SPE News Letter

SPE(I), Vadodara Chapter
October, 2022 Issue: 4/2022

NAVRATRI IN VADODARA GUJARAT

HAPPY DIPAWALI &
VIKRAM SAMVAT 2079

SILVER JUBILEE YEAR - *BID ADIEU* Society of Power Engineers (India)

Vadodara Chapter (Estd. 1996)

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S D E S K F R O M T H E C H A I R M A N'

Dear Readers,

I am pleased to present this issue after the AGM last month on 28 August 2022. The election for the Executive Committee for this year was held which was attended by **120** members. The AGM and election process went very smoothly with the induction of new three younger and more enthusiastic members. I also take this pleasure to inform you that Advisory Committee was also formed with more members from the academy and industry selected by EC. Many Life and Fellow members of the SPE responded and offered their services for joining SPE's working team and we accommodated most of them by forming a new group of Volunteers so that we can get help from them as and when required.

After the great success of our 2-Day conference on Power Reforms held in the month of May-2022 in Vadodara, now we have concluded 2nd conference on "**Metallurgy in Power Sector & Industries**" held on **29-30 Sep 2022** in Vadodara. Even though metallurgy is the most important base of equipment used in the power sector and industry and our day-to-day life, it is considered to be a non-electrical topic by power engineers and hence we were a bit comprehensive about the success of this conference. However, I am very happy to inform all the SPE members that the conference was quite successful with the participation of about a hundred delegates from the utilities, industries, and academic institutes. The conference aroused plenty of interest from the delegates and a lot of interactions and deliberations took place among the expert metallurgist and other speakers. It was noticed from the responses and the feedback during the session of the conference that the delegates have benefited from the conference. It is an encouraging outcome with a moderate amount of surpluses generated out of this conference, which is very welcoming news after the erosion of our corpus fund due to the effect of COVID-19 during the last two and half year.

The new team of Executive and the Advisory committees and many active members volunteering and contributing to our work are now enthused by the success of the previous conferences. Our team will undertake different conferences, monthly lectures, and other technical activities on relevant subjects as furnished in my earlier article in the SPE Newsletter of July 2022.

With this, I appeal to all the members to actively participate and attend the different programs and contribute their might in the accomplishment of the novel task undertaken by the SPE, Vadodara Chapter.

I wish you and your family members a very Happy Diwali and the New Year.

Thanking you,

Er. GV Akre

DIWALI GREETINGS

The Executive Committee, the Advisory Committee and Editorial Board (SPE NEWS LETTER) wish all the Members, Readers, Patrons and Well Wishers a very Happy DIWALI and Prosperous NEW YEAR following this Diwali

May God shower thousands of Blessings on You and your Family Members in the New Year

STRENGTH OF AN ORGANIZATION

EDITORIAL

Dear Readers,

An organization is a group of individuals who work for a common cause. The organization can be for a bonafide cause or a malafide cause. Each organization is generally brainwave of handful individuals. Tata, Birla, Godrej etc. set up their organization through a vision of individuals.

Semi Government organizations also come in to existence owing to a vision of Government functionaries. The Non-Government Organizations (NGOs) thrive on charity or on the strength of their service orientation.

Again a visionary is always behind the inception and sustenance of such NGOs. Disregarding the functioning of NGO, many times Government department also solicit the help of NGO in organizing events or propagation of a theme related to public interest or in case of calamities. The private organizations include industrial houses, construction companies, consulting firms and MSMES (Micro, Small & Medium Enterprises). As a matter of fact, the Central Government and the State Governments have realized the importance of MSMEs as a feeder pillar of large industrial organizations as well as the Government itself. MSMEs have also been responsible for job creation in rural and urban areas of the country.

Cohesion is the most important parameter and strength of the organization. Cohesion amongst the employees and the management is ranking top in this matter. The organization is also supported by various service providers such as housekeeping, Pantry Services, Printing, Supply of ancillary, legal and auditing services etc. Good business relations with all the support service providers is vital and that is a strength. Conducive HR Policy leads to better satisfaction of employees. This includes linking talent to the payment, social motivation and freedom to handle the assignments given to them. Involvement of employees in the functions and policies of the organization brings belongingness amongst the employees.

Proper financial management is the most important strength. Good marketing strategies keep the organization sailing smoothly. The quantum of borrowing should match the capacity to pay back.

As stated above, an organization is a group of individual working for a common goal. However, every individual is an entity in itself. While working for an organization, there is always a hidden personal agenda pursued by an individual who may be part of the management, employee or service provider. To contain such agenda below the flashpoint limit is the responsibility of all the individuals and in turn is the strength of the organization. The organization should pursue the path of the sustainable development and long term perspectives. Most of the political organizations in the World suffer from loss of the strength indicated above and thus their sustainability is always a question. This results in instability and public sufferings. This can always be avoided by putting the interest of organization first and individual's ambitions next. The organizations established for malafied intentions suffer from infighting and lack of fruitful activities, but work for a sole ambition of handful individuals who are actually the handlers of such organization.

The Vadodara Chapter of SPE(I) is an unique example of cohesion and dedication by a group of individuals. The members have always appreciated team work during every small & big event organized by the Chapter. The elected members, co-opted members and other members always work hand in hand and difference in opinion is ironed out through a dialogue.

Best Wishes to all the members and readers for the ensuing Diwali festival.

