

INDUSTRIAL IN-PLANT TRAINING(IIT)
REPORT ON
(POWER DISTRIBUTION IN ELECTRIC SUB-STATION)

AT
(TSSPDCL SUB-STATION AT D.POCHAMPALLY)

A Report submitted by

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ELECTRICAL AND ELECTRONICS ENGINEERING
INSTITUTE OF AERONAUTICAL ENGINEERING
(AUTONOMOUS)

Dundigal,Hyderabad-500043,Telangana

April,2022

FIELD PROJECT CERTIFICATE

Date: 29/04/2022

This is to certify that D. Nazish Roll No. 1995140234
From college Institute of Aeronautical Engineering has
completed summer social Internship in our organization from 23/04/2022
to 29/04/2022 totally for 42 hours. He / She actively participated in
the programme conducted by the organization and we appreciate him/her for
the same.

Name, 

Designation with office stamp

Asst. Engineer
Operation, TSSPDCL
T. P. Pally.



INSTITUTE OF AERONAUTICAL ENGINEERING

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1. Student Details

Name of the Student	Dabbari Naresh
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2. Mentor Details

Name of the Mentor	P. Peerya Naik
Organization	TSSPDCL Substation, D. Pochampally.
Designation	Assistant Engineer
Email ID	
Mobile Number	(+91) 9491038350

3. Title of the field project:

Power Distribution in Electric Sub-station at TSSPDCL, D. Pochampally.

4. Purpose:

- To collect the information about working of transformers.
- To understand the process of power distribution to the houses in the village through substation.

5. Objectives:

- Investigation about the working and condition of the transformers and other electronic devices in the substation.
- Collecting the information about the power distribution at sub-station.
- Interacting with the department of sub-station.

6. Description of the field visit

- Introduction** – I have visited the TSSPDCL sub-station at D. Pochampally on 23-04-2022 and met Peerya Naik, Assistant Engineer (TSSPDCL). We have observed the heavy components used in the Sub-station and Power Distribution to the houses.

7.

- **Background** - TSSPDCL has a vast infrastructure facility in its operating area with 1,605 Nos. of 33/11 KV substations 3,102 Nos. of power transformers, 1,220 Nos. of 33 KV feeders 7,263 Nos. of 11 KV feeders and around 4,22,003 Nos. of distribution transformers of various capacities. In addition to these, solar power is also considered a priority in order to overcome the shortage of power in the state.

8. Photos of field visit with description



Fig: Substation Operator sir Explanation

CONTROL & RELAY ROOM:

The control room has various control panels which shows the information like incoming power, outgoing power, frequency, time common to all sub-stations, status of various lines(healthy, faulted, under outage or maintenance), status of various protective instruments like isolators, circuit breaker, temperature of various instruments, working tap of transformer etc. The DAS (Data Acquisition System) is used to accumulate the data received from various sources. The relay room is separate from the control room. The protection system is so fast that it can detect a

fault within 30 ms and hence the circuit breaker can be operated within as less as 80 ms. For 400KV side C.B., one time auto re-closure is allowed in order to clear the faults automatically.

- **Major Observations:**

- a. Working and management of power distribution.
- b. Working of Electronic and Electrical equipment.
- c. Trouble shooting while there's a problem in the power distribution.
- d. Management of calls and complaints of people in the village.

Explanation:

At the consumers premises, distribution transformers transform the distribution voltage to the service level voltage directly used in households and industrial plants, usually from 110 to 600 V.

Distribution substation is generally comprised of the following major components:

1. Supply Line
2. Transformers
3. Busbars
4. Switchgear
5. Outcoming feeders
6. Switching apparatus
 - a. Switches
 - b. Fuses
 - c. Circuit breakers
7. Surge voltage protection
8. Grounding



Fig: Power Transformer



Fig: Power Distribution System

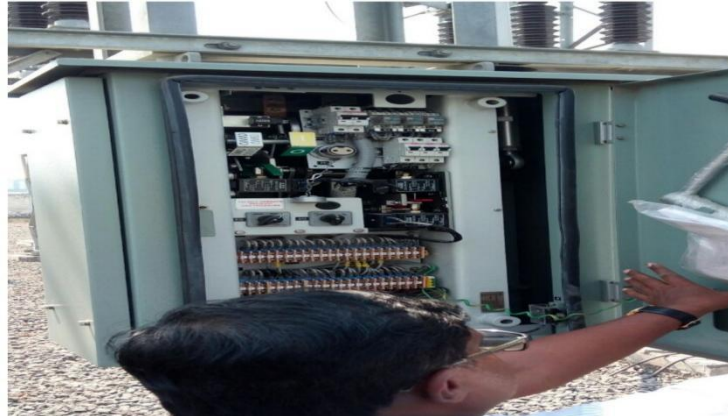


Fig: Circuit Breaker

Circuit breaker:

