

INDUSTRIAL VISIT REPORT

**BACHELOR OF ENGINEERING
in
ELECTRICAL AND ELECTRONICS ENGINEERING
by**

II YEAR , EEE – B

**Under the Supervision of
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Workshop Personnel Officer,
For CWM/S&T/Workshop/Podanur
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**KPR INSTITUTE OF ENGINEERING AND TECHNOLOGY
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ABSTRACT

Signal and telecommunication workshop which was functioning as a small repair unit in Tiruchchirappalli was shifted to Podanur in 1958 and later it become a largest workshop in India. Initially, this workshop manufactured control panels, lever lock circuit, lever frames mostly mechanical items which was later modified to manufacture signaling equipment's like Block Instruments, Relays, Axle Counter, Fail Safe Timer and Signaling LED's. S & T Workshop at Podanur is one of the largest workshop in India after. This has various working sections such as E-Lab, ESED, Tools, Relay, Fabrication, Electrical and mechanical Willright, Electromechanical divisions etc. The learning opportunity in this workshop is huge as various sections has different topics to be learned. This workshop entirely runs up with the latest technologies for the ease and safety working of the entire railway structure. It also has a laboratory to carry out developmental activities in telecom sector. The equipments produced in this workshop are supplied to the entire Indian railways. This workshop has a special feature as Pointing Devices used for automatic train track changer are only produced here and supplied all over the India from Jammu to Kanyakumari. Every important part of equipment like detector rod, driver rod, lock rod, relay pins, springs, control panels are produced here. Some smalls components like capacitors, resistors, transformers are bought from private manufactures. The assembly of signaling instruments and testing are done in this workshop. Apart from the academic side, we had a chance to learn about new things that are not in our syllabus. It was an amazing experience to learn the working of railway structure and signaling methods. Even we done testing on batteries and recorded the discharging rates and various parameters. As a whole we learnt some engineering stuffs that will help us in our future studies.

FIELD VISIT OBJECTIVES

Indian railway is a largest network which has been performing well with satisfying peoples need with absolute safety and concern. The whole network is an interconnected system which is working with latest technologies. In this field visit we would like to learn about some practical stuffs that are used in industrial sides which cannot acquired through academics. As a student with only theoretical knowledge, We would also like to know about the actual working of devices in practical how they are handled, how the errors are corrected, how they are manufactured, how they are assembled and even more. We would also like to see how the olden methodology were replaced with new ones. In this signal and telecommunication workshop we hope there will be lot of new stuffs to be learnt and knowledge to be gained. Even if we are appointed as a senior section engineer in railways we can do well through our experience gained here. Our managerial skills must also be developed to manage people and how to tackle a serious situation in unexpected time. As electrical engineers we must posses vast knowledge in various field as electrical is filled up everywhere. For that knowledge this field visit helped us to improve ourself and our confidence level. The new ideas can be created when we work on it with perfection and patience. This field visit taught me how to work on a problem and how to get through it. As overall this field visit is a guide for us to improve ourself and also it must be a self-test for evaluating our skills and a mentor like to correct the defects in us. This field visit must be a overall package of self-evaluation and self-improvement.

INTRODUCTION

In this railway field visit, We had a great opportunity to learn the basics of soldering, electricals and electronics. We had a hands-on training on how to do soldering, how to use flux and various tips on soldering. It was a step by step training and We done it well through overcoming our mistakes. Current ratings, manufactures and types of various devices were taught. Had an excellent lecture about battery types, cables, communication etc. The SMPS circuit done during training was shown.