SM Takalkar

CHAPTER'S ACTIVITIES

➢ On **23 Aug 2022,** the **Chapter** organized an evening lecture at the Auditorium of IE(I) Vadodara. The speaker was **Prof. AK Singh,** former Vice-Chairman SPE(I) Vadodara.
He made a presentation on the topic of "Change Management". He started his presentation with the machine age which started from Europe. This was at change. All the manual labour work was reduced by the machines which included steam engines. He went on to describe the changes which took place in science all over the World during last two centuries. The human beings have adopted each change with initial resistance. The lecture was well received by one and all present in the hall.

➢ On **28 Aug 2022,** the **Chapter** organized **26th AGM** at the Auditorium of Baroda High School, Alkapuri, Vadodara. The report of the same is brought out in this issue separately.

➢ **On 09 Sep 2022, Chapter** organized an event in the Hotel Grand Mercure. The topic was **"Wealth Creation via Mutual Fund". Ms. Prarthana Dave** who is an exponent in the Fund & Financial Management, described the advantages of Mutual Fund and stated that Fund Manager tries to maintain a balance between Debt & Equity to optimize the return. About 100 members attended the event and raised various queries to the speaker which were very much relevant.

➢ **On 28 & 29 Sep 2022,** the **Chapter** organized **2-Day Conference** on the topic of **"Metallurgy in Power Sector & Industries"** at the Auditorium of FGI, Sevasi, Vadodara. The report of the same is brought out in this issue separately.

Er. VB Harani
I/c Secretary

SWEET MEMORIES OF 26TH AGM

REGISTRATION
Registration of members attending AGM.
L to R Er. Manish Pandya, ECM
Shi Harendra Parmar, Office Asst.
Er. YD Mehta, ECM

OFFICE BEARERS ON DAIS
L to R Er. NG Yadav, Treasurer, Er. VB Harani, I/c Secretary, Er. GV Akre, Chairman, Er. SM Takalkar, Vice-Chairman, Er. NC Solanki, Jt. Secretary

MINUTESS OF 26TH ANNUAL GENERAL BODY MEETING

The **26th Annual General Meeting** (AGM) of SPE(I) Vadodara Chapter was organized at the Auditorium of Baroda High School, Alkapuri, Vadodara on 28th Aug 2022 at 10.00 hrs. The following transpired during the meeting.

Er. GV Akre, Chairman, **Er. SM Takalkar**, Vice-Chairman, Er. **VB Harani**, I/c Secretary, **Er. NG Yadav**, Treasurer and **Er. NC Solanki**, Jt. Secretary were on dais.

The programme started with digital **Ganeshstuti** which was followed by a prayer by **Er. YD Mehta,** Executive Committee member.

The members present in the house got up from their seats and stood for 1-minute's silence to pay homage to the souls of Er. PO Parikh-Life Member and Er. NT Shah-Life Member who left for their heavenly abode during last one year.

Er. SM Takalkar gave welcome speech & greeted all the members. **Er. PH Rana**, Chairman Silver Jubilee Celebration Committee, gave brief account of the events organized by the Chapter as a part of Silver Jubilee Celebration.

Er. GV Akre addressed the house. He highlighted the achievements of the Chapter over the years in general & the last year in particular. He stated that the Chapter is aiming at helping the students' Chapters in the colleges. He expressed his satisfaction at the present level of corpus fund of the Chapter. He hinted at the possible introduction of Green energy & Hydrogen cells in very near future. He wished that the Chapter should also try to propagate & work for it. He noted with satisfaction that many young engineers are taking keen interest in the Chapter's activities.

Er. VB Harani, I/c Secretary presented minutes of last AGM and Secretary's report. Both were accepted by the members present in the house.

Er. NG Yadav, Treasurer presented accounts for the FY 2021-22 which were approved by the members. He also presented Budget for the year 2022-23 which was also approved by the members.

He proposed the name of Shri Niraj Majmundar as an Auditor for FY 2022-23. This was approved by the members present in the meeting.

This was followed by the felicitation of the Life Members/Fellows who completed 65 years of their life before this AGM. The members who completed 65 years in previous years but could not remain present during the respective AGMs, were also felicitated. Some photos are included in this NEWS Letter

Following the felicitation, **Er. VB Harani** declared the **Open House** discussion.

Er. YK Sharma, Er. Manish Pandya, Er. Devendra Panchal, Er. Mohan Tilwalli, Er. Bharat Dalwadi, Er.Gitesh Chikhaliya, Er. JC Marathe, Er. Namra Joshi, Er. Vrajesh Desai and few other members made valuable suggestions and hailed the performance of the Chapter's activities over the years. The details of open house are given here under:

1. **Er. YK Sharma** suggested that there should be a National Organization for Engineers from all disciplines. The point was noted, and it was decided that the committee will take necessary action.
2. **Er. Manish N Pandya** stated that a logo should be made available to all members for display on the trousers during the meeting and lecture session of SPE. The point was replied stating that Life Membership ID cards are issued to every Life Member/Fellow and they can be displayed if deemed fit by them.
3. **Er. Mohan R Tilwalli** stated that talent of youngsters in the Chapter should be appreciated and should be made to work for the development of the Chapter.

The point was well taken. The office bearers replied that best efforts are being made to rope in youngsters from Utility, Academy and Industry.

4. **Er. Gitesh Chitaliya** suggested that for furthering the aims and objectives of the SPE(I), Students Chapters should be opened in the colleges. The office bearers replied that first Chapter is proposed to be opened at Parul Engineering College with the initiative of Er. PA Shah. Success of this Chapter will lead to opening of other Chapters in the State.
5. **Er. JC Marathe** suggested that in the vicinity of Vadodara there are about 2,000 industrial units. SPE(I) Vadodara should make efforts to make them Institutional Members. The point was well taken the office bearers.

