

## 1: inplant training report for tnpl

*A REPORT ON IN-PLANT TRAINING AT THE FERTILIZERS AND CHEMICALS TRAVANCORE LIMITED (FACT)UDYOGAMANDAL SUBMITTED BY AKSHAY VENUGOPAL [www.enganchecubano.com](http://www.enganchecubano.com) MECHANICAL ENGINEERING AT SNM INSTITUTE OF MANAGEMENT AND TECHNOLOGY, MOOTHAKUNNAM TRAINING PERIOD 1 ABSTRACT I underwent in-plant training to acquaint myself for a period of days from to get an industrial exposure in a practical aspect of technical.*

As economy grows the demand for power increases at a very faster rate. It was started in the year and was completed in The first stage was commissioned in the year The plant has two stages viz. On the first day we were given the introduction of the plant. They showed us the model of the plant which was kept there. We were given a power point presentation about the same. On the second day they took us to the Boiler Monitoring and Chemical plant which is used to treat the sea water. On the fourth day we went to the Main Relay Testing MRT where the relays used in the transmission lines are tested for proper functioning. In the afternoon we went to the Coal Monitoring unit which takes care of the coal handling system of the plant. On the final day they took us to Technical Service unit which ensures the proper functioning of turbines and generators used in the plant. At the height of about 22m CD, it is at second stage and is o due to heavy furnace oil. Inside the boiler a camera is used for monitoring the fire. This camera is provided with special lens and cooling system. In that case of any trip the secondary combustion should be prevented, the heated air is blown of from entering the secondary stage. This process is called purging. The raw water having the conductivity value of ppm is passed through sand filter to remove impurities. A reverse osmosis plant is provided to reduce the dissolved solids in the raw water. The result is that the solute is retained on the pressurized side of the membrane and the pure solvent is allowed to pass to the other side. To be "selective," this membrane should not allow large molecules or ions through the pores holes , but should allow smaller components of the solution such as the solvent to pass freely. In the normal osmosis process the solvent naturally moves from an area of low solute concentration High Water Potential , through a membrane, to an area of high solute concentration Low Water Potential. The movement of a pure solvent to equalize solute concentrations on each side of a membrane generates osmotic pressure. Applying an external pressure to reverse the natural flow of pure solvent, thus, is reverse osmosis. There are two strong acidic cation beds for one weak acidic cation bed. The cation bed is regenerated using HCl for every 50Hrs. There are two weak anion beds for one strong acidic anion bed. The anion bed is regenerated by NaOH. The water then reaches mixed bed where both anionic and cationic impurities left are removed. Now the demineralized water with a conductivity of 0. Increasing computerization has enabled the use of some very sophisticated techniques for controlling and monitoring power systems. Earlier, control and monitoring systems were usually made up of simple circuits. Now, monitoring and control in power plants are based almost entirely on computerized equipment, which has considerably simplified the control of processes involving multiple variables. In fact, control and instrumentation or automation at power plants has become critical to maximizing efficiency and availability. It has allowed faster collection and processing of all data from various parts of the plant and has even provided for remote control of all devices. It has also helped optimize fuel utilization and lower operational costs. The only disadvantage is that in case of any failure of processor the whole system gets collapsed, but in older version only the concerned area will be affected. The total power generation is MV. The process is explained by the following points: Then a separate supply called DG Cell is used. SF6-sulphur hexafluoride gas is used inside the insulators due to its special properties. CTs and CVTs are used for protection and measurement. Here double bus bar scheme is used. Many relays use an electromagnet to operate a switching mechanism mechanically, but other operating principles are also used. Relays are used where it is necessary to control a circuit by a low-power signal with complete electrical isolation between control and controlled circuits , or where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits, repeating the signal coming in from one circuit and retransmitting it to another. Relays were used extensively in telephone exchanges and early computers to perform logical operations. A type of relay that can

