SPE Newsletter

SPE(I), Vadodara Chapter
January 2026 Issue: 1/2026

Wish you all Happy
New Year 2026 & Makarsankranti

"पतंगों की उड़ान सी, ऊंचा हो जीवन का सफर। सूर्य देव की कृपा से, जीवन में चमक आए।"
"तिल गुड़ की मिठास, जीवन में भर दे खुशियां।"

- Til gul ghya, god god bola!
- Fly high, dream big, shine bright!
- Sun, kites, joy – Happy Sankranti!
- Harvest of joy, season of light.
- New beginnings, bright futures.

The Society of Power Engineers (India)
Vadodara Chapter (Estd. 1996)

414-415, Wing-B, Monalisa Business Centre, Near Saptarshi Samanvay
Manjalpur, Vadodara-390 011
spevadodara01@rediffmail.com & social.spevadodara@gmail.com
web site: www.spevadodara.in M – 9328658594

Facebook Whatsapp LinkedIn Instagram Telegram

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CHAIRMAN'S DESK

Dear Readers,

The Seminar on transmission lines, held last month, was a great success with a record participation of **180** plus. Unfortunately, I could not attend it, as I was away abroad. I believe it highlighted the importance of staying up to date with the latest developments in our field. As power engineers, we can leverage AI to improve the Grid management, predict energy demand and optimize transmission line performance. The Conference has helped in making SPE as a brand. Different sections of Power Sector entities have started supporting the activities of SPE. The Chapter has also stepped in to a corporate culture by obtaining GST registration. This aspect is going to help in growth of the Chapter.

As we welcome the **NEW YEAR 2026**, I would like to express my gratitude to our members and fellow partners for their continued support. I am confident that with the help of AI and our collective expertise, we will drive innovation and shape the future of power engineering.

We had many Seminars last year and all of them were well received. This year too, we would like to hold more such seminars on various topics. Involvement of academy in the Chapter's activities is vital. In this regard suggestions of members and others are welcome and will be appreciated.

I wish Happy Christmas and very HAPPY NEW YEAR to all the members of the SPE and their family members.

Thank you all!!

Er. MR Tilwalli

GRATITUDE

The 3-Day Tutorial & Conference on Power Transmission Line organised by **SPE(I) Vadodara Chapter** on 5, 6 & 7 Nov 2025 has left behind a very big foot print. Similar conference was organised by SPE(I) Vadodara 23 years before. That conference was to celebrate 100 years of Power Transmission System in the country. Perhaps most of the members of SPE(I) Vadodara may be aware that during my tenure in GEB/GETCO, I have been attached to Transmission Sector. Even after retirement (Mar-2006) till date it is the core-competence of my consultancy firm named Takalkar Power Engineers & Consultants.

Thus the conference on Transmission lines was my Trump card which I was planning to play at an appropriate time. The purchase of new office premises made a heavy dent in the corpus of the Chapter and simultaneously created large debt. Fortunately, many members came forward and contributed interest free advance to the Chapter for outright purchase of the new premises in Monalisa Business Centre. Thus, I found an opportunity to play my trump card.

The idea came in my mind almost in the end of 2024. The date of 5, 6, 7 Nov 2025 was fixed with the confirmation of CBIP to avoid a clash with their any other event. FGI Hall was booked. It was for the first time that we had included Tutorials in the schedule of conference.

I had all the themes embedded in my mind but the members of the Chapter's committees were not very clear.

After the SPE committee members and organizing committee members approved the Information Bulletin, myself and selected committee members started roping in prospective sponsors.

To my surprise, the large business houses in my inner circle started sponsoring the event. The breakeven was achieved just in a matter of

(Contd. on page-13)

EDITORIAL

Dear Readers,

Repowering Reforms

Season's Greetings to all esteemed members of the Chapter!

Recently, the Power Ministry published the Draft Electricity (amendment) Bill-2025, inviting comments and suggestions from stakeholders. The Bill proposes key amendments to the Electricity Act-2003, aiming to boost fair competition in retail electricity supply, bring discipline to power market and improve the overall financial health of power sector. According to the proposals in the draft bill, distribution networks will be opened to multiple private companies within the same supply area, subject to applicable charges. Currently, multiple licensees in the same area are required to maintain separate networks, leading to infrastructure duplication and excess costs.

