TERNA PUBLIC CHARITABLE TRUST'S

TERNA ENGINEERING COLLEGE

7.1.3

INDEX

Green Audit Report.

Water Audit Report

Plot No 12, Sector-22 Opposite Nerul (W) Railway Station, Nerul,
Navi Mumbai, Maharashtra 400706.

Green Audit was conducted by

Quality Certification Services.

Saket 101, Shivaji Park, Dadar (W), Mumbai – 400028.

Green Audit was conducted by

CA. Dr. Ashis .Arun. Palkhiwale.

Green Audit was conducted On

12th & 13th July 2022.

For Green Audit the Data considered for the Period

July 2021 to June 2022.

Inclusions & Exclusions while performing the Green Audit.

1) Carbon emissions due to Students Travelling is not considered.

2) Carbon emissions due to Faculty & Staff Travelling is not considered.

3) Carbon emissions during Industrial Visits travelling not considered.

4) Carbon emissions from the Construction of Building are not considered as the Building is more than 10 Years old.

5) All Wood is more than 6 years old so not considered. (Classroom Faculty Platforms).

6) Plywood is not considered as Plywood is already recycled.

7) Total Consumption of Electricity for the Institute is considered. (Some Meters are common & it is difficult to Bifurcate accurately).

8) Total Consumption of Water for the Institute is considered. (Some Meters are common & it is difficult to Bifurcate accurately).

9) LPG Cylinders are consumed in Laboratories & in Pantry.

10) Green Cover is considered of the Whole Campus & very difficult to allocate for the Institute premises.

11) Emissions from Tiles, Paints & Printers are not considered.

12) Ambient Air Quality Monitoring is not performed as it was an Online Remote Audit.

13) Analysis of Water entering the drains / soak pits is not performed. as it was an Online Remote Audit. (Sewage water, Lab washing water, Washing & Cleaning water) is let out in drains.

14) Raw Water Analysis is not performed as it was an Online Remote Audit..

15) Radiation due to Wifi & Mobile Phones is not considered.

Air.

Since it was an Online Remote Audit. Ambient Air Quality was not monitored. Ideally it should be monitored at atleast 12 locations depending on the area of the Institute.

Stack Emissions of the Diesel Generator has also to be monitored.

Paper.

Each A 4 paper is used from both the sides.

After use on both the sides then it is sold to Old Paper Merchant.

To the extent possible use of soft copies of documents is promoted.

No details of Paper Consumption is provided
So unable to calculate the Paper Consumption.

Water.

Water used for

Drinking, Cleaning, Washing & Flushing, Gardening, In Laboratory.

Water Meters are not specifically demarcated for the Engineering College. So accurate allocation for Engineering College is not possible.

Sr. No.	*Month*	*Consumption in mcu (M3)*
01	July 2021	4,007
02	August 2021	4,062
03	September 2021	4,061
04	October 2021	4,184
05	November 2021	4,183
06	December 2021	4,600
07	January 2022	4,599
08	February 2022	4,502
09	March 2022	4,501
10	April 2022	4,411
11	May 2022	4,410
12	June 2022	4034
	TOTAL	**51,554**

Total Consumption of water from July 2021 to June 2022 will be

Consumption of Water given is 5,15,54,000 Liters for 12 Months.
So considering 360 Working Days

Total Consumption of water from July 2021 to June 2022 will be

Water Foot Print is
5,15,54,000 / 360 = 1,43,206 Liters per Day.

So the Water Foot Print is 1,43,206 Liters of Water Per Day.

A separate Water Foot Print Certificate is given to the Institute.

Electricity.

Total Consumption of Electricity is considered from the Meter reading shown in the Electricity Bill.

Electricity Meters are not specifically demarcated for the Engineering College. So accurate allocation for Engineering College is not possible.

Electricity used for

Tube Lights, Lights & Fans, Computers & Printers, To run the Utilities.

The details of the Electricity Units consumed from July 2021 to June 2022.

Sr No.	Month/ Year	Consumption in KWH
01	July 2021	11,500
02	August 2021	11,600
03	September 2021	11,700
04	October 2021	10,750
05	November 2021	10,430
06	December 2021	10,100
07	January 2022	11,300
08	February 2022	11,850
09	March 2022	11,950
10	April 2022	12,230
11	May 2022	12,350
12	June 2022	12,950
TOTAL		**1,38,710**
Monthly Average		***11,599***

Power Generation by running the Diesel Generator.

Diesel Generator of capacity 200 KVA
Diesel Consumption is 100 Liters per Month.
Total Diesel Consumption is 1200 Liters per Year.

Measures taken for Energy / Electricity Conservation.

1) Replacing the conventional Florescent Tube Lights with LED Tube Lights.
2) Replacing the CFL Blubs with LED Bulbs.
3) Periodic Maintenance of the Diesel Generator to get Optimum performance.

LPG Consumption

Liquefied Petroleum Gas.

5 LPG Cylinders for the period selected (July 2021 to June 2022)
(In Each LPG Cylinder the gas is 14.2 Kg is taken as base)

So in a period of 12 Months the Total consumption of LPG gas was 14.2 Kg X 5 = 71 Kg.
so a Monthly Average of 5.92 Kg per month.

So Following is the Calculation of the Carbon Foot Print.

Calculation of Kg of CO2 emissions

1	2 *As per GRI Standards*	3	4	5
Category	**Kg of CO2 per unit of consumption**	**Average Monthly Consumption**	**Calculation 2*3**	**Total Kg of CO2 2*3=5**
Electricity	**0.371 Kg per KWH**	***11,599 KWH***	**11,599 X 0.371**	**4303.23**
Diesel	**2.68 Kg per liter**	***100* Liters**	**100 X 2.68**	**268**
LPG	**3 Kg per Kg**	**5.92 Kg.**	**5.92 X 3**	**17.76**
		TOTAL		**4589**

GRI **(Global Reporting Initiative) Standards.**

So the Average Monthly CO2 Emissions are 4589 Kg of CO2.

A separate Carbon Foot Print Certificate is given to the Institute.

Green Cover Details.

Green cover area in the campus is considered and not only for the Engineering College.

Various Types trees planted in the campus.

There are currently **300 Trees** in the Campus.

Additional trees will be planted in the Academic year 2022- 2023.

Hazardous Waste Disposal

No details provided regarding collection & disposal of E waste.

No details provided regarding collection & disposal of Used Batteries.

Laboratory Waste & Used Chemicals & Reagents are diluted & let out in a pit specifically prepared for Chemical waste.

Suggestions for Environment / Green Audit / Water Audit related activities to be carried out by the Institute.

1) STP (Sewage Treatment Plant) can be installed for processing & reusing the Sewage waste water.
2) The Flushing Tanks of WC (Toilets) to be modified such that only half gets filled & thus while flushing only half of the water is used.
3) Drip irrigation can be implemented for the Trees.
4) To fit the atomizer devise to taps to save water.
5) Measures to be taken & implemented to save water or to recycle water.
6) Testing of the water in the drain as it is directly going into the soil.
7) Motion sensors can be fitted for the Light fittings in Washrooms, Lift and Lobby where continuous usage is not there.
8) In the next Green Audit to test the Ambient Air Quality at least at 12 Locations.
9) To test the Diesel Generator Stack Emissions.
10) To verify the radiation from Wifi & Mobile phones.
11) To conduct Poster & other Innovative Environment Idea Competition among students.
12) Installation of Secondary Electricity & Water Meters for getting accurate consumption figures.

The Above Report is prepared based on the Records & Facts given by the Office bearers of Terna Engineering College.