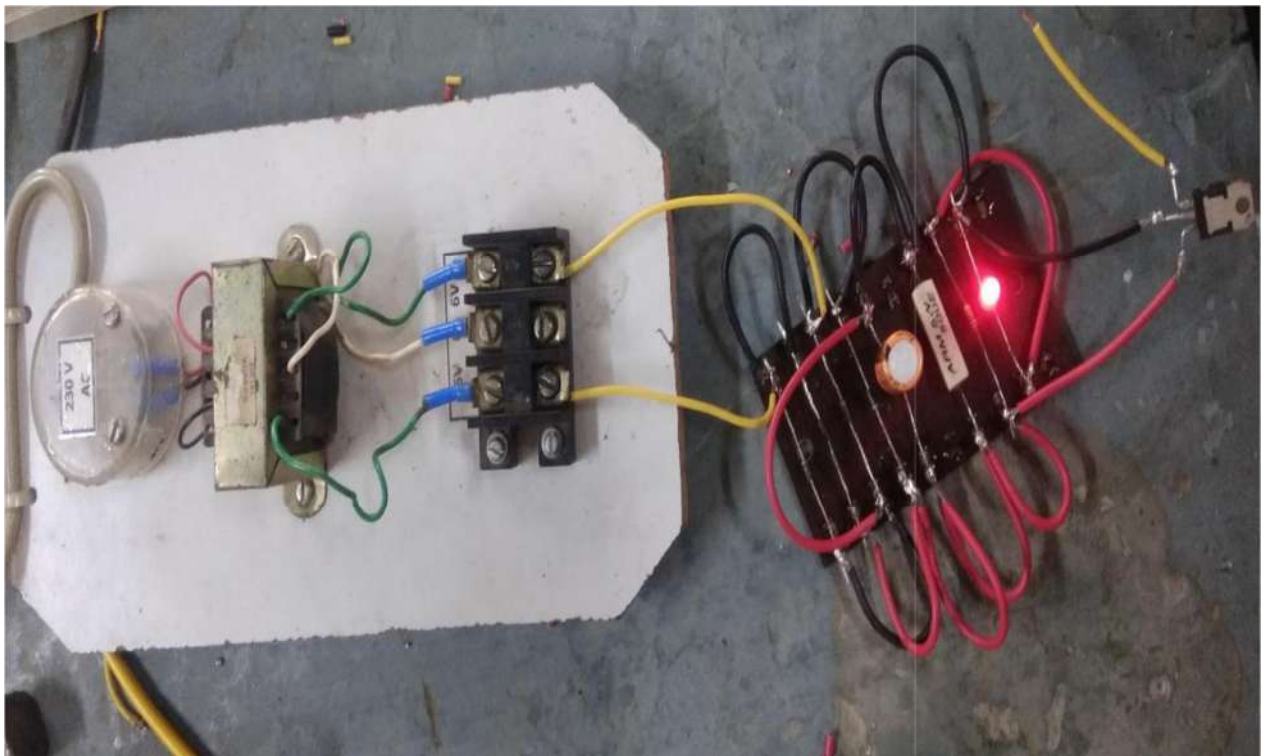


Fig. SMPS Circuit

This field visit gave us a skill to operate on our own to do the given circuits with most perfections and accurateness. The various stabilization ideas of circuit and elements used for those stabilization was also discussed.

FIELD VISIT DISCUSSION

Introduction to power supply and various components used in railway circuit were taught. Switched mode power supply circuit was studied, designed and modelled. The basic circuit diagram which describes the components used, wiring diagram which describes the actual connection of components whether it is shunt or series connection were drawn. Components, materials required, tools used were listed. Actual SMPS was modelled.

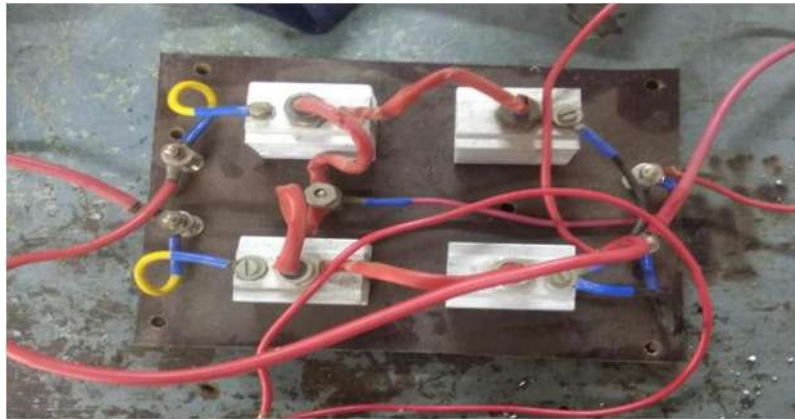


Fig. Bridge Rectifier

The bridge rectifier used for high power applications is shown. Likewise, components used for high power application like power capacitor, power diodes, power electronics devices were seen. Learned about group board types, bleeder resistor which is used to discharge the capacitor charges without damaging the circuit devices. LED current and voltage calculation done through ohms law etc. Half wave and full wave rectifier circuit diagram and current flow diagram were discussed.