6. **Er. Namra R Joshi** suggested that SPE(I) should meet HoD of different engineering disciplines in various colleges and bring students in the fold of SPE(I). Office bearers replied that SPE(I) Vadodara Chapter is making all efforts to bring students and faculty members of various colleges around Vadodara, under the umbrella of SPE(I). However, the scenario in academy all over the country is not conducive and hence the SPE(I) Vadodara is not able to fulfill its aim as envisaged.

7. **Er. GV Akre** informed the house regarding the activities of The Chapter aiming at the participation of students in a big way. He also stated that UGC has issued a draft guide line for engaging professor of practice in universities and colleges which aims at bridging the gap between industries and academy. The point was appreciated by the house.

8. **Er. Vrajesh J Desai** suggested that the Chapter should create a data base which should include the brief biodata of the member who would like to extend their services to industry and academy, as an expert. He also informed that SPE should help for providing jobs. The point was well taken by the office bearers.

Er. SM Takalkar, Vice-Chairman presented vote of thanks. In his speech, he thanked all the members, GUVNL and its subsidiaries, industries.

He appealed all members to take active part for the progress of SPE(I) Vadodara. He mentioned that this is his last AGM as an office bearer. He has been actively involved in the activities of the Chapter for more than 25 years as a committee member and now has decided to make a way for younger generation to take over the management of the Chapter. He thanked one and all who helped in his tenure of 25 years in the Chapter.

Er. JC Marathe spoke volumes about Er. SM Takalkar for his selfless service to SPE(I) Vadodara and requested all the members to offer standing ovation to Er. Takalkar.

The members responded to the request and rose from their seats as well as joined their hands while offering standing ovation to Er. SM Takalkar. This was acknowledged by Er. SM Takalkar

Er. PN Shah who was a polling and returning officer, conducted election for Executive Committee members for four number of vacancies.

(11) He declared **Er. Shailesh Trivedi, Er. Umesh Parikh, Er. Bharat Dalwadi and Er. Sanjay Shiledar Baxi** elected for a term of **3** years.

Entire event was anchored by Er. Parag Parmar, ECM. Digital & logistic support were provided by Er. PA Shah, ACM & Er. Gargey Bhatt, LM.

The AGM was concluded with thanks to the chair.

The AGM was preceded by Hi-Tea and followed by the Lunch

Er. VB Harani
I/C Secretary

ACKNOWLEDGEMENT BY ER. SM TAKALKAR TO STANDING OVATION BY MEMBERS

SWEET MEMORIES OF 26TH AGM

PRAYER

Beginning of 26th AGM
with **Prayer** (Digital) **Ganesh Stuti and Prayer by Er. YD Mehta, ECM**

WELCOME ADDRESS
By **Er. SM Takalkar,** Vice-Chairman

BRIEF ACCOUNTS OF THE EVENTS
Er. PH Rana, Chairman
Silver Jubilee Celebration

ACHIEVEMENTS OF CHAPTER
Er. GV Akre, Chairman

Report of 2-Day Conference on "Metallurgy in Power Sector & Industry"

On 29 & 30 Sep 2022, the Chapter organized 2-Day Conference on the topic of **"Metallurgy in Power Sector & Industry"** at the Auditorium of FGI, Sevasi, Vadodara.

Er. Anil Das (NTPC), **Er. Shyamsunder M**, (Consultant), **Er. YS Trivedi, Er. GV Akre**, **Er. SM Takalkar** and **Er. RR Vishwakarma** were on the dais during the opening ceremony.

Er. GV Akre gave welcome speech which was followed by the speech of **Er. SM Takalkar** and **Er. RR Vishwakarma**. Both of them briefed about the planning & execution of the conference. **Er. Anil Das** and **Er. Shyamsunder** and **Er. YS Trivedi** also praised the efforts of SPE(I) Vadodara in organizing event on such a offbeat topic for power sector but which is very important for every discipline of engineering. **Er. YV Joshi** presented vote of thanks.

The conference was spread over 7 Sessions. The following engineers made presentation. **Session-I Session Chair**: **Er. AK Das**, NETRA

Paper-1 Overview of Metallurgy in Power Sector
Author: **Er. RR Vishwakarma**, Consultant Metallurgist

Paper-2 Perpectives on material and complexities for Indian Power sector
Author: **Er. YS Trivedi**, Ex. L&T

Paper-3 Trends and Advances in Non-destructive Evaluation and Inspection for the power Industry
Author: **Dr. Shyamsunder,** Ex-IGCAR/GE

Paper-4 Distributed power supply based on modular Hydrogen fuel cells at different scales

Session-II Session Chair: **Er. YS Trivedi**, Ex. L&T

Paper-5 Power plant corrosion - Consequences & prevention
Author: **Prof. Babapai,** Dir., ITM University

Paper-6 Advanced Welding Technology for Power Sector
Author: **Prof. V Badheka**,HOD Mech. Engg., PDEU

Paper-7 Failure Analysis of components for power sector applications
Author: Dr. **UN Puntambekar,** Asst. Director ERDA & **Dr. Gunjal**

Paper-8 RLA of power plant: A Compulsion or an opportunity
Author: **Er. Nikhil Sabhaya**,TCR

Session-III Session Chair: **Dr. Shyamsunder,** Ex-IGCAR/GE

Paper-9 Analysis of Recent Failure Trends in Super Critical Power Plants from Metallurgical Perspective–Few Case studies
Author: **Er. Prahlad Haldera, Er. Anand D Verma, Er. Aditya Gokhle, Er. AK Das**, GM (NETRA)

Paper-10 Advanced Material for UMPP Boiler and Turbine
Author: **Er. Dinanath**

Paper-11 Importance of monitoring metallurgical health of boiler & power plant
Author: **Er. Paresh Haribhakti,** MD TCR