CA. Dr. Ashis .Arun. Palkhiwale. (14th July 2022)

CA, GDCA, MBA (Finance), MBA (IS), MBA (HR), DIP (Automobile Engg), Mcom, MA (Eco), Msc. (Environmental Science),
(DISA, DFM, DPT, DCL, DFEA, DAD, DVCCR, DET, DPTHR, DTDC & DJL)
PhD (Environment Science)
Post Doc (Marine Environment Science)

For, Quality Certification Services.

Dr. Ashis Arun Palkhiwale.
(Green Auditor & LA ISO 14001)
(Blue Flag Certification Auditor)

For, Quality Certification Services.

Quality Certification Services

Mr. Shrinivas Joshi.
(Authorized Signatory)

POWER QUALITY AUDIT REPORT

For

Terna Engineering College,

Plot No-12, Sector-22,
Infront of Nerul station,
Nerul(w), Navi Mumbai-400706

By

Dr. Rajendra R Sawant
Director, Inventronics Private Limited

Date of Visit: 20 May 2022

TABLE OF CONTENTS:

Section-1 INTRODUCTION

"M/s Inventronics Private Limited" is appointed as principal consultant through its Director Dr. Rajendra Sawant for carrying out the Power Quality Audit of Terna Engineering College, Nerul, Navi-Mumbai as per IEEE 1159-1995 – (Recommended practice for monitoring electric power quality) and has given recommendations to help the client in mitigating Power Quality Issues as per IEEE standards as mentioned in Section-2 and .

Disclaimer:

Every effort has been made to ensure that all statements and information offered in this report are provided in good faith and are based on observations made during the audit, together with information/data supplied by the organisation. The auditors assume that the aforementioned information supplied and the representations made by the organisation during the audit, on which the report is based, were current, valid, accurate and complete. The organisation must notify the Lead Auditor of any factual inaccuracies, or misinterpretation of information provided by the organisation, as reflected in the report. The issues commented on in this report are limited to areas reviewed during the audit process, and should not be taken as identifying all areas of possible unsafe conditions and/or contravention of statutory requirements.

Section-2 AUDIT METHODOLOGY

Step -1	Walk Through Inspection
	The electric meter room and the CNC Lab is inspected by the Audit team. Possible reasons & effects of Power Quality issues of the institute are discussed.

Step -2	Electrical Measurements
	Power Quality Analyzer is used to record data at the Main PCC (Pont of Common Coupling) Incomer and the CNC Lab. The following data is logged. i. Electrical Power data ii. Harmonics data

Step -3	Recommendations and Report
	Based on the audit data a report is created. Recommendations are made for PQ mitigation.

Section-3 BASICS OF GENERAL POWER QUALITY PROBLEMS

3.1 IEEE Standards for Power Quality in Distribution Systems

IEEE 1159-1995 - Recommended practice for monitoring electric power quality

EEE Power Quality Standards do not have such a structured and comprehensive set as compared to IEC. Nonetheless, the IEEE standards give more practical and some theoretical background on the phenomena, which makes it a very useful reference, even outside of the United States. The following are the power quality standards and documents released by IEEE:

IEEE 4-1995 - Standard techniques for high voltage testing

IEEE 8-2002 - Standard for Shunt Power Capacitors

IEEE 120-1989 - Master Test Guide for Electrical Measurements in Power Circuits

IEEE 141-1993 - Recommended practice for electric power distribution for industrial plants

IEEE 142-1991 - Recommended practice for grounding of industrial and commercial power systems, also known as the **Green Book**

IEEE 213-1993 - Standard procedure for measuring conducted emissions in the range of 300 kHz to 25 MHz from television and FM broadcast receivers to power lines

IEEE 241-1990 - Recommended practice for electric power systems in commercial buildings, also known as the **Gray Book**

IEEE 281-1994 - Standard service conditions for power system communication equipment

IEEE 299-1991 - Standard method of measuring the effectiveness of electromagnetic shielding enclosures

IEEE 352-1993 - Guide for general principles of reliability analysis of nuclear power generating station safety systems

IEEE 367-1996 - Recommended practice for determining the electric power station ground potential rise and induced voltage from a power fault

IEEE 376-1993 - Standard for the measurement of impulse strength and impulse bandwidth

IEEE 388-1992 - Standard for Transformers and Inductors in Electronic Power Conversion Equipment

IEEE 430-1991 - Standard procedures for the measurement of radio noise from overhead power lines and substations

IEEE 446-1987 - Recommended practice for emergency and standby power systems for industrial and commercial applications, also known as the **Orange Book**

IEEE 449-1990 - Standard for ferroresonance voltage regulators

IEEE 473-1991 - Recommended practice for an electromagnetic site survey (10 kHz to 10 GHz)

IEEE 493-1997 - Recommended practice for the design of reliable industrial and commercial power systems, also known as the **Gold Book**

IEEE 519-1992 - Recommended practice and requirements for harmonic control in electric power systems

IEEE 539-1990 - Standard definitions of terms relation to corona and field effects of overhead power lines

IEEE 762-1987 - Standard definitions for use in reporting electric generating unit reliability, availability and productivity

IEEE 859-1987 - Standard terms for reporting and analyzing outage occurrences and outage states of electrical transmission facilities

IEEE 944-1986 - Application and testing of uninterruptible power supplies for power generating stations

IEEE 998-1996 - Guide for direct lightning stroke shielding of substations

IEEE 1048-1990 - Guide for protective grounding of power lines

IEEE 1057-1994 - Standard for digitizing waveform recorders

IEEE 1100-1992 - Recommended practice for powering and grounding sensitive electronic equipment, also known as the **Emerald Book**

3.2 System Average Power Factor in Distribution Systems

All the distribution electrical networks in India must maintain average PF greater than 0.98 lagging or leading. The AVG PF is calculated over all three phases and on energy basis as a ratio of kWh to KVAh. The resultant reactive VARh is calculated by adding both the lagging and leading VARh.

For LT Consumers the PF Penalty is separately mentioned in electricity bills under the heading "PF Penalty or Incentives", whereas the Chargeable Energy Consumption is considered on the basis of kWh.

For HT Consumers the PF Penalty head does not reflect separately but the Chargeable energy consumption is considered on the basis of kVAh, which automatically considers the Power Factor, whether lagging or leading. Therefore, it is important to maintain kWh and kVAh nearly same with AVG PF near unity.

For mitigating the PF near unity, it is recommended to use an Automatic PF Compensation by using a Switched Shunt Capacitor Bank Panel with appropriate step size as Passive Compensation. The Active Harmonic Filters can be used in case of sensitive and dynamically changing loads to perform harmonic compensation, PF Correction and Neutral Balancing with a single unit

3.3 Power System Harmonics

All the distribution electrical networks in India must maintain Voltage THD up-to 5% and below and Current THD up-to 8% and below for medium power networks on all of the phases as per IEEE-519 / 1994 standards. For Harmonic mitigation, either Passive Harmonic Filters or Active Harmonic Filters are used depending on the type of load and Installations.

