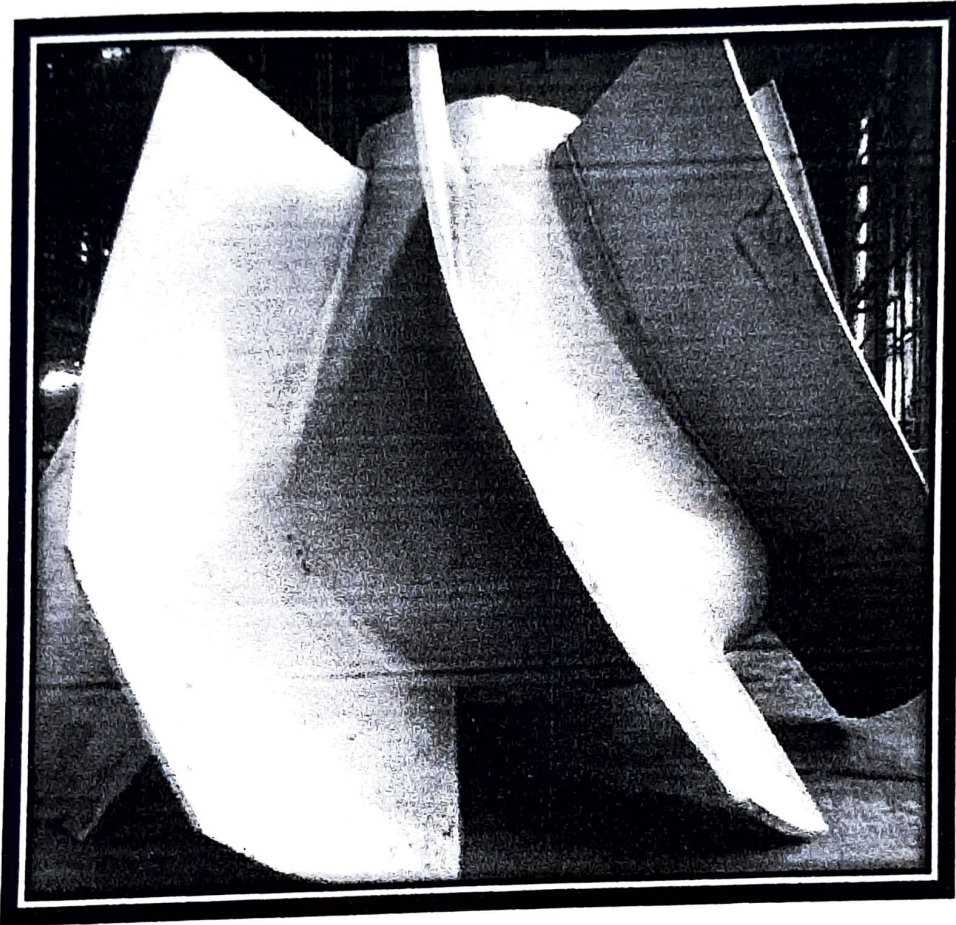
1. Plain Carbon Steel
2. Alloy Steel
3. Stainless Steel
4. Duplex Steel
5. Super Duplex Steel

2.2 Weight range:

1. Plain Carbon & Alloy Steel –300 kg to 14 MT Single Piece
2. Stainless Steel –300 kg to 6 MT Single Piece

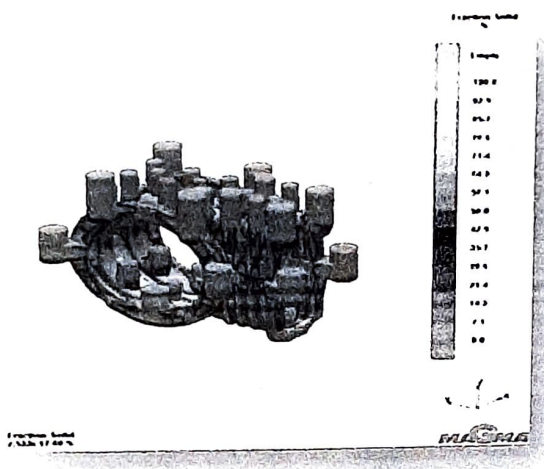
3. Pattern Making

- ♣ Good infrastructure for in house repair, rectification of all types of pattern by dedicated skilled work force.
- ♣ New pattern manufacturing work outsourced from local reputed pattern manufacturers equipped with CNC & VMC setup



4. Methoding

Magma 5.3 and 10 Core processor Simulation software predicts the complete casting process including filling, solidification, cooling and allows the quantitative predication of various properties. Simulation accurately describes a cast component quality up-front before pattern manufactured and the Casting Methoding can be designed to meet required quality invariably reducing casting development time.



4.1 Moulding Equipment & Infrastructure

The Moulding shop is equipped with latest Moulding facilities.