A circuit breaker is an equipment, which can open or close a circuit under normal as well as fault condition. These circuit breaker breaks for a fault which can damage other instrument in the station. It is so designed that it can be operated manually (or by remote control) under normal conditions and automatically under fault condition. The use of SF6 circuit breaker is mainly in the substations which are having high input KV input, say above 220KV and more. The gas is put inside the circuit breaker by force i.e. under high pressure. When if the gas gets decreases there is a motor connected to the circuit breaker. The motor starts operating if the gas went lower than 20.8 bar. There is a meter connected to the breaker so that it can be manually seen if the gas goes low. The circuit breaker uses the SF6 gas to reduce the torque produce in it due to any fault in the line. The circuit breaker has a direct link with the instruments in the station, when any fault occur alarm bell rings.

ABB		CE		MADE IN ABB	
Circuit-breaker type	EDF SK 1-1	Operating device type	FSA-1(F)		
No.	700 18 326	No.	700 18 326		
Order	4201163737	Order	4201163737		
Voltage	72.5 kV	Breaking current	31.5 kA		
Insulation level		DC-component	45 %		
lightning imp. with voltage	375 kVp	First-pole-to-clear-factor	1.5		
switching imp. with voltage	- kV	Making current	79 kA		
power frequency with voltage	140 kV	Short-time current	3 s 31.5 kA		
Frequency	50 Hz				
Normal current at 40 °C	2500 A	Line charging breaking current	10 A		
Gas pressure SF6	abs (+20 °C)	Mass total	963 kg		
Max. working pressure	0.9 MPa	Mass of gas	2.5 kg		
Filling	0.7 MPa	Rules	IEC 62271-100		
Signal	0.62 MPa	Operating sequence	0-0.3s-CO-3min-CO		
Blocking	0.6 MPa	Temperature class	-30 °C		
Volume per pole	18 l	Year of manufacture	2016		
GETCO A/T No. ACE(Proc)/II/E-2515/e-104057/66 KV Breaker(B/B)/ABB/4158					
DTD-22-03-2016					
"PROPERTY OF GETCO"					

Fig: Circuit breaker name plate



Fig: Isolator

Isolating Switches:

In Sub-Station, it is often desired to disconnect a part of the system for general maintenance and repairs. This is accomplished by an isolating switch or isolator. An isolator is essentially a knife Switch and is design to often open a circuit under no load, in other words, isolator Switches are operate only when the line is which they are connected carry no load. For example, consider that the isolator are connected on both side of a circuit breaker, if the isolators are to be opened, the C.B. must be opened first.

In addition to above, there may be following equipment in a Substation :

- i) Fuses
- ii) Carrier-current equipment
- iii) Sub-Station auxiliary supplies

9. Project deployment photos with description



Fig: 33/11KV Substation



Fig: TSSPDCL Sub-station D.Pochampally

10. Conclusions:

Now from this report I can conclude that electricity plays an important role in our life. I am made aware of how the transmission the transmission of electricity is done. I too came to know about the various parts of the substation system. The three wings of electrical system viz. generation, transmission and distribution are connected to each other and that too very perfectly. Thus for effective transmission and distribution a substation must:

- Ensure steady state and transient stability
- Effective voltage control
- Prevention of loss of synchronism
- Reliable supply by feeding the network at various points
- Fault analysis improvement in respective field
- Establishment of economic load distribution

We are very grateful to 33/11kV D.Pochampally Substation, TSSPDCL for giving permission for this visit. I got an opportunity to know regarding practical aspects about what they are learning in theory. We hope that such kind of permission will be given in future also. It was an informative, interesting and a successful visit.

Name, 
 Designation with office stamp
 Asst. Engineer
 Operation, TSSPDCL.
 N.P. Pally.

Signature of the Student

Signature of the Mentor

Signature of the Head of the Department with Seal