3.4 Excessive Neutral Current Problem

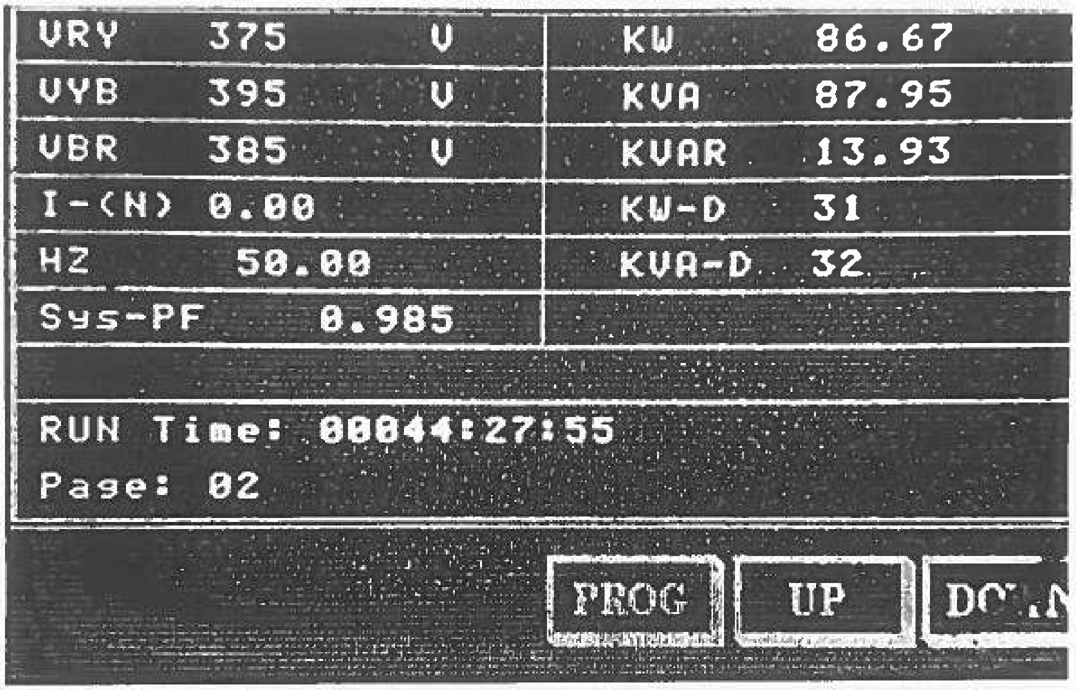
All the 3-phase 4-wire distribution electrical installations in India must take appropriate care to distribute the single-phase loads on the available three phases nearly balanced, so that neutral currents must be as minimum as possible. The excessive neutral current may be caused due unequal distribution of single-phase loads and heavy total harmonic distortions. As a thumb-rule, for 4-core Cables the neutral current must be below 20% of the any of the phase current rating and for 3.5 Core Cable, the neutral current should be well below 20% of the half of any of the phase current rating.

In some installations, the excessive neutral current is also caused due to unbalance in the Input Line voltages (negative and zero sequence components). This may be perhaps due to long distances over 200meters from the PCC to distribution transformer with several cable joints all over the route.

The shifted Neutral point can cause heavy neutral currents which in turn can results in either frequent heating and bursting of Neutral conductors OR frequent tripping of sensitive equipment and low phase voltage problems.

The installation of specially designed Neutral Compensators OR Active Power Filters / Static VAR Compensators at PCC can solve the Neutral Current issues

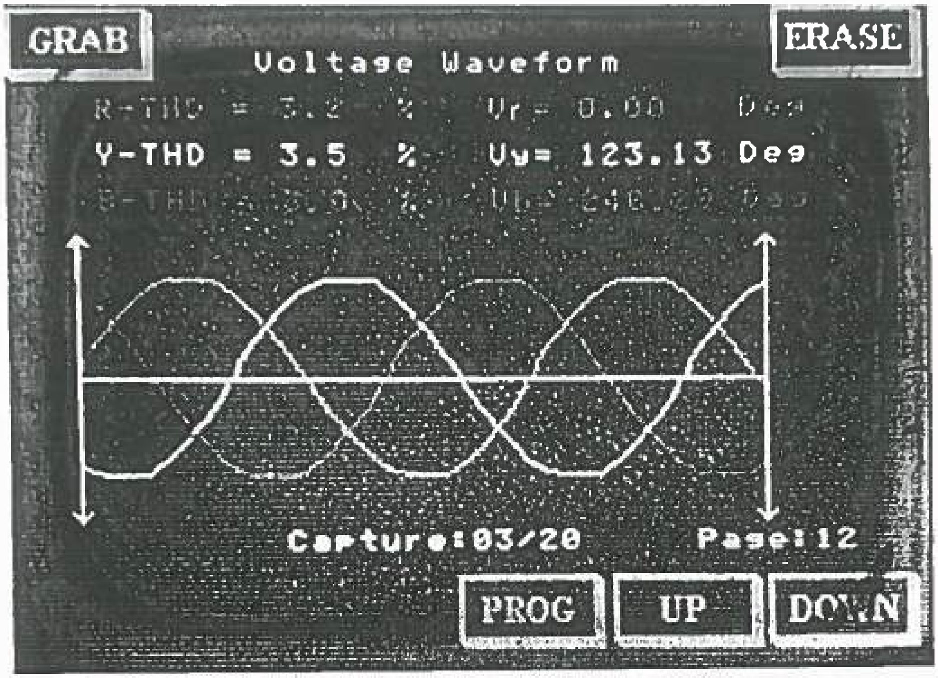
Section-4 Power Quality Data/Waveforms @ Terna Engineering College

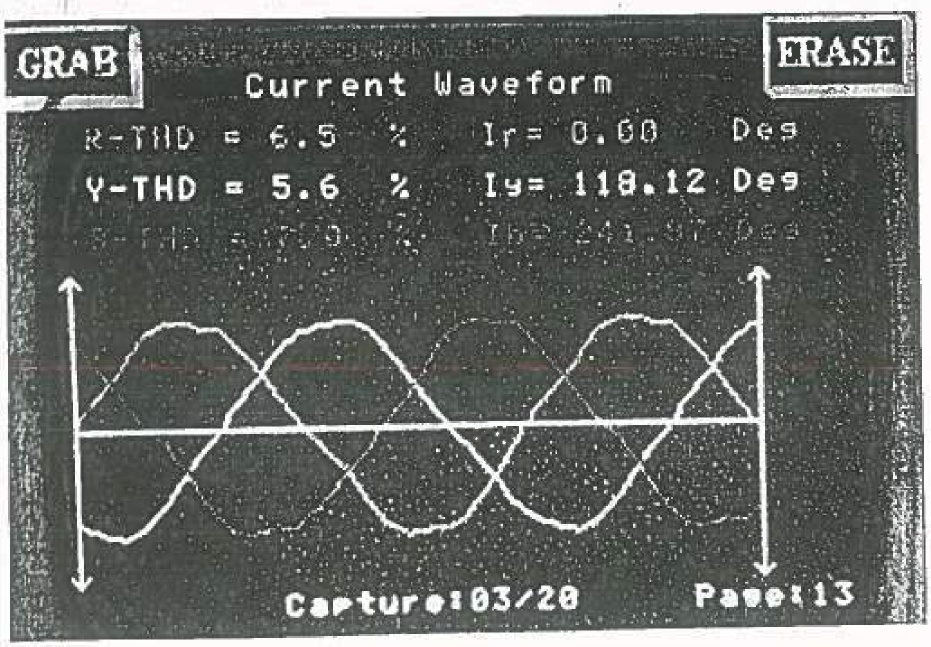


Three Phase Measurements of Voltages, Currents, Active Power, Reactive Power and Average Power Factor @ Main Distribution feeder.