Paper-12 Metallurgical Aspects in thermal power generation
Author: **Er. Vinay Gaddu**- GM Adani Power

Session-IV Session Chair: **Prof. Babapai,** Dir., ITM University

Paper-13 Metallurgical Aspects of electrical contacts used in Power Sector
Author: **Prof PB Joshi,** Ex. HOD, Met Engg, MSU

Paper-14 Importance of Materials & Metallurgy in Hydro Power Sector and Relevant Case Studies
Author: **Dr. MK Sharma, Prof. AK Singh, Er. Suresh Nair,** AVIS

Session-V Session Chair: **Prof. AK Singh,** President, AVIS

Paper-15 Copper in Power
Author: **Er. YV Joshi,**

Paper-16 Role of conductor metallurgy in EHV Transmission Line Design
Author: **Er. SM Takelkar,** MD, TPE & C Pvt. Ltd.

Paper-17 Metallurgical Aspects in bare over-head conductors & OPGW for power Transmission and distribution
Author: **Er. SM Takalkar,** MD, TPE & C Pvt. Ltd.

Paper-18 Metallurgy of Earthing Conductor in Power Sector
Author: **Er. Nitesh Pandya**, Director ETC & **Dr. MK Sharma**, Director AVIS

Session-VI Session Chair: **Er. P Haldhar, NETRA**

Paper-19 Challenges in Thermal Power Station
Author: **Er. RN Patil,** L&T- S&L

Paper-20 Failure Analysis of Boiler Pressure Vessel, Motor Driven Pump etc. in TPP
Author: **Er. PB Shah, DE, GSECL** Paper-21 Condition Monitoring and Non-Destructive Testing of Power Station Components such as Boiler, Turbine etc.
Author: **Er. Ramakrishnan**, EE, GSECL, WTPS

Paper-22 Role of Metallurgy in TPS as seen by Boiler Engineer
Author: **Er. VL Dave,** Ex. GSECL

Session-VII Session Chair: **Prof. PB Joshi, MSU**

Paper-23 Hot Dip Galvanising-Protection process for steel components of power sectors

Author: **Mrs. Sangeeta Godkhindi,** Ex, Asst. Dir. ERDA, **Er. SM Takalkar, Er. Bhargavi Baliga**

Paper-24 Modular Wear Protection & Repair Welding in Power Sector

Author: **Er. JB Shrinivas & Er. UK Sharma,** Wear Resist

Paper-25 Metallurgical Challenges in Super Critical Boilers

Author: **Er. SK Singh,** L&T

Paper-26 Effect of Marine on the Metallic Components of Distribution Network

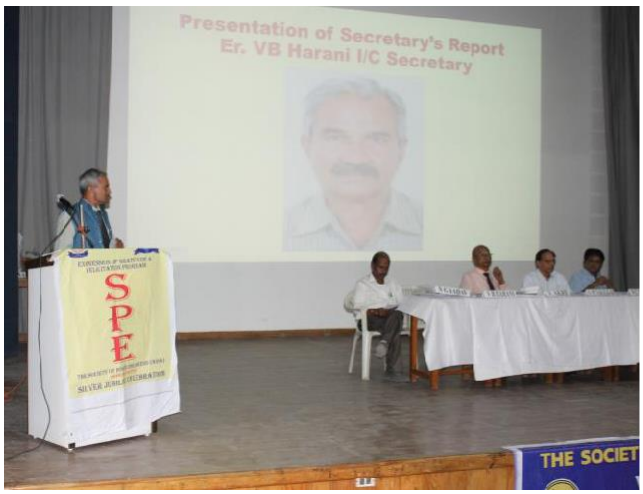
Author: **Er. SM Takalkar, Er. PA Shah & Er. SP Trivedi**

Er. Parag Parmar, ECM anchored all the Sessions

All the presentations and display were organized by **Er. PA Shah** & **Er. Gargey Bhatt.** The logistic support was provided by **Er. SM Godkhindi, Er. RS Shah, Er. Bharat Dalwadi, Er. Sanjay Shiledar Baxi, Er. Umesh Parikh, Er. VB Harani, Er. NG Yadav, Er. JK Surti**

The proceedings was compiled by **Er, NV Rede** The conference was attended by more than 100 delegates which included Authors, Invitees and SPE(I) members. Delegates comprised engineers from NTPC, GETCO, GSECL, MPPGCL, Engineering Colleges, Industries, Tata Power, EVIS, TCR Advance etc.

SWEET MEMORIES OF 26TH AGM



MINUTES OF LAST AGM & SECRETARY'S REPORT
Er. VB Harani, I/c Secretary

ACCOUNTS FOR FY 2021-22 & BUDGET FOR 2022-23
Er. NG Yadav, Treasurer

AUGUST GATHERING

ANCHORING THE EVENT
Er. Parag Parmar, ECM

DEVELOPMENTS & UP GRADATION IN MATERIALS FOR RELIABLE & EFFICIENT TRANSFORMER

Minesh Bhatt
GM-Design
Atlanta Electricals Pvt Ltd

ABSTRACT:
Development is going on from when the 1st single phase transformer developed by Mr. Stenly in 1886.Power flow within networks is becoming increasingly complex. There is a higher probability of unforeseen peak demands throughout the day, which create major energy challenges of today and tomorrow: Like energy efficiency, market efficiency, grid reliability, space concern and environmental concerns. Hence utility demands for sustainable range of green eco-efficient power transformers, Ester oil based transformers are looking more reliable for all above aspect compare to mineral oil and the addition of TUP and CTC will greatly enhance the loading capability of power transformer. Also RIP Bushing and HDG Paint will play a major role for more efficient transformer as per today's scenario.