Draft Bill further empowers State Electricity Regulatory Commissions (SERCs) to determine tariffs suo-motu without waiting for proposals from power utilities. This aims to eliminate delays in tariff determination and ensure revised tariffs are implemented from Apr-01 of each financial year. In another significant move to expedite dispute resolution, the bill proposed 120 days' time limit for disposing off cases.

The Bill also permits SERCs, in consultation with State Governments, to remove Universal Service Obligation (USO) for consumers with contract demand greater than 1MW. These consumers, already eligible for Open Access under prevailing provisions, can purchase power independently without DISCOM support. Distribution utilities will act as suppliers of last resort, providing supply at premium over cost of supply when needed, without incurring losses.

An important development proposed in the Bill is the establishment of a National-level Electricity Council under the Chairmanship of the Union Power Minister. The Council will include State Power Ministers as members and the Secretary (Power), Govt. of India, as member-convener. The Council is expected to advise the Central and States on policy matters and provide a platform for consensus-based reforms in the power sector.

Since electricity is in Concurrent List of the Construction of India, State inputs carry significant weightage. The Electricity Council, similar to the GST Council, aims to ensure that the States remain integral to the reform process and it is envisaged that this will bring a turnaround in the performance of power distribution companies.

On the renewable front, the Bill ensures the Renewable Purchase Obligation (RPO) percentages specified by SERCs are not less than those prescribed by the Central Government. Defaulting entities will be liable to pay penalties ranging from Rs.0.35 to 0.45 per kWh.

Five previous attempts to amend the Act-2003 were abortive due to various reasons. We hope the Electricity Amendment Bill-2025 passes in Parliament in the wider interest of consumers as it promises lower tariffs, cleaner energy and improved services. The Draft Bill represents a paradigm shift towards a future-ready electricity sector that integrates renewables, storage and market principles.

The design and construction of transmission lines play a vital role in ensuring reliable and efficient power supply to utilities. With electricity demand expected to grow at 4.5% annually in India, transmission lines are increasingly called upon to meet rising electricity demands while improving system reliability. Our chapter successfully organized a three-day Tutorial and Conference on "Design & Construction of Transmission Line" from November 5-7, 2025, in Vadodara. During the tutorial day, industry experts imparted knowledge on HVDC, transmission

CHAPTER'S ACTIVITIES

- On **03 Oct 2025, Chapter** organized ***Satyanarayan Pooja*** as a part of celebration of Foundation Day. The pooja was performed at the Office of SPE (I), Vadodara Chapter. About Sixty Members and their spouse attended pooja. The members and their family availed Prasad and greeted each other. The pooja was performed by **Er. Pradip P Shah**, Jt. Secretary and his better half.

Er. PP Shah & his better half performing ***Satyanarayan Pooja***

- On **05, 06 & 07 Nov 2025, Chapter organised a 1-Day Tutorial and 2-Day Conference on "Design & Construction of Transmission Line"** at FGI, Sevasi, Vadodara. The report of the same is brought out in this issue elsewhere.

(Contd. on page-17)

EDITORIAL

(from page-2)

line design, and recent trends in electrical design of transmission systems. The conference featured power sector professionals discussing innovations in transmission line design, best practices in line construction, and challenges in acquiring Right-of-Way (ROW) for transmission lines.

The conference received an overwhelming response, with record delegate registrations from across various sections of society. The Technical Committee received seven tutorial papers and twenty-one technical papers from industry experts and academia. The conference proceedings are now available on our website for members' reference.

SPE(I) Vadodara takes this opportunity to acknowledge the valuable support of all sponsors, well-wishers and advertisers and express sincere thanks for making the conference a grand success.

May this winter bring you joy, coziness and cherished moments with family.