Observations:

Sr. No.	Observations
1	The Line Voltages are in the range of 375V-395V (low) instead of 415-420V. Also there is unbalance in the voltages
2	The average PF is around 0.985.
3	Three Phase KVA is found to be 88kVA and Active Power as 87 kW, kVAR Lagging=14kVAR

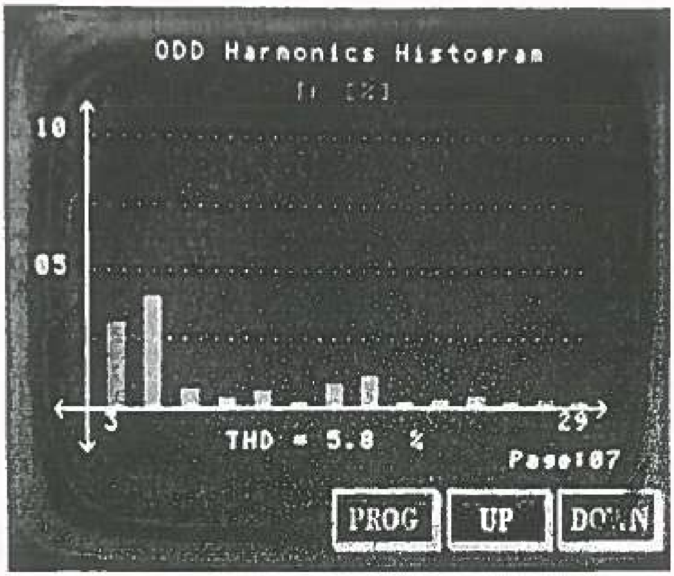


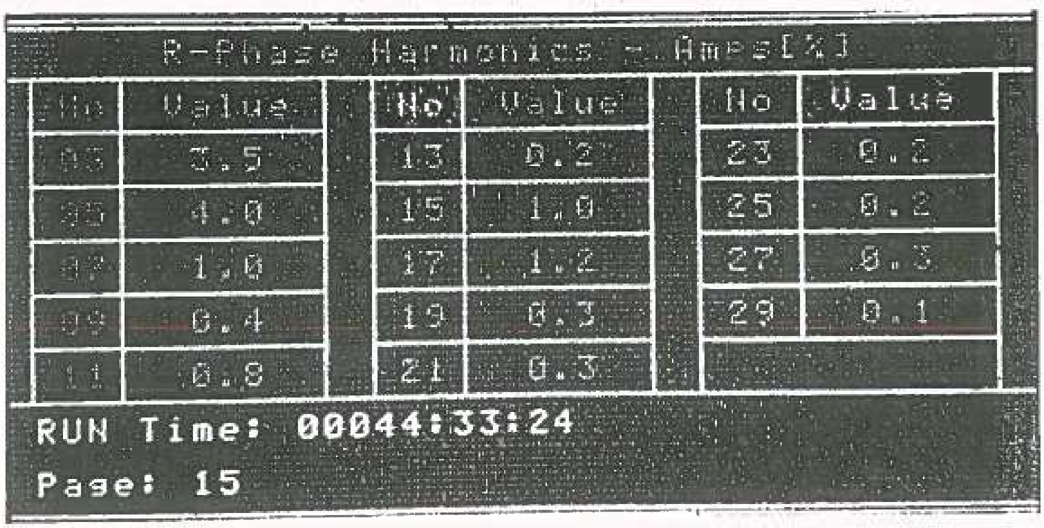


Voltage THD is ranging from 3-3.5 %

Current THD is ranging from 5.6% to 7%

R-Phase Current Harmonics Spectrum





R-Phase Harmonics - Amps[%]

No	Value	No	Value	No	Value
03	3.5	13	0.2	23	0.2
05	4.0	15	1.0	25	0.2
07	1.0	17	1.2	27	0.3
09	0.4	19	0.3	29	0.1
11	0.8	21	0.3		

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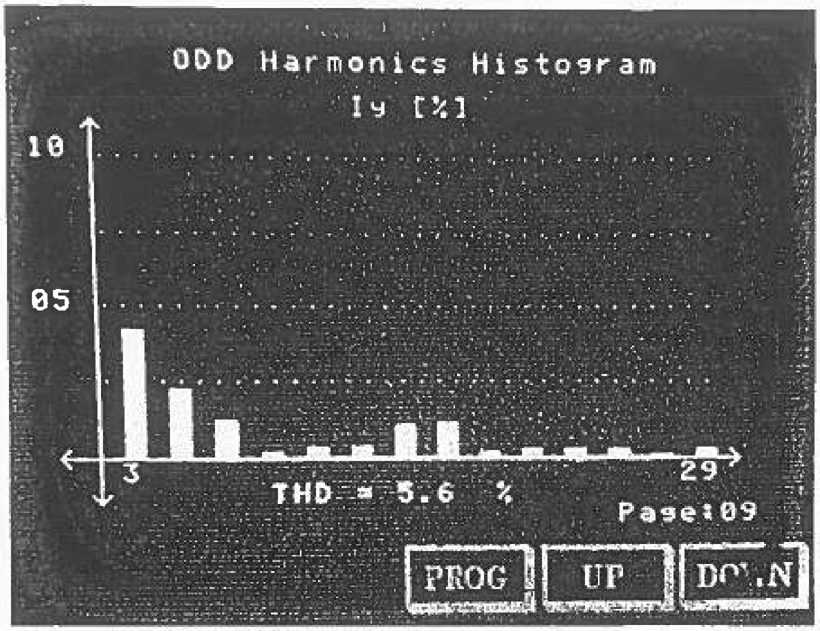
Harmonic Profile of R-Phase Current shows that The THD=5% is well within the standard limits of 8% for this installation

B-Phase Current Harmonics Spectrum



Y-Phase Harmonics - Amps[%]

No	Value	No	Value	No	Value
03	5.6	13	0.4	23	0.4
05	3.7	15	1.0	25	0.3
07	1.1	17	1.1	27	0.2
09	0.4	19	0.3	29	0.2
11	0.3	21	0.3		