1. Mineral Oil
Need of higher fire point, environment friendly, and fire safety new fluids become alternative to mineral oil. Worldwide global emission of CO_2 jumped causing a global temperature increase of 3.5°C. So, mineral oil **replaced by**

Ester Oil:
Increased load ability, lower CO_2 emissions, limitation of environmental risk, noise reduction, space savings, because of high fire point. (360°C)

2. Paper Insulated Copper Covering (PICC):
This is the principal type of conductor used for winding of transformer. Type of insulation paper such as Kraft paper. Due to lower short circuit strength in higher current rating transformer causing **PICC replaced by**

Thermally Upgraded Paper: which is suitable for Hot-spot temperature of about 110°C.It is possible to meet the special overloading condition.

Enamelled Rectangular Copper Conductor:
This is coated by the various enamel films on the bare. **CTC conductor** best option for reducing stray flux, eddy current losses and improves the thermal performance.

Nomex Paper Covering:
For better mechanical properties Nomex paper can be used as an interlayer insulation for a multilayer winding.

3. OIP Bushing:
OIP Bushings are contain Porcelain provided with Oil level gauge & Test Tap;But due to certain drawbacks now it is gradually **replace by**

RIP Bushing:
Which is much better in terms of handling, tan delta & durability against conventional OIP Bushing.

4. PU Paint:
Paints are generally not resistant to scratching, cracking, or impact, resulting in a compromised coating so, due to above uncertainties PU paint **replace by**

HDG Paint:
For atmospheric condition & reduce leakage HDG paint is one of the best options.

In this Paper we will discuss all above points in detail which finally support to the up gradation of transformers.

MINERAL OIL

What is Mineral Oil?
Petroleum based purified mineral oil has been used in transformer for over hundred years.
For most transformers mineral oil is the most efficient medium for absorbing heat from the core and the windings and transmitting it, sometimes aided by forced circulation, to the naturally or artificially cooled outer surfaces of the transformer. The heat capacity, or specific heat, and the thermal conductivity of the oil have an important influence on the rate of heat transfer

What is negative effect on Environment & Transformer due to Mineral Oil?

- The major limitations of mineral oil are low biodegradation and panic threats to human beings and eco system.
- Due to their poor performance at high temperature, the use of mineral oil is restricted in ecologically sensitive locations.
- Mineral-oil-filled transformer explosions and fires causing heavy collateral damage have

- have raised major safety concerns.
- There has also been major environmental concern over the toxic effects of uncontained mineral oil spills.
- Above all, petroleum products are eventually going to run out and there could be serious shortages even by the mid-twenty-first century.

This has given rise to a new class of alternate natural sources of dielectric insulating fluids

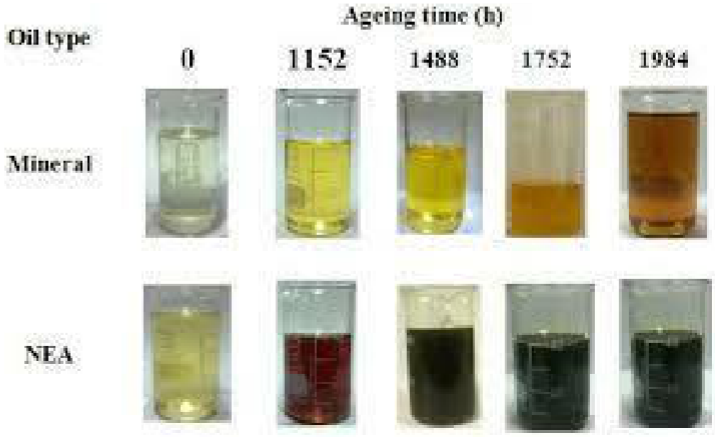
ESTER OIL

Ester oils are dielectric coolants designed for use in distribution and power class transformers. They may be natural or synthetic in origin, deriving from commodity seed oils or inorganic feed stocks. While the specific formulations are proprietary, these dielectric fluids are biodegradable compounds combined with a small percentage of biodegradable additives for performance enhancement.

Increased fire safety and energy efficiency of power transformers using natural ester deeply affects the criteria for transformer selection among electric utilities and grid companies. Natural ester made up of renewable source helps achieve greater continuous load capacity to better handle demand fluctuations Current loading profiles based on mineral oil transformer limits may not be able to withstand those inconsistent demands.

Advantages:

- Environmentally friendly
- Nontoxic and readily biodegradable
- Non-hazardous to water
- The by-products of natural esters after combustion are also much less toxic than the ones of mineral oils, which further minimizes their overall impact on the environment.
- have a flash and fire point above 300°C



Ageing time comparison of insulation paper in Mineral oil and Ester Oil

Actual site image of Atlanta make Synthetic Ester oil filled transformer

Actual site image of Atlanta make Natural Ester oil filled transformer

FELICITATION OF MEMBERS ON COMPLETION OF 65 YEARS

Er. Jagdish Thakkar Felicitated with Shawl by **Er. SM Takalkar** Vice-Chm.

