



# **A REPORT ON ONE DAY INDUSTRIAL VISIT**

**DATE : 17-10-2022 (9am to 5:30pm)**

**PLACE OF VISIT :**

- (1) 220KV KSEB TRANSMISSION SUBSTATION KALOOR**
- (2) 110KV SUBSTATION KSEB TRANSMISSION SUBSTATION KALOOR**
- (3). WAVE ELECTRONICS PRIVATE LIMITED, KIZHKKAMBALAM,  
KOCHI**

## ACKNOWLEDGEMENT

Our sincere thanks to our Principal Dr. Anitha G Pillai, Head of the department (EEE) Dr. Jayanand (Professor), Ms. Deepa. S (Associate Professor) and Class coordinator Ms. Beena Puthillath (Assistant Professor) for the guidance and support for the industrial visit to KSEB Sub-station, Kaloor and Wave Electronics, Kizhakkambalam, Kochi. We express our gratitude to SSET college and the Department of Electrical and Electronic engineering of SSET for providing adequate facilities for an industrial visit. We also thank the student representative Mr. Aditya J P, S5 EEE who took effort in getting permission from KSEB for the visit. We also thank KSEB, all employees of 220 & 110kv substation and Wave Electronics in spending their evaluable time to share the knowledge and working of the system there.

## **SUBSTATION PROFILE**

The substation is undertaken by Kerala state electricity board limited. It has 220kv GIS substation and 110 kv. It is situated in Kaloorkochi, Kerala. The 110 kV substation in Kaloorkochi is serving most of the city. The 220 kv GIS substation help to provide support to other small substations and help bring down the transmission loss, according to KSEB officials. The 110kV substation which was arranged in 1993, had reached its most capability years in the past. Development started in February 2018. The 4.5 km line from Brahmaputra to Kakkanad Tuthiyoor is overhead. The gas insulated substation is positioned on half an acre. A typical 220 KV substation requires not less than 4 acres of land. The brand new substation was constructed to resist the specter of floods.

### 220 KV GIS SUBSTATION

Gas insulated substation (GIS) consist of components where active parts on high voltage potential are located in the middle of the aluminum alloy pipes and held in this location by resin insulators. The pipes are filled in with insulating gas and have earth potential. The GIS consists of typical HV components such as isolators, CBs, bus bars, voltage and current transducers. GIS can save up to 90% of space compared with air insulated substation. It is particularly suitable for indoor and outdoor substation.

**SCADA SYSTEM** continuously monitors the status of various equipment's in substation and accordingly sends control signals to the remote control equipment's. Also, it collects and saves the historical of the substation and generates alarm during fault or accident.

**Lightning arrester** seems like a set of insulators connected together with a ring in the top. This ring is called grading ring. The purpose of grading rings is that in case of heavy voltage surges the charge is distributed uniformly through the ring and then the discharge occurs. The ammeter in the arrester carrying the top most conductor will have maximum current passing through it.

**Wave Trap:** It is an instrument used for tripping of the wave. The function of this trap is that it traps the unwanted waves. Its shape is like that of a drum. It is connected to the main incoming feeder so that it can trap the waves which may be dangerous to the instruments in the substation. The wave trap traps the high frequency communication signals sent on the line from the remote substation and diverting them to the telecom / tele protection panel in substation control room through coupling capacitor.

**Capacitor bank:** A capacitor bank is a grouping of several identical capacitors interconnected in parallel or in series with one another. These groups of capacitors are typically used to correct or counteract undesirable characteristics, such as power factor lag or phase shifts inherent in alternating current (AC) electrical power supplies.

**Isolator:** In order to disconnect a part of system for maintenance and repair, isolators are used. It is a knife switch designed to open a circuit under no load. If isolators are to be opened, the Circuit Breaker connected must be opened first. Otherwise there is a possibility of occurrence of a spark at the isolator contacts. After repair, first isolators are closed and the circuit breaker.