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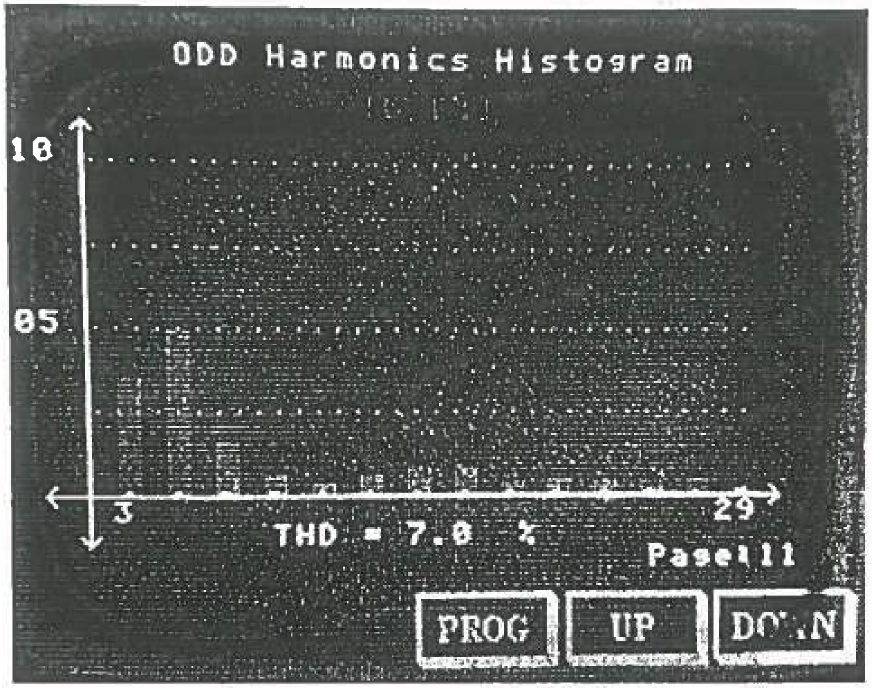
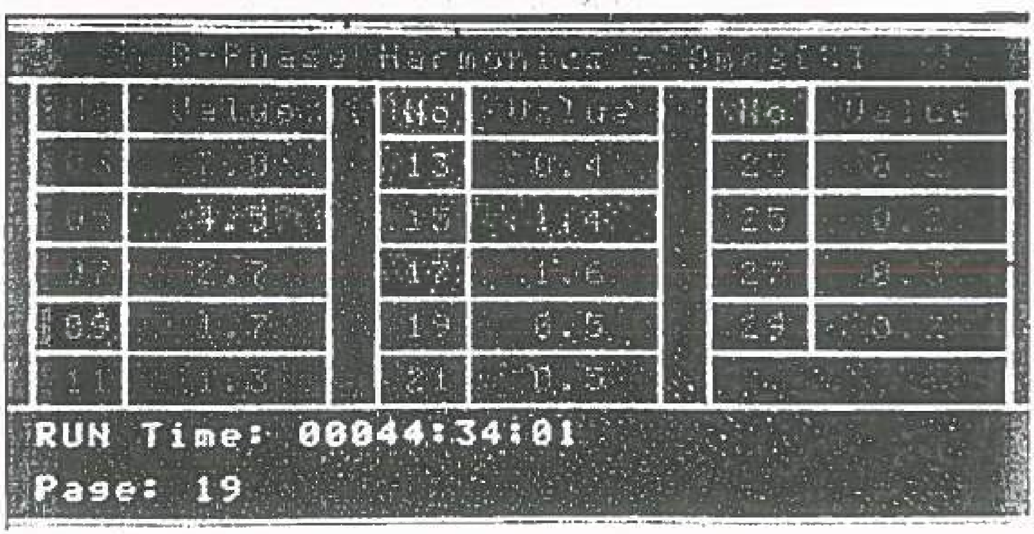
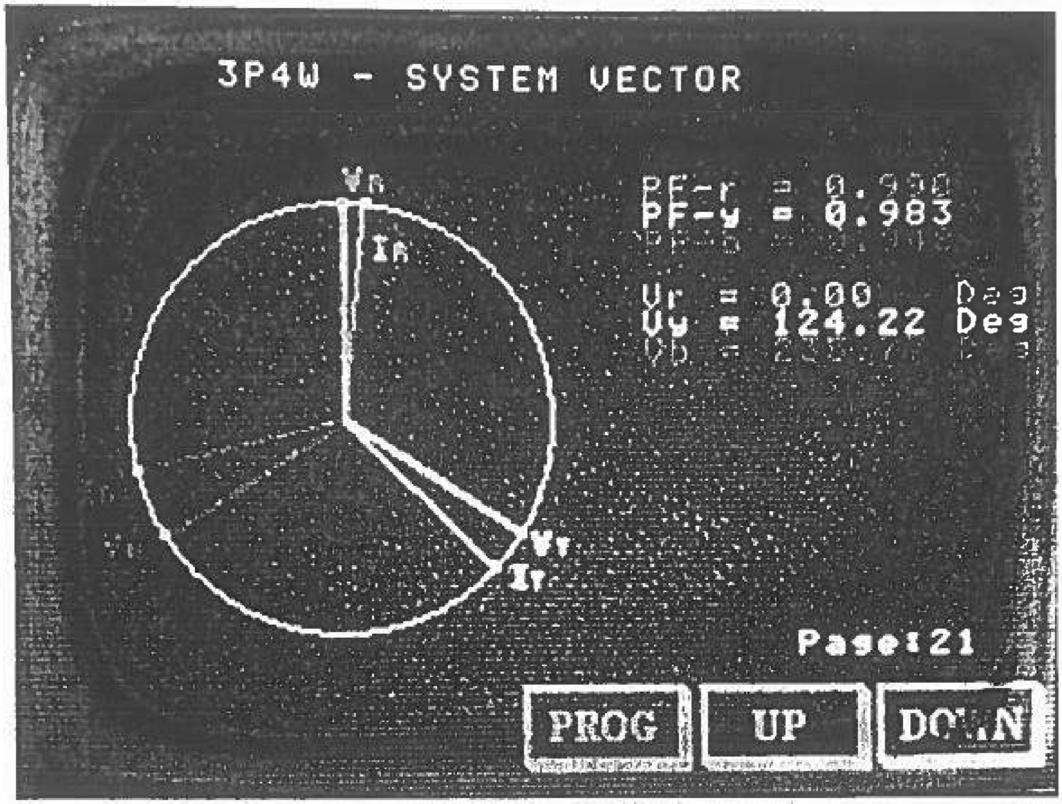
Harmonic Profile of Y-Phase Current shows that The THD=5.6% is well within the standard limits of 8% for this installation

B-Phase Current Harmonics Spectrum



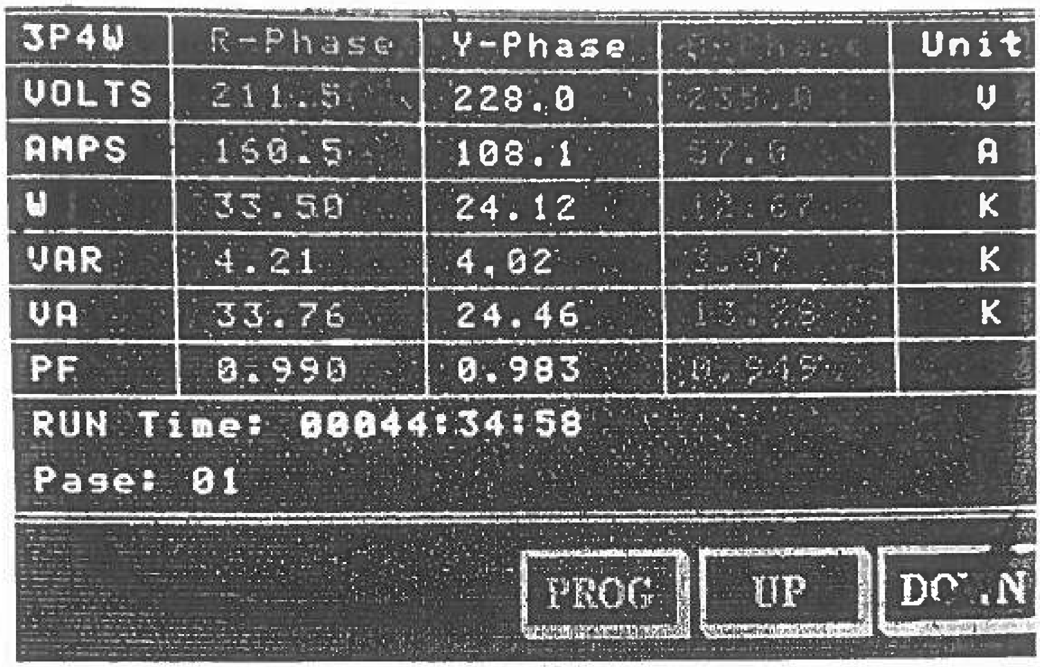


Harmonic Profile of B-Phase Current shows that The THD=7.0% is well within the standard limits of 8% for this installation



The B-Phase PF Is lesser than required and it is found to be 0.95, needs improvement.

