



IEEE – MVSR STUDENT BRANCH

Student Branch Code: 12161 , School Code: 41329276

Malkaram Substation Field Visit

IEEE MVSR SB PES Chapter has organised field visit to Malkaram Substation, Hyderabad on 17th February 2018 to educate the students with the practical aspects of substation and various components of power system.

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Event Details:

Date: 17th Feb 2018

Time: 10 am – 4 pm

Venue: Malkaram Substation, Hyderabad.

Attendees: 50

IEEE MVSR SB Power & Energy Society Chapter has organized the field visit to Malkaram Substation on 17th Feb 2018. The purpose of the visit is to educate the students with the practical aspects of substation and various components of power system. The Malkaram Substation was chosen as it is nearly 30 km from Hyderabad.

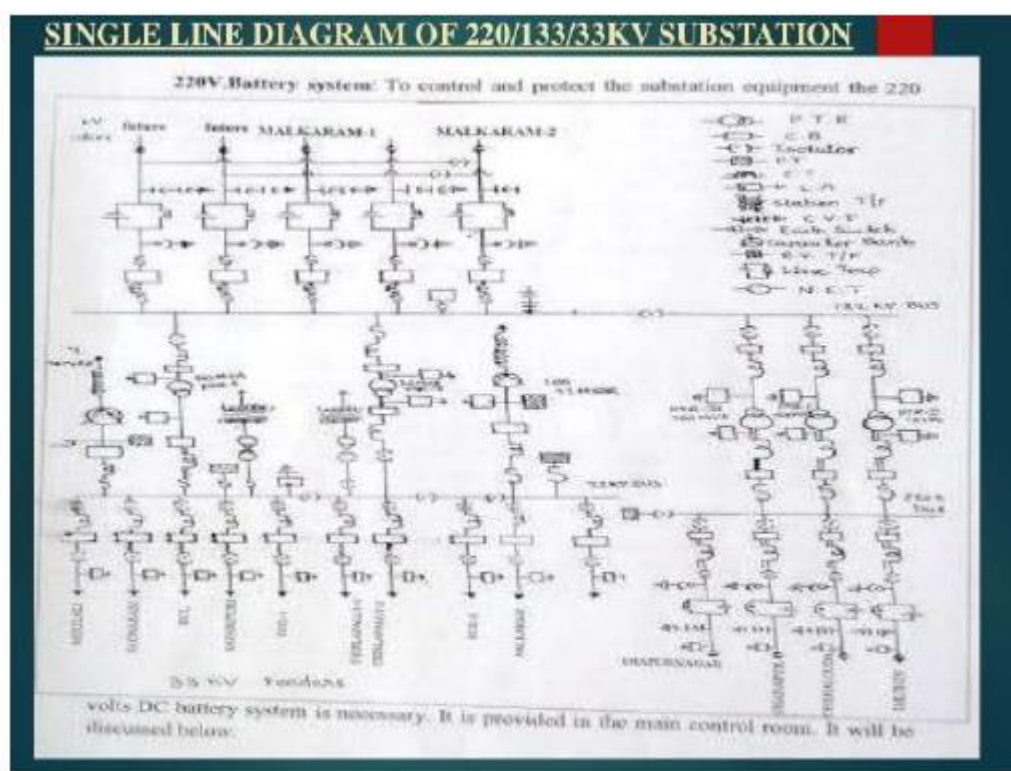
IEEE MVSR Student Branch Counsellor and PES advisor Dr. D. Hari Krishna, Associate Professor, EEE Department and Mr. I.N. Swamy Assistant Professor, EEE Department were the faculty coordinators for the field visit and IEEE MVSR PES Chapter Excom members were the student volunteers.



The EEE students were explained various practical aspects of power system and components by the faculty coordinators and the engineers working in the substation. The students have visited the switch yard and all the components in substation were shown and explained in detail.

The Malkaram Substation is the largest substation in Telangana State. The country's lengthiest 220 KV underground cable line. This important feeder line for the city runs a length of 16 kilometres to connect the 400 KV Malkaram substation with the 220/132 KV Gunrock substation. The 220KV power substation has the capacity- (3*100MVA+2*50MVA). It receives two 220kv lines from Malkaram-1& Malkaram-2 and two future feeders newly installed circuit. It steps down this supply to 132kv, 66kv, 33kv and 11kv. 132kv line gives supply to shapurnagar, Ghanapur, Chilkalguda, Imlibun. 33kv line to Moulali, Nacharam, HCL, Sanikpuri, ECIL-1, Cherlapally-1, Cherlapally-2, Malkaram, and 66kv to ECIL-2 New substation.