Er. SG Prasad Felicitated with Shawl by **Er. VB Harani** I/c Secretary

	COMPARISION: ESTER OIL v/s MINERAL OIL		
Sr. No.	**Characteristic**	**Mineral oil**	**Ester oil**
1	Density	0.89 Gm/cm^3 at 29.5^{0}C	Max.1.0 Gm/cm$_3$ at 20^{0}C
2	Kinematics viscosity	27 cst at 27^{0}C (Max)	Max.15 mm$_2$/s at 100^{0}C Max.50 mm$_2$/s at 40^{0}C
3	Flash point (Min)	140^{0}C	250^{0}C
4	Pour point (Max)	(-6)^{0}C	(-10)^{0}C
5	Fire point(Min)	170^{0}C	300^{0}C
6	Calorific value	high	low
7	Corrosive sulphur (in Terms of classification of copper strip)	Noncorrosive	Noncorrosive
9	Electric strength (breakdown voltage) (Min) (A) New unfiltered oil (B) After filtration	30 kVrms /minute 60 kVrms /minute	Min.35 kVrms /minute Min.70 kVrms /minute
10	Die electric dissipation factor (tan delta) at 90^{0}C (Max)	0.002	0.05
11	Water content (Max) by weight - Untreated new oil - After treatment	50 ppm 15 ppm	100 ppm 50 ppm
12	Biodegradation	Poor biodegradability	Good biodegradability
13	Safety	low	high
14	Fossil/non fossil	fossil	recyclable
15	Effect on environment	Worse effect	Environment friendly
16	Ageing/degradation rate of insulation	fast	slow

FELICITATION OF MEMBERS ON COMPLETION OF 65 YEARS

Er. Bharat Dalwadi Felicitated with Shawl
By **Er. GV Akre,** Chairman

Er. DN Panchal Felicitated with Shawl
By **Er. NG Yadav,** Treasurer

COPPER CONDUCTOR INSULATION PAPER

Important Electrical properties for paper insulation

1) High dielectric strength
2) Dielectric constant in oil-filled transformers as close as possible a match that of oil
3) Low power factor (dielectric loss)
4) Freedom from conducting particles.

KRAFT PAPER

- Paper is among the cheapest and best electrical insulation material known.
- Kraft paper is, by definition, made entirely from paper Insulation unbleached softwood pulp manufactured by the sulphate process
- They were not desirable in high-stressed areas such as angles and corners (boundary areas) as the voltage rating increased.
- Has a thermal class rating of only 105°C,
- Thermal resistance for heat transfer from paper to oil Is low

TUP

- Better temperature stability
- Reduced thermal degradation
- The superiority of the upgraded papers was demonstrated by both short-term and long term aging.
- Increase the insulation life
- Transformers rated at 55°C oil rise could be upgraded to 65°C oil rise, which meant the insulation life was extended by at least three times
- Thermal class could reach up to 120°C
- For TUK paper the uprising intervals are 60~80^{0}C
- Moreover, the aging of winding insulating material will be slowed down comparatively.

NOMEX COVERING

- This material can be made into a range of papers and boards in a similar way to cellulose fibres but which remain stable at operating temperatures of up to 220°C.
- In addition, although the material will absorb some moisture dependent upon the relative humidity of its environment, moisture does not detract from its dielectric strength to anything like the extent as is the case with cellulose-based insulation
- Has a considerably higher thermal rating (220°C).
- Low moisture absorption
- Higher cost

CTC

- The individual conductor is insulated with super enamel covering & all conductors are finally insulated together with paper insulation
- The odd conductor in two stacks are continuously transposed at regular interval so that eddy current losses are minimized.
- The introduction of continuously transposed strip has been particularly beneficial to the design of large transformers, which must be capable of carrying large currents
- Enables a far greater number of transpositions to be carried out.
- Net improvement in space factor as well as improved uniformity of ampere-conductor distribution.
- The strand insulation can be over-coated with bondable epoxy.
  These epoxy resins cure under the same thermal conditions applied to the cellulose components in the drying process of the winding.

- Epoxy bonded transposed cable are characterised by very high mechanical strength, which enables the winding to withstand high electro-dynamic forces, e.g. in the event of short circuit.
- Enamelled covered conductors are used nowadays in power transformers winding due to high capitalization of load loss.
- CTC conductor is best option for reducing stray flux, eddy current losses and improves the thermal performance (decrease in tempe rature gradient by over 50%), increase space factor up to 30%.

➢ **OIP Bushing**

In OIP bushing the core is wound from paper and subsequently treated and impregnated with an insulating liquid, generally transformer oil. The core is contained in an insulating envelope (generally "Porcelain"), the space between the core and the insulating envelope being filled with the same insulating liquid as that used for impregnation.. In the centre stem is provided which connects the Overhead conductor to transformer winding, this is usually made of copper. The traditional OIP bushing technology uses oil as its basic insulating medium. Use of oil has many severe drawbacks in bushing life, such as being susceptible to moisture ingress and oil leakage due to worn out seals. In turn greater vulnerability in an OIP bushing exists to lightning strikes or other factors that can trigger explosive failure. Additionally, excessive filling of oil reservoirs in horizontal mount applications can lead to severe operational problems. Unusually high operating temperatures on an OIP bushing can comprise its bushing life and again lead to severe operational problems.

Power Transformers failure rate are 14% due to OIP bushings. Following are the major causes of OIP bushing failures:-

i. Oil leakage
ii. Test Tap unearth
iii. Irregular maintenance
iv. High Electrical Stress
v. Crack in the Porcelain
vi. Improper Installation/handling
vii. Insulation deterioration (high PD /Tan Delta)
viii. Manufacturing /Material defect

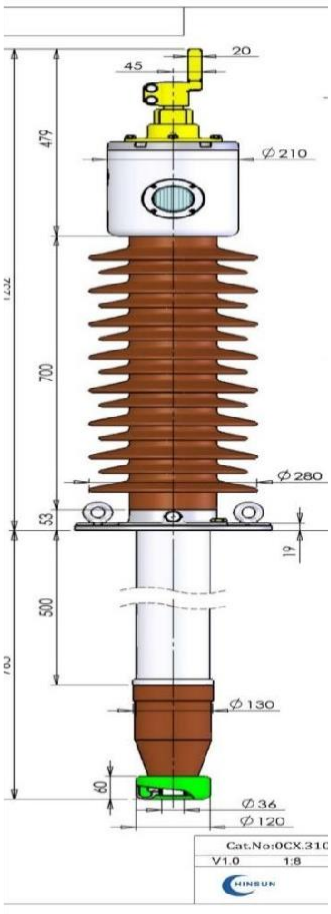
➢ RIP Bushing

In RIP bushing the major insulation consists of a core wound from paper and subsequently impregnated with epoxy resin. The casting and curing of this insulation is a carefully controlled process.