**MAT Earthing:** Depending up On the types of soil. Further, their resistivity may also vary at different depth depending upon the type of soil, moisture content and temperature etc., at various depths which affects the flow of current due to the fact that the earth fault current take path through various layers.

## **WAVE ELECTRONICS**

The Waves Electronics Private Limited was founded in 1972 by Mr. C. P. Philipose and Mr. P. I. Chacko, alumni of National Institute of Technology, Warangal, South India. Waves is today the market leader in the manufacture of Industrial Battery Chargers, Marine Control Systems, Navigation Light Indicator Panels, Generator Automation, and Automatic Power Factor Correction Control Panels. They are the cater to the leaders in Indian industry and export to countries in Europe, South East Asia, Middle East, and Africa. They produce high quality, performance tested, and fully certified control systems that provides a stable operation over theb complete life cycle.

### **Functions:**

The industry taking control over the manufacturing of electronics systems including marine switch boards, battery charges, navigation light control system. The ongoing project is based on navigation control system for INS VIKRANT. The process of manufacturing goes on through a series of process from basic punching operation till the assembly and final operation of the project. There uses trumpf punching machine with cnc and other modern technologies in manufacturing process.

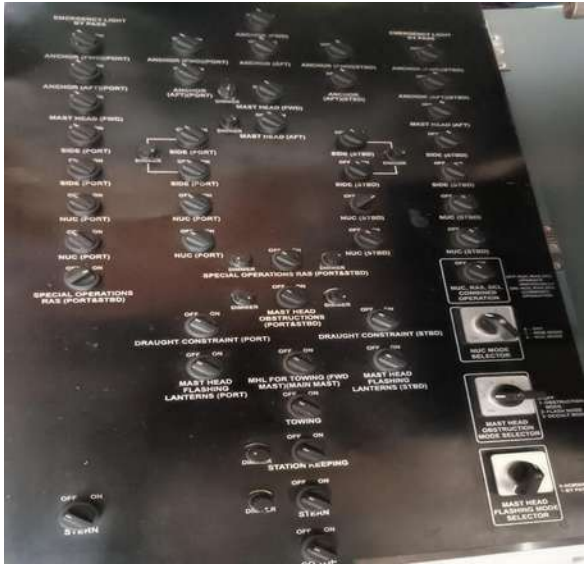


Figure 1: Navigation Panel

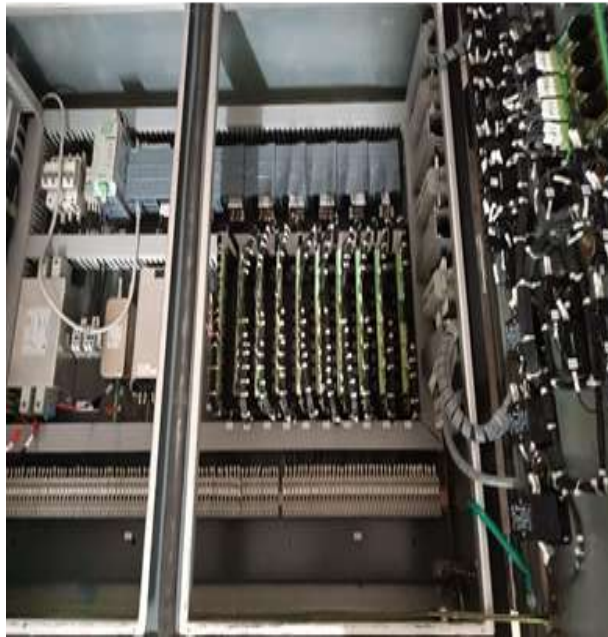


Figure 2: Marine main switch board



Figure3: Trumpf Punching machine / nibbling machine with CNC

Figure 1 and 2 are the works done by wave electronics and figure 3 is the CNC machine used for mechanical modelling

### **CONCLUSION**

The industrial visit on 220/110kv Substation, Kaloor and wave electronics kizhakkambalam perumbavoor was informative. Students gained adequate knowledge on working of substation and equipments included in operation and had a clear vision regarding the electronics systems and its basic manufacturing operations.

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