handle the high power required to directly control an electric motor is called a contactor. Solid-state relays control power circuits with no moving parts, instead using a semiconductor device to perform switching. Relays with calibrated operating characteristics and sometimes multiple operating coils are used to protect electrical circuits from overload or faults; in modern electric power systems these functions are performed by digital instruments still called "protective relays". The armature is hinged to the yoke and mechanically linked to one or more sets of moving contacts. It is held in place by a spring so that when the relay is de-energized there is an air gap in the magnetic circuit. In this condition, one of the two sets of contacts in the relay pictured is closed, and the other set is open. Other relays may have more or fewer sets of contacts depending on their function. The relay in the picture also has a wire connecting the armature to the yoke. This ensures continuity of the circuit between the moving contacts on the armature, and the circuit track on the printed circuit board PCB via the yoke, which is soldered to the PCB. When an electric current is passed through the coil it generates a magnetic field that activates the armature and the consequent movement of the movable contact either makes or breaks depending upon construction a connection with a fixed contact. If the set of contacts was closed when the relay was de-energized, then the movement opens the contacts and breaks the connection, and vice versa if the contacts were open. When the current to the coil is switched off, the armature is returned by a force, approximately half as strong as the magnetic force, to its relaxed position. Usually this force is provided by a spring, but gravity is also used commonly in industrial motor starters. Most relays are manufactured to operate quickly. In a low-voltage application this reduces noise; in a high voltage or current application it reduces arcing. The hydel and windmill stations are located in various parts of the state. The installed capacity of the board as on 31st march, was The fuels used in the power generation are coal, furnace oil, high speed diesel oil, gas and naphtha. Coal and oil cost constituted This review covers the activities relating to procurement, transportation, storage and consumption of fuel for the five years ending 31st March, The performance of kuthalam gas turbine power station has not been included in the review since it commenced generation in March only. The Board received adequate quantity of coal to meet the demand entire requirements of the thermal station. There was no shut down of the power station for want of coal. Higher ash content in coal is one of the main reasons for excess consumption of coal in thermal power station. The following table indicates the percentage of ash content in coal received at NCTPS is as follows 1 A conveyor belt or belt conveyor consists of two or more pulleys, with a continuous loop of material - the conveyor belt - that rotates about them. One or both of the pulleys are powered, moving the belt and the material on the belt forward. The powered pulley is called the drive pulley while the unpowered pulley is called the idler. The materials entering the mill plant are coal, hot air and seal air. The mill plant used here are bowl mills. The motion is given to the bowl which also makes the roller to rotate. In this motion the coal gets pulverized. In NCTPS six bowl mills for each boiler are used out of which only four are used and the remaining are standbys.

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*inplant training report. at mahanagar telephone nigram limited (bkc) submitted by abhishek kumar pandey (6th, www.enganchecubano.com) electronics & communication engineering national institute of technology, srinagar from 27th january to 14th march*

During the course of study I was able to interact freely with the officials and other employees in the plant and fetch maximum relevant information from them. The training helped me to get an idea about the various manufacturing processes and the technical instruments which are used in the plant. I place my sincere thanks to Mr. I would also like to thank Mr. George Varghese and Mr. The 2nd stage of expansion of FACT was completed in FACT Engineering and Design Organization was set up on 24th July to meet the emerging need for indigenous capabilities in vital areas of Engineering, Design and Consultancy for establishing large and modern fertilizer plants. FEDO offers services from project identification and evaluation stage to plant design, procurement, project management, site supervision and commissioning of new plants as well as revamping and modernization of old plants. FACT Engineering Works was established on 13 th April as a unit to fabricate and install equipments for fertilizer 4 plants. Over the years FEW developed capabilities in the fabrication of pressure vessels and heat exchangers. FEW have also undertaken lying of cross country piping and fabrication and installation of large penstocks of hydelpjects. As a diversification plans from the traditional field of Fertilizers and Chemicals, TPA Caprolactam Plant at Udyogamandal was commissioned in The Ammonia plant was commissioned in Today, the Udyogamandal Plants has an installed capacity of 76, tonnes of N and tonnes of P<sub>2</sub>O<sub>5</sub>. Continual improvement in its environmental performance and prevention of pollution 2. Compliance with environmental rules, regulations and other requirements applicable 3. Conservation of resources and waste minimization 8 4. Improvement of communication with interested parties 5. FACT, one of the only two manufactures of this product in India, has the capacity to produce 50, tonnes of Caprolactam in a year. The Caprolactam Plant also produces 2,25, tonnes of Ammonium Sulphate per year as co-product and small quantities of Soda Ash and Nitric Acid as by products. The plant has been certified ISO Ammonium Sulphate is a nitrogenous fertilizer containing It has excellent physical properties; non-hygroscopic, crystalline and free flowing. It is ideal as a straight nitrogenous fertilizer and also as an ingredient in fertilizer mixtures. It is the most widely preferred nitrogenous fertilizer for top dressing on all crops. The entire N is in ammonical form and P is completely water soluble. It is ideal for application on all soils and all crops. In addition, FACT prepares special tailor made fertilizer mixtures of any required grade for plantation crops like coffee, tea, rubber, etc. FACT mixtures are superior in quality with the presence of ammonical nitrogen, water soluble phosphorus, and other major nutrients like sulphur, calcium, etc. This second collection of SO<sub>2</sub> is very attractive as it is utilising the by-products of other processes and reduces emissions and waste. Furnace or Burner Only necessary if raw sulfur is used Air is cleaned by electrostatic precipitation, dried then heated to approx. Pure liquid sulphur is sprayed under pressure into the furnace, reacting with the oxygen in the air. If so this stage can be skipped. The converter The converter contains trays or layers of porous pellets of a catalyst, vanadium V oxide V<sub>2</sub>O<sub>5</sub>. The sulphur dioxide reacts with more air to form sulphur trioxide. This reaction is reversible and reaches equilibrium. It is also an exothermic reaction and the temperature will rise to over oC. The mixture is continuously cooled to oC between each tray. To counter this the gases are allowed to cool slightly before they pass over the next layer of catalyst, by carefully controlling the process almost all sulphur dioxide is converted to sulphur trioxide 12 The absorption tower Sulphur trioxide will dissolve in water to form our final goal of sulphuric acid. However it is violently exothermic and usually results in a mist of sulphuric acid droplets that are very difficult to control. The main objective of the workshop is to provide various services to the other departments such as repairing and designing of machinery parts. The workshop with modern machines and dedicated operators is capable of operating the requirements of all other departments. Workshop has several machines namely Lathe machine, Shaping machine, Slotting machine, Drilling machine, Boring machine, grinding machine etc. It also has Welding and Cutting equipment. Moreover, the workshop offer services to automobiles and locomotives