A resin-impregnated paper bushing can be provided with an insulating envelope (generally "Silicone Composite insulator"), in which case the intervening space can be filled with an insulating liquid or another insulating medium like polyurethane foam, gel etc.

COMPARISION: OIP BUSHING v/s RIP BUSHING		
	OIP Bushing	**RIP Bushing**
PD level	5 pC,	2 pC,
Tan Delta	0.45% or lower	0.35% or lower
Insulation Class	Class-A (up to 105°C).	Class-E (up to 120°C)
Weight	more	Less
Maintenance	more	Less
Seismic Withstand capability & Mechanical Strength:	low	High
Capacitance	Low	High
Installation/ commissioning	Time consuming	Easy
Flammability & Explosion Risk:	high	Non-flammable/ Non- explosive
Cost Aspect	Less than RIP	Costly
Handling/ Transportation	Not easy	Easy

Transformer with OIP Bushing



LIFE MEMBERS / FELLOWS FELICITATED ON COMPLETION OF 65 YEARS

1. **Er. Jagdishchandra Thakkar**
2. **Er Srinivasa Prasad**
3. **Er. Bharat Dalwadi**
4. **Dilipbhai Patel**
5. **Devendra Panchal**
6. **SD Parmar**

Transformer with RIP Bushing

➢ **PU PAINT RADIATOR**

- There are significant material and labor costs associated with packaging painted structural steel or steel assemblies for shipping, including wooden age and soft material (paper, cardboard) interleave to prevent contact between individual pieces
- There is usually a time-consuming inspection and field touch-up necessary to repair damaged areas of painted bare steel.
- Whether the application of paint is done in the factory or field, the internal tubular sections and hard to reach areas of bare steel remain unprotected; these areas are where corrosion usually begins.
- Painted systems often experience project delays because of unpredictable weather. When the parameters of safe and quality painting (temperature, humidity, wind) are stretched or compromised, coating failure is almost assured
- Paint is a barrier protector only, and when scratches and cracks occur, corrosion of the underlying steel is immediate.
- Paint coating thickness on all surfaces is a variable and uniform as the applicator, with corners and edges highly susceptible to corrosion because of thin films
- Paints are generally not resistant to scratching, cracking, or impact, resulting in a begins and maintenance painting is required.
- Sun, heat, wind and weathering are constants that result in paint typically requiring touch-up and replacement in 12-15 years, costing far more than galvanizing over the intended life of the project
- Paint is a barrier protector only, and when scratches and cracks occur, corrosion of the underlying steel is immediate
- Paint coating thickness on all surfaces is a variable and uniform as the applicator, with corners and edges highly susceptible to corrosion because of thin films
- Paints are generally not resistant to compromised coating where corrosion begins and maintenance painting is required.
- Scratching, cracking, or impact, resulting in a compromised coating where corrosion begins and maintenance painting is required.

➢ **HDG RADIATOR**

- The zinc-iron alloy layers of the hot-dip galvanizing (HDG) steel coating are harder than steel and are unaffected by rough handling typical during shipment and erection. Bending of HDG steel pieces in contact with each other is common and acceptable.

- Field touch up rarely needed for HDG steel unless for cosmetic reasons to hide a chain mark or to provide corrosion protection to a field-modified area
- Galvanizing is always factory-controlled, with a precise, scientific methodology that ensures complete coverage and corrosion protection.

- Hot-dip galvanizing can be done 24/7/365, the process is totally independent of weather conditions
- Hot-dip galvanizing provides both cathodic & barrier protection to steel, delivering a rust and-maintenance-free system in most environments for 75 years or more
- The metallurgical reaction between 840oF molten zinc and iron in steel ensure a uniform and guaranteed coating thickness, docume-nted in ASTM specifications

- The alloying of zinc and iron in the HDG coating means the zinc and steel metallurgically become one, yielding a coating bond ten times greater than the strictly mechanical bond of paint to steel
- With a coating hardness greater than the steel alone, galvanized steel provides a durable, scratch-resistant coating that maintains the integrity of overall corrosion protection system Hot-Dip Galvanized steel commonly provides maintenance-free corrosion protection for 75 years or more in atmospheric use, especially as our environment and air have become cleaner as a result of regulation.
- Hot-Dip Galvanized steel commonly provides maintenance-free corrosion protection for 75 years or more in atmospheric use, especially as our environment and air have become cleaner as a result of regulation.