Best Wishes to all the readers for the **New Year of 2026.**

Er. Umesh Parikh

NEW LIFE MEMBER

GR No.	Name	Grade
2477	**Er. Kaushik S Patel**	**LM**

FUTURE EVENT

2-Day Conference on **21 & 22 Feb 2026** on **"Industrial Electrification"** at FGI, Sevasi, Vadodara

Report on 1-Day Tutorial during 3-Day Conference on Design & Construction of Power Transmission Line

The Vadodara Chapter of SPE(I) jointly with CBIP, New Delhi organised a 1-Day Tutorial and 2-Day Conference on **"Design & Construction of Power Transmission Line"** on 05, 06 & 07 Nov 2025 at FGI, Vadodara. More than **180** delegates from all over the country participated in the event. The delegates hailed from Gujarat Energy Transmission Corporation (GETCO), APAR Electricals, Jyoti Structures, Resonia Ltd. (former M/s Sterlite), Transrail Lighting Ltd., Associated Power Structures, Transmission Line EPC Contractors, Experts from Industries, Academic Institutions, Transmission Line related Commissioning Firms, Individuals etc. The **Tutorial** was conducted on **05 Nov 2025.**

The inaugural session of Tutorial was presided over by **Er. PH Rana**, Patron-SPE(I), **Er. Nihar Raj**(VP)-Adani Energy Solutions, **Er. YV Joshi**, Vice-Chairman, SPE(I), **Er. VB Harani,** Secretary, SPE(I), **Er. SM Takalkar**, Conf. Coordinator.

L to R
Er. VB Harani, Er. PH Rana,
Er. Nihar Raj (Guest of Honor),
Er. SM Takalkar. Er. YV Joshi

Lighting of Holy Lamp by **Er. Nihar Raj** &
Er. PH Rana

Er. YV Joshi presented Welcome Address and highlighted the activities of SPE(I) Vadodara. **Er. SM Takalkar** gave brief about the Tutorial and basic theme of the Tutorial and Conference.

Er. Nihar Raj praised SPE(I) Vadodara for organizing Tutorial on such an important topic of Transmission Line which is useful for Utilities as well as manufacturers of transmission line materials and erectors thereof. Er. PH Rana shared his views and experience on importance of Tutorial for academicians, practicing engineers & designers of transmission line.

All audio visuals starting from prayer till concluding session were designed by **Er. PA Shah, Dr. Gitesh Chitalia** and **Er. Gargey Bhatt.** The entire inaugural as well as technical sessions were anchored by **Er. PA Shah, Er. Parag Parmar** and **Er. PP Shah.** The logistics and other support were provided by **Er. RM Athawale**, **Er. Keyur Nanavati, Er. DD Kothari** and **Er. VB Harani.** The proceedings was compiled by **Er. PA Shah, Er. NV Rede** and **Er. YV Joshi.**

Technical Sessions:

There were 2 Sessions.

In Session –I two papers were presented, one by **Er. SM Takalkar**, MD-TPEC and second

L to R
Er. KG Gaikwad and **Er. SM Takalkar**

Session-I

Presentation-1 Electrical Design of Transmission Line.

Presenter: **Er. SM Takalkar**, MD-TPEC

The presenter emphasized the importance of Electrical Design of transmission line before taking up the Mechanical/Structural/Civil design of the same. He also stressed that the electrical clearances are vital for its design and during operation too.

Presentation-2 Various Case Studies of Diversion and Modification of existing transmission lines.

Presenter: **Er. KG Gaikwad**, GM-TPEC

The presenter talked about various case studies. He explained about the care to be taken while diversion/modification of transmission line. RoW issues, Tree cutting, Road Crossing etc. shall be kept in mind while preparing the proposal for diversion/ modification.

Session-II

Presentation-3 Optimization of Tower Spotting in PLS-CADD

Presenter: **Er. (Ms) Megha Patel –** Jyoti Structures

The presenter delivered talk on Tower Spotting after survey work. She explained how the PLS-CADD is useful in tower spotting of trans-mission line. She gave demonstration on the use of PLS-CADD software. She also explained how to take care of RoW, various crossings like river, road, rail, nala etc. and optimize the spotting and the cost.