SINGLE LINE DIAGRAM OF 220/133/33KV SUBSTATION



MAIN EQUIPMENTS AT SUBSTATION:

220KVA lightning arrester is a device used on electrical power systems to protect the insulation on the system from the damaging effect of lightning.

ZINC OXIDE ARRESTOR GAPLESS Also known as surge arrester are used in the power station to protect from lightning when surge travels along the line, the arrester diverts it to the earth

EARTHING: It is adopted at generating, sub-station and lines to provide

- Safety to personal
- Reduce the damage during heavy inrush of faulty currents
- Improve reliability of power system

PRIMARY REQUIREMENTS: The impedance to ground should be as low as below Large-substation-1ohms Small-substation-2ohms Power station-0.5ohms Distribution transformer station-5ohms **PLATE EARTHING:** 1.3m*13mm cast iron plates of 25mm thick plates are buried vertically In pits at intervals not less than 15m apart of EHT SS PIPE EARTHING: 125mm in diameter 2.75m long are placed in vertically at intervals not less Than 12.2m

CAPACITOR VOLTAGE TRANSFORMER A capacitor voltage transformer (CVT), or capacitance coupled voltage transformer (CCVT) is a transformer used in power systems to step down extra high voltage signals and provide a low voltage signal, for measurement or to operate a protective relay

To reduce the power failure in extent & time, to maintain the interconnected grid system in optimum working condition to coordinate the operation of various generating unit communication network is indispensable for state electricity board.

Wave trap is an instrument using for trapping of the wave. The function of this trap is that it traps the unwanted waves. Its function is of trapping wave. Its shape is like a drum. It is connected to the main incoming feeder so that it can trap the waves which may be dangerous to the instruments here in the substation.

ISOLATOR: Used to ensure that an electrical circuit is completely de-energised for service or maintenance. Such switches are often found in electrical distribution and industrial applications, where machinery must have its source of driving power removed for adjustment or repair. High-voltage isolation switches are used in electrical substations to allow isolation of apparatus such as circuit breakers, transformers, and transmission lines, for maintenance. It is only for safety isolation. Disconnecter can be operated either manually or automatically (motorized disconnected)

GENERAL CHECKS FOR PT: Mechanical alignments for PT power jaws, PT primary winding star earthlings, Tightness of all connections ☑Primary/secondary fuse rating

Sulphur hexafluoride circuit breaker (SF6) Sulphur hexa fluoride (SF6) gas is used as the arc quenching medium. Circuit breakers have been developed for voltage 115KV to 230KV; power rating 10 MVA. Vacuum circuit breakers are circuit breakers which are used to protect medium and high voltage circuits from dangerous electrical situations

There are 3 transformers in the substation: 100MVA, 220/132 KV (3nos.) 100 MVA (2nos) Power Transformer feeding 160 MVA transformers are manufactured by ADITYA and by TRM. These are the power transformers and, their efficiency is high. Primary side is star connected while secondary is delta connected. There are seventeen tapping in it. Every transformer has OLTC to change the tap for controlling voltage.

TYPES OF COOLING: AIR NATURAL COOLING, AIR BLAST COOLING, OIL NATURAL COOLING OIL BLAST COOLING etc.

Specifications of 220/132(100 mva) transformers	
Rated MVA	100 MVA
Frequency	50Hz
No. of phases	3
Insulation level	HV LI 900 AC 395 HVN LI 95 AC 38 IV LI 550 AC 230 LV LI 170 AC 70
Type of cooling	ONAN DDAF
Rated MVA	75 100
Rated KV at no load: HV	220kv— IV 132KV— LV 11KV—
Line amperes	HV 196.8 262.2 IV 328.0 437.4 LV 1299.0 1732.1
Temperature rise °c	Top oil—50°c Avg WDG—55°c
Impedance volts	HV-IV 7.667 10.222
Normal tap conditions	HV-LV 24.55 32.72 IV-LV 17.69 23.59



The technical team in the substation has given a detailed explanation and advice the students to learn and understand importance of the basics in the field of electrical engineering.

The field visit was successful and the students thanked the technical persons in substation, faculty coordinators and IEEE MVSR PES chapter Excom members for the visit.

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