There is Unbalance negative sequence component is present in the System as all currents does not have mutual phase difference of 120^0



3P4W	R-Phase	Y-Phase	B-Phase	Unit
VOLTS	211.5	228.0	235.0	V
AMPS	160.5	108.1	57.6	A
W	33.50	24.12	12.67	K
VAR	4.21	4.02	3.97	K
VA	33.76	24.46	13.28	K
PF	0.990	0.983	0.945	

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Page: 01

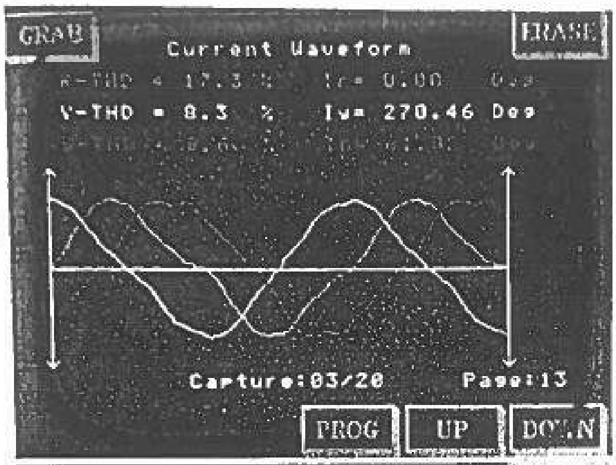
PROG UP DOWN

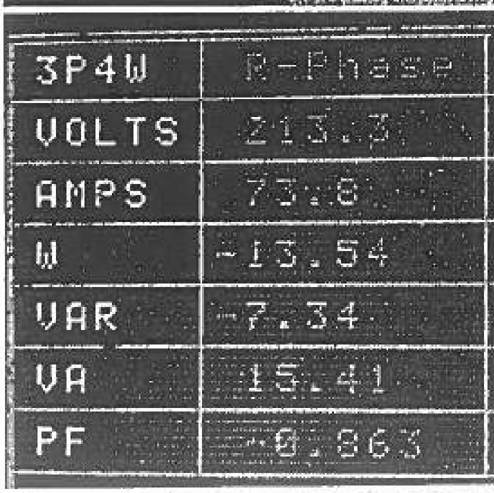
Phase voltages are varying from 211 to 235, that indicates the unbalance load conditions.

The Line currents were found to be IR=160A, IY=108A and IB=57A

This shows that the line currents are varying in the range of 50A to 160A, which results in Heavy unbalanced conditions at the PCC, with neutral current more than one of the minimum line currents.

Neutral Current (Red Trace)

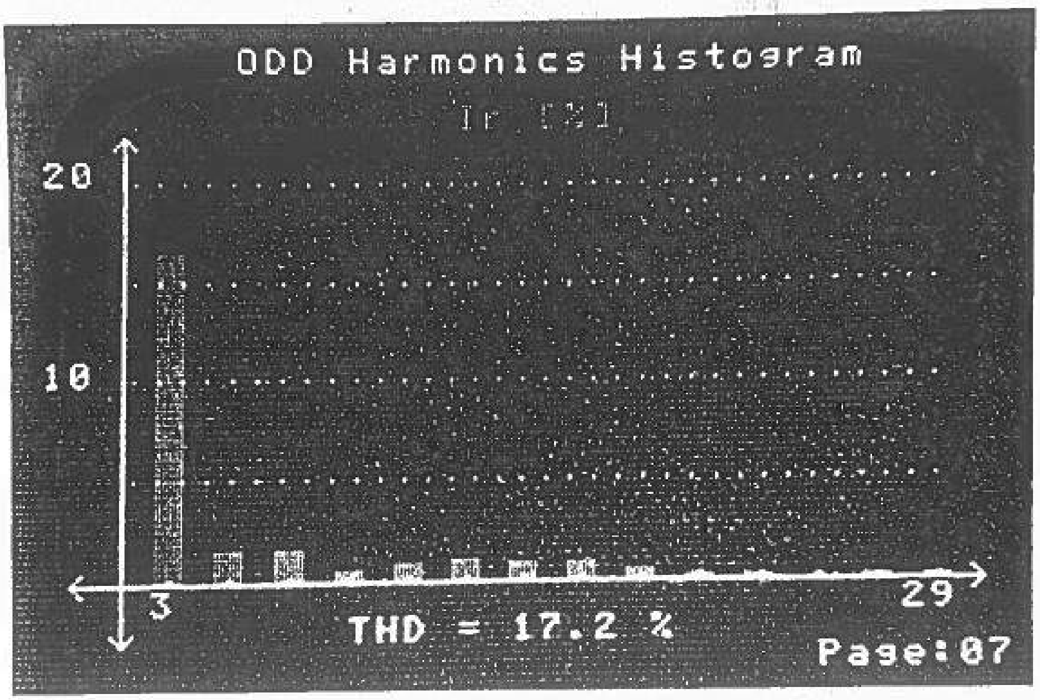




Neutral Current is found to be 73.6A. This is equivalent to one of the line currents. This shows that the system has substantial zero sequence components

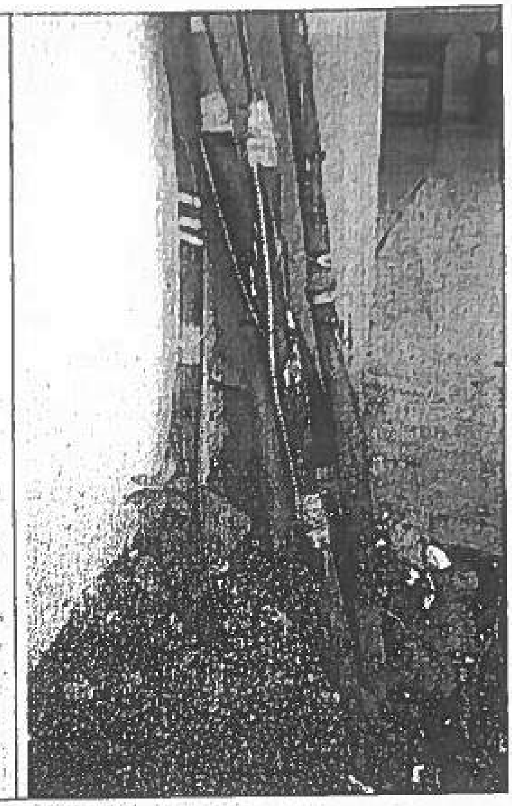
The neural current THD is 17%. This shows that there are substantial triplen harmonic currents in Neutral wire, which causes heating of Neutral Conductor. In addition, these harmonic currents when flowing through the longer length cable will produce harmonic drops all along the line and will produce unbalance in the system voltages, which in-turn leading to more unbalance currents.