1. 20 MT Omega make continuous sand mixer.
2. 3 MT Omega make continuous sand mixer
3. 10 MT/hr. Omega make sand reclamation unit
4. Gas fired mould heating oven

4.2. Melting Furnaces & related Infrastructure

Induction Furnace with five crucibles,

One - 2 MT,

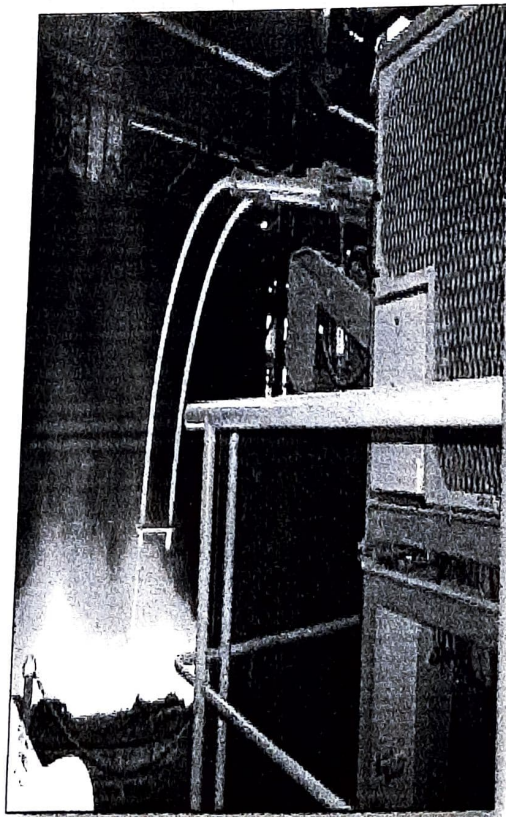
Two - 5 MT,

One - 8 MT

One - 12 MT capacity.

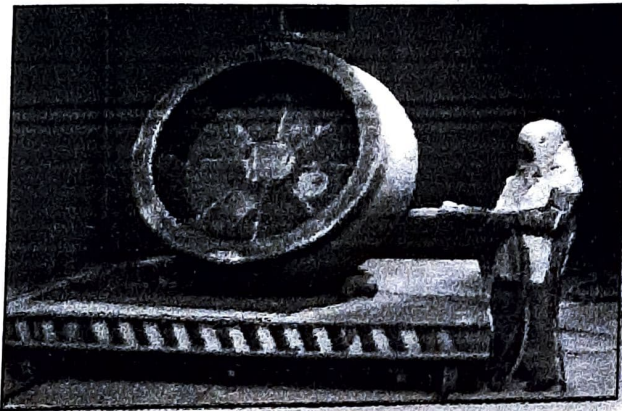
5. Core Wire Injection for Deoxidation

An essential feature in steel refining is the injection of calcium in the steel ladle in the form of a cored wire for de-oxidation and inclusion modification. A cored wire is a continuous steel tube filled with calcium bearing powder. The melting behavior of these cored wires has an important bearing on the efficiency of the injection process, castability of steel and the product quality. The recovery of calcium in this process is relatively higher than in the conventional lumpy



6. Heat treatment Facility

The Heat treatment shop is equipped with two HT furnaces well calibrated as per API 6A standard. To achieve good hardenability quenching tank is fitted with 60HP Pump system.



6.1 Fettleing & Finishing

Apart from various pneumatic, electric grinders fettleing shop is equipped with Grit blasting facility and 3MT shot blasting machine

7. Testing

7.1. Mechanical Testing Facility

1. Spectromax (Germany) Spectrometer with 31 Elements including Nitrogen facility

2. Impact Testing machinewith cryogenic testing facility up-to -46°C

3. Universal Testing Machine 100 Tons capacity with Extensometer calibrated under Lloyds, TUV, IRS and IBR.

7.2 sand and mould testing

1. Compression strength tester

2. Permeability meter tester

3. Scratch hardness tester

4. Sieve analyser

5. Baume meter

Mechanical Testing

1. Calculation

1.1 Gauge Length 5d or 5.56 Area

1.2 Cross Section $= 3.14/4 * D^2$

2.3 Yield Strength (kg/mm^2) = Yield Load / Cross
Section area

2. Percentage Elongation

= Final Gauge Length - Initial Gauge Length / Initial
Gauge Length

2. Percentage Reduction Area

= initial C.S.A - Final C.S.A / initial C.S.A

8. Radiography

Apart from support from parent company dedicated vendor viz. Quality Inspection Services, Hyderabad and Industrial NDT and Inspection services, Pune perform RT with help of qualified personal using Co-60 and Ir-192 source and reference radiography films

1. Welding qualification tests are used to establish and ensure that the welder can weld up to the company's standards.

2. TKSL has 14 qualified welder as per ASME section IX for various position and grade

Steam Turbine:

- 1) Kirloskar Ebara Pumps Limited
- 2) Triveni Turbines Limited
- 3) BHEL, Hyderabad
- 4) Siemens Limited
- 5) Turtle Turbines Private Limited

Hydro Turbine :

- 1) Kirloskar Brothers Limited
- 2) GE Power India Limited
- 3) Voith hydro Private Limited
- 4) B Fouress Private Limited
- 5) Chintamani Industries
- 6) Jyoti Limited

General Engg. /Marine / Defence :

- 1) L&T KOBELCO Machinery Private Limited
- 2) L&T Rubber Processing Machinery
- 3) KLEEMANN GmbH (Wirtgen Group)
- 4) Goa Shipyard Limited
- 5) Disa India Limited
- 6) L&T, Powai
- 7) Vulcan Industrial Engineering Co. Limited 8) BEML, Mysore & KG

V. K. Patil
9422047817

Ajay V. Patil
9890004422



Ref. No.

VKP / 2022-23 / 2053 - A

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27th September 2022

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CERTIFICATE

Here we declare that **Saurabh S. Asabe** student of Department of Civil Engineering, D. Y. Patil Technical Campus, Talsande, Kolhapur.

He successfully completed field training on our construction site of Mahalaxmi Mandir's Multi Level Car Parking Building, Kolhapur from the date 11/08/2022 to 30/08/2022. During training he found very sincere, hardworking & obedient.

We wish here all the best for his future career.