L to R **Er. (Ms) Megha Patel** and **Er. Pankaj Kumar**

Presentation-4 Execution of Transmission Line

Presenter: **Er. Pankaj Kumar** – PGCIL

The presenter explained in deep about the issues of RoW and how to tackle them in villagers' language during execution of transmission line. He also mentioned the practical problems of materials availability, visit of officers, approach roads etc. He too talked about difficulties faced during construction of trans-mission line particularly during rain, cyclone like natural calamities.

Presentation-5

Presenter: **Er. Nihar Raj,** VP Adani Energy Solution

The presenter talked about the Power Transmission Asset management which includes Transmission lines, Sub-stations and Equipment

He shared his experience with Adani Electricity Solutions and explained how modern tools and software are able to help in best Asset Management and the maintenance.

August Audience in the Auditorium

Group photograph of Participants

Technical Sessions were also conducted by **Er. Keyur Nanavati, Er. BP Soni, Er. PP Shah** and **Er. KG Shah.**

Tutorial Sessions ended with **Vote of Thanks** presented by **Er. VB Harani**

Following organizations heartily supported the event.

PLATINUM SPONSORS

1. Gujarat Energy Transmission Corporation
2. Diamond Power Infrastructures Ltd.
3. Apar Electricals, Selvassa/Vadodara
4. CTC Global Pvt. Ltd., Pune
5. Resonia Ltd. (former Sterlite), Gurugram

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4. Maskin Power, Ahmedabad
5. KEC International, Mumbai
6. Salasar Techno Engineering Ltd., Noida
7. Geo Dynamics, Vadodara

Viewing in totality, the Tutorial was a Grand Success.

Report on 2nd & 3rd Day during 3-Day Conference on Design & Construction of Power Transmission Line

The Conference on Design and Construction of Power Transmission Line was conducted on 06 and 07 Nov 2025.

More than 180 delegates from all over the country participated in the Conference.

The delegates hailed from Gujarat Energy Transmission Corporation (GETCO), Diamond Power Infrastructure Ltd., Apar Electricals, CTC Global Pvt. Ltd., Resonia Ltd. (former M/s Sterlite), Transrail Lighting Ltd., Associated Power Structures Ltd., Top Line Pvt. Ltd., Viviana Power Tech Ltd., Takalkar Power Engineers and Consultants Pvt. Ltd., Kalpataru Power Infrastructures Ltd., Ultra Tech Transmission, Maskin Power Pvt. Ltd., KEC International, Salasar Techno Engineering Ltd. Geo Dynamics, Orissa Power Transmission Co., Madhya Pradesh Power Transmission Co. Ltd., Experts from Academic Institutions, Transmission Line Material Manufacturers, Transmission Line related Commissioning Firms, Individuals etc.

The inaugural session was presided over by Er. Upendra Pandey, MD-GETCO; Er. Sanjeev Singh, Secretary (Power)-CBIP, New Delhi; Er. PH Rana, Patron-SPE(I); Er. YV Joshi, Vice-Chairman- SPE (I); Er. DC Bagde, Transrail Pvt. Ltd.; Er. SM Takalkar, Conference Coordinator and representatives from Platinum Sponsor Companies Apar, CTC Global, Diamond Power, GETCO and Resonia. Delegates from Transmission utilities like GETCO, OPTCL, MPPTCL, CPRI Banglore, TPEC, Adani Power, Kalptaru International, Makin Power Ltd., OM Transmission, Salasar, Bilmet Engineering, ETP Earthing Solutions, OM Technical, Jyoti Structures, RR Ispat, Geo Dynamics and many more.

Inaugural Session

L to R

Er. SK Jana, Er. DC Bagde,
Er. Sanjeev Singh,
Er. Upendra Pande, IAS
Er. PH Rana,
Er. SM Takalkar,
Er. YV Joshi

Er. SM Takalkar presented Welcome Address. He welcomed the Guests of Honor, Dignitaries on dais, Platinum Sponsors, Golden Sponsors, Silver Sponsors, Delegates, Authors, Invitees, Committee Members, Members of SPE(I) etc. He also talked about the Conference journey right from the initiating to the date. He also stated that there are more than 20 papers contributed for the Conference and 6 papers in the Tutorial. Further, about 180 delegates from all part of the country are participating in the Conference, he added. This was followed by lighting of Holy Lamp by dignitaries on the dais along with digital Ganesh Stuti.