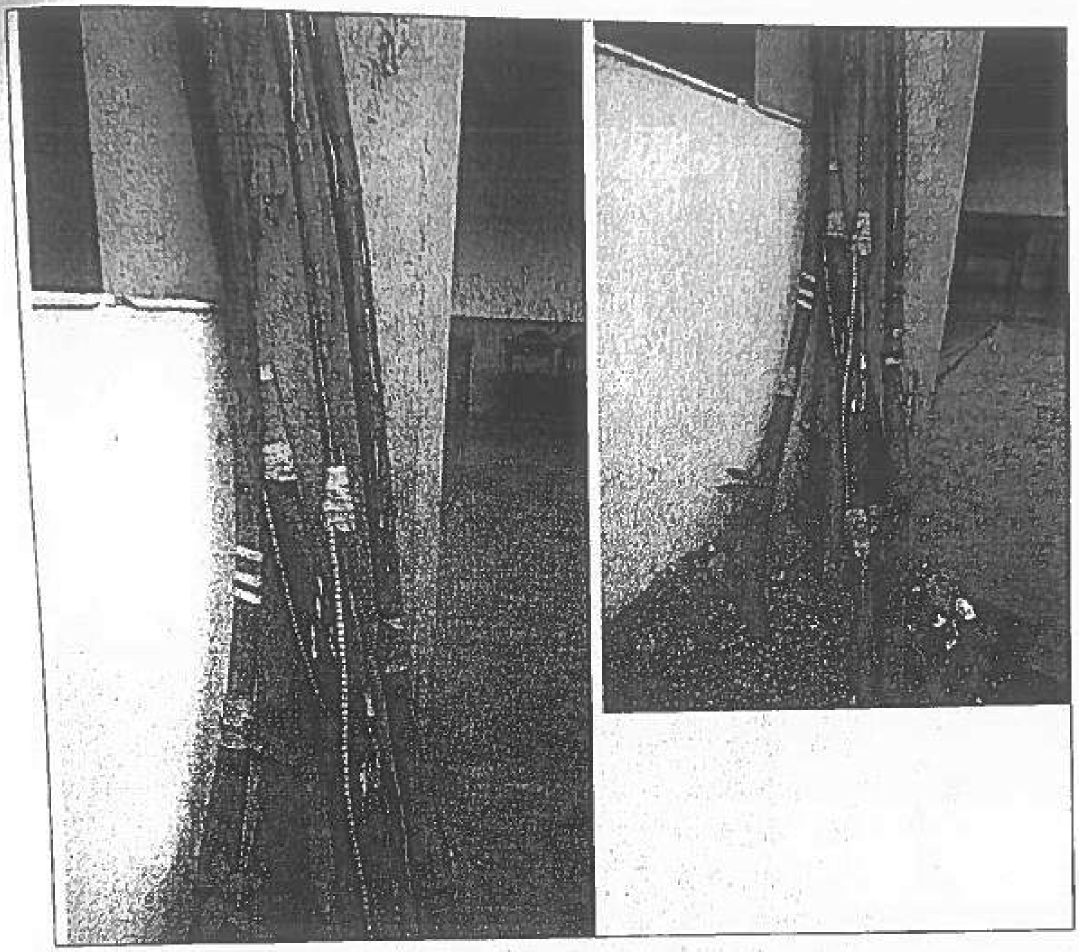
Neutral Current Harmonic Spectrum



Neutral Current Harmonic Spectrum

Cable Joints





We have found several cable joints all over the route of the cable from Transformer secondary to Electrical Distribution Panel of the College (PCC). Although, we can not investigate the quality of the joints, these joints will cause unequal resistive drops all over the route as load current flows through the cable. These joints will cause heating @ the joints and reduce the line voltage reaching to PCC. In addition, the joints may cause unbalance negative and zero sequence voltages, this will further increase the neutral current and reduce the phase voltages available at the critical loads. The heating may cause fire hazards in some occasion. The reduced voltages at the critical loads suxh as CNC Machine may cause unwanted and unwarranted tripping. Therefore as far as possible the joints must be avoided.

Section-5 Analysis and Recommendations

After careful measurements at the strategic locations at Terna engineering college electrical distribution network installation, and deliberate observations thereof, we conclude the following points:

(1) The electrical distribution panels are properly wired and the place is found neat and clean. Generator backup is also available, that is an encouraging thing to facilitate uninterrupted functioning of electrical loads. Since it is an educational complex, the motor type of inductive loads are limited, but most of the loads are lighting, CNC Demonstrator/Workshop, computer installations, etc.

(2) We found no substantial harmonic distortion at the line currents drawn at PCC. The THD figures are well within tolerance limits as 5% for THDv and 8% limit for THDi as per IEEE-519/1991 STD. However, the B-phase installation is found on the verge of 8%THDi and line current is found less than 50% of other phases. That causes severe current unbalance. **The harmonic compensation is not required.**

(3) Since we found line currents on R, Y and B Phases are 160A, 108A and 57A, we feel that there is either unequal load distribution among all three phases OR some potential loads are switched off at the time of measurements. The neutral current is found to be nearly 73A, more than the phase current. The **Neutral to earth voltage is found to be 4.55V, whereas the recommended limits are up-to 2V,** that confirms the neutral shifting problem. This is not healthy sign of electrical installation, which prevails us to suggest **Neutral Compensation** at the earliest. If not done, the installation neutral may get heated, cause fire and bursts, which is detrimental to tripping and damaging some single-phase loads.

(4) **The Neutral Compensator that we are suggesting, shall try to balance the phase voltages, eliminates the neutral current shared by transformer as the new neutral point is generated locally. reduce Neutral current and eliminates the triplen harmonics from the neutral current. This will lead to lesser Neutral to earth potential. The phase voltages will be balanced.**

(5) We also found the line voltage at PCC unbalanced and low. The typical healthy installation should have 415 to 420V, but this installation has 370-

380V. This results in lower phase voltages. This problem can be solved first by Neutral Compensation, Connecting an intact cable from transformer to PCC. If nothing works, then you may have to change the transformer tapping to higher voltages.

(6) The cable joints should be avoided in the near future OR if possible, new fresh intact cable should be laid from transformer to PCC.

(7) The local physical load balancing can be done meticulously by transferring some of the R-Phase load on Y and B Phase, respectively.

(8) After neutral compensation, your critical loads such as CNC machine may not see any electrical supply problems. We recommend to use online UPS instead of voltage stabilizer for such systems. The existing voltage stabilizer may become redundant and useless if neutral problem exists.

(9) We also recommend to install 20kVAR Automatic PFC Panel to maintain Average PF @ 0.99 or unity.

Acknowledgements:

We @ Inventronics Pvt; Ltd are thankful to the authorities of Terna engineering college, that they have given us an opportunity to study their electrical installation and power quality issues. If we succeed in solving these problems as observed by us by your sincere and candid implementations and support on our recommendations, we shall feel highly motivated and excited to solve many such problems in the near future as a Professional and Academic group.

INVENTRONICS PRIVATE LIMITED
AIROLI
NAVI-MUMBAI

Dr Rajendra R Sawant

For Inventronics Private Limited

S & A Certifications

Certificate of Registration & Approval Awarded to

Terna Public Charitable Trust's
Terna Engineering College.

Plot No 12, Sector-22 Opposite Nerul (W) Railway Station, Nerul, Navi Mumbai, Maharashtra 400706.

The Green House Gases Emissions Management System (Carbon Footprint) has been assessed successfully and found to comply with the requirements of the International Standard.

ISO 14064 : 2018.

Scope of Certification

To Reduce the release of CO2 (Carbon Emissions) by implementing measures to reduce the consumption of Electricity, create awareness regarding responsible usage of Electricity. Implement solutions for installation of renewable sources of electricity.

Calculation of Kg of CO_2 emissions Per Month for the Period July 2021 to June 2022

1	2	3	4	5
Parameter	Kg of CO2 per KWH *As per GRI Standards*	Average Actual Consumed in per Month July 2021 to June 2022	Calculation 2*3	Total Kg of CO2 per Month 2*3=5
Electricity	0.371 Kg per KWH	*11,599 KWH*	11,599 X 0.371	4303.23
Diesel	2.68 Kg per liter	*100* Liters	100 X 2.68	268
LPG	3 Kg per Kg	5.92 Kg.	5.92 X 3	17.76
TOTAL				4589

So Carbon Foot Print Per Month for the Period July 2021 to June 2022 is 4589 Kg of CO_2 per Month is the Carbon Foot Print.

Certificate Number : S & A Certifications 01/07/ GHGEMS / 22-23

Certification Audit Date : 12/07/2022

Issue Date : 14/07/2022

Expiry Date : 13/07/2023

S&A CERTIFICATIONS

S & A Euro Cert.

Mr. Shrinivas Joshi

(Authorised Signatory) S & A Certifications

Global Corporate Office :- Woody House 212-224 Ferries Avenue, London, UK.

The Validity & the Traceability of the Certificate can be verified on the website www.sandacertifications.com

S & A Certifications

Certificate of Registration & Approval Awarded to

Terna Public Charitable Trust's

Terna Engineering College.

Plot No 12, Sector-22 Opposite Nerul (W) Railway Station, Nerul, Navi Mumbai, Maharashtra 400706.

The Water Management System (Water Foot Print) has been assessed successfully and found to comply with the requirements of the International Standard.

ISO 14046 : 2014.

Scope of Certification

Responsible usage of water, to avoid wastage of water, implement various measures for reduction in usage of water, create awareness regarding responsible usage of water, introduction of Reuse & Recycle of water.

Water Foot Print

July 2021 to June 2022.

51,554 KL - Total Water Consumption in Liters from July 2021 to June 2022.