COMPARISON: HDG PAINT RADIATOR V/S PU PAINT RADIATOR

	PU Paint Radiator	HDG Radiator
Special Handling	Required	Not required
Field Touch-Up	Required	Not required
Weather Dependent	Yes	No
Temperature Range	< 200^{O}F	-75^{O}F to 392^{O}F
Coating Thickness	variable	> 3.9 Mils
Corrosion Protection	Barrier	Cathodic & Barrier
Bond Strength	600 psi	3600 psi
Hardness/Abrasion Resistance	Varies by Type	179 to 250 DPN
Service Life - Atmospheric	12-15 Years	75 Years

FELICITATION OF MEMBERS ON COMPLETION OF 65 YEARS

Er. SD Parmar Felicitated with Shawl By **Er. NC Solanki,** Jt. Secretary

Er. Dilipbhai M Patel Felicitated with Shawl By **Er. VB Harani,** I/c Secretary

SHINING GUJARAT IN RE SECTOR

Shining at the National level, Gujarat State has won awards in different categories for **EXCELLENCE IN THE RENEWABLE ENERGY SECTOR** during year 2021-22. Hon'ble Minister of State for New and Renewable Energy and Chemicals and Fertilizers, Govt. of India, Shri Bhagwanth Khuba, Chief Guest of the function, felicitated the award winners. Award organizer - Association of Renewable Energy Agencies of States (AREAS) distributed these awards on its 8th Foundation Day Awards ceremony held at Kochi on 27 Aug 2022 (Saturday).

The awards conferred by the Association of Renewable Energy of States (AREAS) in the field of renewable energy include

- Gujarat Energy Development Agency (GEDA) for the second highest **'INSTALLED CAPACITY' OF RENEWABLE ENERGY FOR THE YEAR 2021-22.**
- Gujarat Energy Development Agency (GEDA) for the **SECOND HIGHEST RENEWABLE WIND ENERGY INSTALLED CAPACITY FOR THE YEAR 2021-22.**
- Gujarat Energy Development Agency (GEDA) for the **SECOND HIGHEST RENEWABLE ENERGY GENERATION FOR THE YEAR 2021-22**
- Gujarat Energy Development Agency (GEDA) for the **SECOND LARGEST RENEWABLE ENERGY CAPACITY ADDITION FOR THE YEAR 2021-22**
- Gujarat Energy Development Agency (GEDA) for the **SECOND LARGEST SOLAR CAPACITY ADDITION FOR THE YEAR 2021-22**
- Madhya Gujarat Vij Co. Ltd. for the (MGVCL) **FIRST HIGHEST WIND POWER ADDITION CAPACITY FOR 2022.**
- Madhya Gujarat Vij Co. Ltd. (MGVCL) for the **SECOND HIGHEST SOLAR POWER 'INSTALLED CAPACITY' FOR THE YEAR 2021-22.**
- Gujarat Energy Transmission Company Ltd. (GETCO) for the second largest solar power addition capacity for the year 2021-22. Gujarat has been selected for the **SECOND HIGHEST TRANSMISSION CAPACITY AND TRANSMISSION LINES FOR THE YEAR 2021-22.**

Awards received by GEDA

MGVCL Achieving 2nd Highest Roof Top Solar Power Installed Capacity during 2021-22

Award received by Er. Upendra Pandey MD, GETCO for Transmission Capacity and Transmission Lines Installed for RE Power during 2021-22

OPEN HOUSE SESSION

CONDUCTING OPEN HOUSE
Er. VB Harani, I/c Secretary

SUGGESTION
from **Er. YK Sharma,** past Jt. Secretary

SUGGESTION
from **Er. Mohan Tilwalli,** LM & Proprietor
Gururaj Engineers

SUGGESTION
from **Er. JC Marathe,** past EC Member

SUGGESTION
from
Prof. Namra Joshi, LM

SUGGESTION
from **Er. Vrajesh Desai,** AC Member

FELICITATION
of
Er. PN Shah
Polling &
Returning
Officer
By
Er. GV Akre
Chairman

VOTING
for **Election of EC Members**

2-DAY CONFERENCE ON ON "METALLURGY IN POWER SECTOR & INDUSTRY

DIGNITARIES & MEMBERS OF SPE(I) ON DAIS
(L to R) **Ers. AK Das, Shyamsundar M, YS Trivedi, GV Akre, SM Takalkar, RR Vishwakarma**

LIGHTING OF LAMP by **Er. YS Trivedi**

WELCOME

ADDRESS By Er. GV Akre, Chairman

FLORAL WELCOME TO DIGNITARIES BY Er. GV Akre, Chairman

Er. YS Trivedi

Er. Shyamsundar M

Er. AK Das

ABOUT THE CONFERENCE

Introduction By Er. SM Takalkar Patron

ADDRESS BY DIGNITARIES

Er. AK Das

Er. Shyamsunder M

Er. YS Trivedi

SPECIAL HONOR

Er. RR Vishwakarma Honored by Er. PH Rana

Er. Chandarana of TCR Honored by Er. RS Shah, Vice-Chairman

HONORING SPONSORS

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Er. Jana of APAR Electricals Honored by Er. YV Joshi, Secretary

Dr. M.K. Sharma of AVIS Honored by Er. Shyamsunder

THE END

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Microstructural Study	Site Testing/Field Studies	Failure Analysis
Technology Qualification	Training & Development	R &D Projects

PROJECTS STUDIES

POWER, OIL&GAS, CHEMICAL, PETROCHEMICAL, PROCESS & CEMENT PLANTS

- **Remaining Life Assessment (RLA) as IBR 391a (B)**
- **Fitness for Service (FFS) as per API 579-1/ ASME FFS1**
- **Integrity Assessment of Aged Plants / Risk Based Inspections (RBI)**
- **Inspection & Testing as per API 510, 570, 571, 580, ASME**
- **Condition / Health /Ageing /Accident Assessment of Plants**
- **FEA, CFD, Stress Analysis, Design & Review, Offshore Projects**
- **Line Pipe & Pipeline Services, API, DNV, ASME, AWS, ASTM, BIS, IIW**

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