Fig. Track Feed Charger

Batteries of different ratings were seen and load testing was done. The UPS and Battery were combined and tested, discharging rate and various parameters of UPS and battery were analyzed. Learned about the primary and secondary cell batteries and its types such as simple voltaic cell, leclanche cell. Also discussed about the electrolyte used in those batteries. Button cells and their applications are discussed. Electrolyte testing were also discussed. Even various suppliers and manufactures were discussed. UPS types as online and offline, how do they work how the connections are made were also learned. Negative impact on UPS and batteries are discussed. Lessons on basic communication and cable types, soldering, switches and its types, manufactures, cost, suppliers and management of goods in an organization was learned.



Fig. Axle Counter

In the ESED lab latest technology devices such as axle counter, SMS alert system, battery fault indicator was also seen. The working of axle counter was well explained by the technical assistant. This axle counter is used to count the wheels of the incoming train and outgoing train to know whether the train reached or left the junction. SMS alert system is designed in a way that if fault occurs in the relay or any other systems the message will be sent to station master and assistants. The signaling LEDs are assembled here and tested through the chromameter. The torch light used by the station master and assistant locomotive is made with high LUX level which were also checked in dark room.



Fig. LED Signaling Unit

Introduction to ESED lab and done some work in assembling of components. The various train track equipment working were learned. The different equipment's used in the train safety like battery charging monitoring were also seen. The train running condition, faults, and various parameters are checked by passing an electric charge through the track and received through the other end. Some basic relay working was also learned.



Fig. Battery Charging Monitoring System

ESM which stand for Electrical Signal Maintenance is the head inspection committee which checks each and every device manufactured in this workshop. Various power source of railways was discussed. The Fail Safe timer assembly was seen. The point commitments in fail safe timer were seen. Block instrument and its components were learned.



Fig. Track Feed Battery Charger And SMS Alert System

Track feed battery charger is an instrument used to charge the track as to send the electrical signal to the receiving side. This electrical signal is received at the other end and the train arriving or departing speed, timing is calculated. Other sections such as relay, mechanical, tools were seen. Discussed about the needs of these sections and instruments.



Fig. Relay and Its Components

The last date is an overview session of all the previously learned things. Here, I additionally learned about telecommunication cables, electrical cables, colour coding of cables in detail. The materials used for those manufacturing of cables is also discussed. The different types of relay and its use in traction and latching are also learned. The detail version of block instrument was also learned.



Fig. Relay Display In Workshop



Fig. Contact Flasher



Fig. Double Line Block Instrument

FIELD VISIT OUTCOMES

This workshop has a numerous learning opportunity for EEE, ECE, MECH streams. Even small engineering methodology is important here because the actual working of some important equipment's requires the basic knowledge of science. Likewise, the various outcomes of this field visit are as follows,

- Train Track Changer – Pointing device working, testing, quality checking was learned.
- Fail Safe timer, Track feed battery charger, Torch light, Battery charge monitoring system were studied in the Electrical signaling and Electronic lab.
- Testing of various batteries and UPS are done. The discharging properties of various batteries were learned.
- Soldering procedures were learned in detail.
- Visited the tools section and learned about the molding and lathe machine used for producing the precision tools only for the workshop purpose.
- Relays, Axle Counter, Block instrument and various instruments working, manufacturing are seen in details.
- In the mechanical section the manufacturing of the mechanical parts is analyzed by how they are plated and deformed into required position.
- Overall working of railway structure such as operation of track changing, signaling, telecommunication was well learned.