through its garage. The principal machines in the workshop are briefly described in the following section: Lathe is the most commonly used machine of workshop. A lathe is a machine tool which rotates the work piece on its axis to perform various operations such as cutting, turning, threading, grooving, and knurling, drilling, boring, chamfering, facing with tools that are applied to the work piece to create an object which has symmetry about an axis of rotation. Lathes are used in woodcutting, metalworking, metal spinning, and glass working. Most suitably equipped metalworking lathes can also be used to produce most solids of revolution, plane surfaces and screw threads or helices. Moreover, eccentric jobs can be performed in this lathe machines. Shafts of different sizes with varying cross section can be machined with the help of a lathe machine. It can cut curves, angles and many other shapes. It is analogous to that of a lathe, except that is archetypal linear instead of helical. Shapers are mainly classified as standard, draw cut, and horizontal, universal, vertical, geared, crank, hydraulic, contour and travelling head. The horizontal arrangement is the most common. Vertical shapers are generally fitted with a rotary table to enable curved surfaces to be machined. The main uses of a shaper machine are: Slotting machines are similar to those of Shaper machine with the difference that the ram holding the toll in slotting machine reciprocates in vertical direction. The cutting action of the tool is only during the downward stroke. The slotter machine can be used on any type of work where vertical tool movement is considered essential and advantageous. The single point cutting tool held properly in the tool post is mounted on a reciprocating ram. The reciprocating motion of the ram is obtained by a quick return mechanism. As the ram reciprocates, the tool cuts the materials during its forward stroke. During return stroke there is no cutting action and the stroke is called the idle stroke. The forward and return stroke constitute one operating cycle of the shaper. The quick return mechanism is understood with the help of the following diagram. In the considered configuration, the fixed pivot of the driven crank is located on the outside of the circle on which the end of driving crank moves. The leads to an alternated motion of the slider crank. The angular speed of the driven crank is variable. The duration of the motion for its part corresponding to the blue arc AB clockwise is shorter than the one related to the red arc AB anticlockwise. This is why this device is named as Quick Return Mechanism, which was used in crank shapers, with the slow part or the stroke being used for the working time of the tool and the quick part for the non-productive time. With various attachments milling machine can be used for boring, slotting, circular milling, dividing and drilling. This machine can also be used for cutting keyways, racks and gears and for fluting taps and reamers. Milling operates on the principle of rotary motion. A milling cutter is spun about an axis while a work piece is advanced through it in such a way that the blades of the cutter are able to shave chips of material with each pass. Milling processes are designed such that the cutter makes many individual cuts on the material in a single run, this may be accomplished by using a cutter with many teeth, spinning the cutter at high speed, or advancing the material through the cutter slowly. Most often it is some combination of the three. The speed at which the piece advances through the cutter is called feed rate, or just feed; it is most often measured in length of material per full revolution of the cutter. Holes of different diameters can be produced using drills of different sizes. A drilling machine, called a drill press, is used to cut holes into or through metal, wood, or other materials. 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 like countersinking, boring, counter boring, spot facing, reaming and tapping. A horizontal boring machine is a machine tool which bore holes in a horizontal direction. Horizontal boring machines are often heavy-duty industrial machines used for roughing out large components but there are high precision models too. Boring is used to achieve a greater accuracy of the diameter of a hole, and can be used to cut a tapered hole. Boring can be viewed as an internal diameter counterpart to turning, which cuts internal diameters. There are three types of horizontal boring machine: So it is known as the universal type boring machine. Some important point about boring machine is: This is often done by melting the work pieces and adding a filler material to form a pool of molten material the weld pool that cools to become a strong joint, with pressure sometimes used in conjunction with heat, or by itself, to produce the weld. This is in contrast with soldering and brazing, which involve melting a lower melting point material between the work pieces to form a bond between them, without melting the work pieces. All in all the training at FACT was a lifetime

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experience which lends me the opportunity to get an on hand experience of how this govt.

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*A Report on 2 week "In-Plant Training" done in FACT Ltd,Udyogmandal 1. A REPORT ON IN-PLANT TRAINING AT THE FERTILIZERS AND CHEMICALS TRAVANCORE LIMITED (FACT), Udyogamandal Submitted by G RAJESH [www.enganchecubano.com](http://www.enganchecubano.com)U4ECE, BTech() Electronics andCommunication Engg.*

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