So Water Foot Print Per Day is

***51,554 KL* / 360 = 143.21 KL Per Day.**

143.21 KL Per Day is the Water Foot Print.

Certificate Number : S & A Certifications 01/07/ WMS / 22-23

Certification Audit Date : 12/07/2022

Issue Date : 14/07/2022

Expiry Date : 13/07/2023

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7.1.3 Clean and green campus initiatives

In view of green campus we encourage **tree plantation** activities in Campus .We have different plant like jack fruit, coconut ,custard apple ,mango which are oxygen reach as well as produce or even raise livestock that can be used in the dining halls or provide free fresh food for the hostel community. It’s a great way to reduce emissions from food transportation.

Fig: TEC Green Campus

Fig: TEC Green Campus

We encourage to reusable Water Bottles

There are too many single-use plastic water bottles to count that end up in landfills and in the environment through pollution. At TEC we have **water coolers** so that student can refill water .This encourages students to use reusable water bottles instead of purchasing single-use plastic bottles of water. Having multiple refill stations makes it easy for people on campus to rehydrate sustainably.

Fig .Water cooler ;initiative towards use of reusable bottle

Distinct Receptacles for Trash and Recycling

Students and staff are using food waste compost bin to eliminate waste .Theses bins are kept near canteen to collect food waste which will be send to prepare compost .

Opt for Low-Emission Transportation

TEC want to reduce cars on campus as it increases emissions, staff and students are using carpool, walk or bike around campus.

Invested in Clean Energy

TEC investing in clean energy is an excellent way for college campuses to go green. Although clean energy such as solar power have been becoming more popular, many buildings on college campuses still rely on nonrenewable energy sources for heating and cooling, electricity and other power needs.

Fig. Solar panel on TEC roof

Fig. Clean energy Solar panel on TEC roof

Electronics over Paper

To reduce paper-use we are using ERP software and website for academic communication. Class advisors are having WhatsApp group for communication with students.

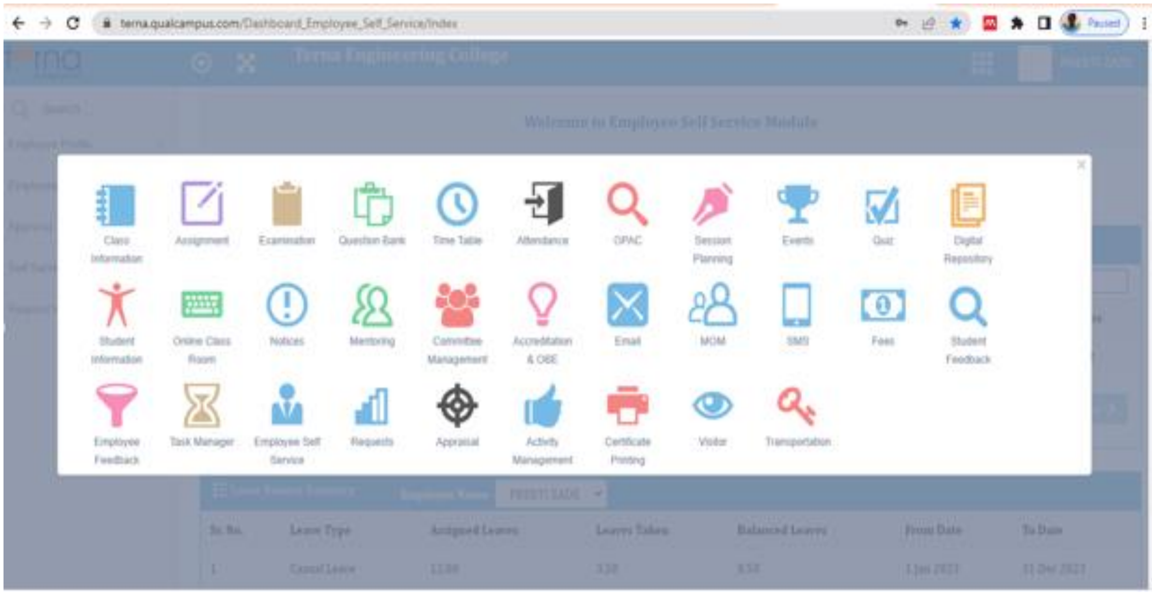

Fig. ERP portal

Institution is always keen to adopt best practices to maintain cleanliness, energy conservation and environment friendliness. Annual audits viz. energy and green audit helped us to achieve major benchmarks in terms of relevant performance.

Following best practices have been adopted by the institution.

1. Engaging special agencies with highest standards on Quality and Service level Agreements for following important components of the premises, campus of the Institution.
    i. Cleanliness of buildings, facilities, and campus.
    ii. Awareness sessions on Health, Precautionary measures, and health checkups.
    iii. Tree plantation, regular maintenance of gardens /water resources.
    iv. Solar Energy Generation.
    v. Energy audit and conservation.
2. It is mandatory to wear helmets entering into the campus. Caution boards have been put at entrances and other major locations. This is one of the best practices to achieve Environmental safety.

Fig. Helmet compulsory in TEC campus

3. Electrical appliances like tubes, bulbs, fans, Air Conditioners have been replaced by energy efficient appliances.
4. Wet and dry wastes being separated from the source of garbage and major contributions being achieved and Municipal solid waste management initiatives.
5. Participated in rallies, half marathons to campaign on environment friendliness, cleanliness.

Beyond the campus environmental promotion activities

Donation for Kerala Flood victims:

For the relief of the flood victims in Kerala, the NSS Unit of Terna Engineering College, Nerul, organized a donation campaign during the 16th - 20th of August, alongside a Kerala Sports Club.

Fig. Flood affected area

Fig .Collection for donation by NSS team

Fig. Distribution to flood victims in Kerala

Fig. Donation campaign flood victims in Kerala

Juhu Beach Cleaning:

NSS unit of Terna Engineering College participated in Clean-a-thon, a large scale event organized to clean waste caused due to Ganpati Visarjan in the beach.

Fig. Clean-a-thon at Juhu beach Fig. Clean-a-thon at Juhu beach by TEC NSS team

Tree Plantation:

On 2nd July 2018, Terna Engineering College successfully completed the event of Tree Plantation under the National Service Scheme at college campus. The staff members and NSS members actively participate in the plantation. Terna Engineering College successfully completed the event of Tree Plantation under the National Service Scheme at college campus. The staff members and NSS members actively participate in the plantation.

Fig. Tree Plantation at NSS team **Fig. Tree Plantation at in TEC campus**

Unnat Bharat Abhiyan, MHRD, Government of India:

Terna Engineering College, Navi Mumbai, has been registered under the Unnat Bharat Abhiyan programme and identified five villages in Raigad District as Kondale, Khaiwadi, Ghot, Gulsunde, and Karnala (Tara) for development challenges and evolving appropriate solutions for accelerating sustainable growth of village.

The activities carried out include village surveys and household surveys. Distribution of cotton bags for plastic free India and distribution of ration in Covid-19 pandemic

Fig. Household survey by TEC team

Fig. Distribution cloth bags by TEC team

Fig. Distribution of Grocery under Unnat Bharat Abhiyan by TEC

Entrepreneurship Cell (E-Cell):

The objectives of the E-Cell centers are to help develop business ideas. To create self-motivated individuals with a constructive and intense entrepreneurial drive. To spread and evolve the concept of entrepreneurship. To help innovate, take risks, shoulder social responsibility, and indulge in creative execution of vibrant business concepts.

The sessions and activities conducted by Terna Centre for Innovation and Entrepreneurship for developing Entrepreneurial Ecosystem under Institution Innovation Council at Terna engineering college .**Agriculture development projects ideas shared through this platform .**

Fig Flayer

Fig. E cell team

Fig. Session on Agriculture development

Fig. Activities under E-Cell centers Entrepreneurial Ecosystem