Lighting of Holy Lamp by
Er. Upendra Pande, IAS
L to R Er. YV Joshi, Er. SK Jana,
Er. VB Harani, Er. DC Bagde

During his address, Er. Sanjeev Singh appreciated SPE(I) Vadodara for organizing Conference on such an important topic of Design and Construction of Power Transmission Line, which is useful for Central as well as State Transmission Utilities, Manufacturers of Transmission Line Materials and Erectors of Transmission Lines. Er. PH Rana shared his views and experience on the importance of Conference for Academicians, practicing Engineers, Transmission Utilities and Designers of transmission line. Er. Upendra Pande, highlighted the development of transmission sector in Gujarat and India. The proceedings of the event was compiled by Er. NV Rede, Er. PA Shah and Er. YV Joshi. The unveiling of the Proceedings was done by Dignitaries on dais.

Unveilling of Proceedings

The inaugural session ended with Vote of Thanks presented by Er. YV Joshi. He thanked Guests, Platinum, Golden & Silver Sponsors, Donors, Advertisers, Delegates, Authors, Invitees, Committee members, SPE(I) Vadodara members, Caterers, FGI & Staff and all those who assisted SPE(I) directly or indirectly to make this event a great success.

At the end of session, a digital National Anthem was attended by the house.

All audio-visuals starting from prayer till concluding session were designed by. Er. PA Shah, Dr. Gitesh Chitalia, Er. Keyur Nanavati, and Er. Gargey Bhatt. The entire inaugural as well as technical sessions were anchored by Er. PA Shah; Er. BP Soni, Er. Parag Parmar and Er. PP Shah. The logistics and other support were provided by Er. VB Harani, Er. RM Athavale, Er. Yatin Pathak and Er. DD Kothari.

The **2-Day Conference** covered 6 Technical Sessions.

Session I

Session Chair: **Er. DC Bagde,** Chairman
Transrail Lighting Ltd.

Paper-1: Uprating of Existing HV Transmission Lines

Author: **Er. AA Joshi**, GETCO

The author delivered expert talk on Uprating of Existing Transmission Lines by HTLS conductor. He talked about initiatives taken by GETCO for adoption of HTLS conductors. He explained various advantages of the same. He too shared the experience of GETCO for use of HTLS conductors

L to R
Session Chair Er. DC Bagde
Er. PP Shah, Er. SK Jana, Er. AA Joshi,
Er. Dayanad Swami

Paper-2: Overview on Utility Poles and its Foundations
Author: Er. Dayanand Swami
M/s Salasar Techno Engineering Ltd.

The author talked about the Overview on Utility Poles and its Foundations. He explained the design and development of utility poles in the factory. He also shared the experience of various Utilities who had used the poles.

Paper-3: Integrated Design for Transmission Line Tower Foundation.
Author: Er. PP Shah, Consultant

The author delivered his speech on Integrated Design for Transmission Line Tower Foundation. He explained difficulties faced for design of tower foundation in varieties of soils. He also talked about unified approach for design of tower foundation for reliable and long life of the transmission line.

Paper-4: Next Generation Conductors
Author: Er. SK Jana, Apar Electricals

The author talked about Next Generation Conductors. He informed about the conductors which are presently used in transmission line. He indicated that new generation conductors are very useful for re-conductoring of existing transmission line. Further, he countered the advantages of next generation conductors. He briefed the contribution of Apar for development of next generation conductors by research and product engineering task taken up by them.

The questions answers were taken at the end of the session. There were very good interactions amongst participants and concerned authors of the paper.

Session II

R to L
Session Chair Er. PH Rana,
Er. SM Takalkar, Er. RP Rokade, Er. Keval Velani, Er. Vijay Patil, Er. Ram Jogdand

Session Chair: **Er. PH Rana**
Patron Member, SPE(I) Vadodara

Paper-5: Case Studies of Tailor made Solutions of existing Transmission Line including tower for re-design, engineering and construction of power transmission line.
Author: **Er. SM Takalkar,** MD
Takalkar Power Engineers & Consultants Pvt. Ltd.

The author talked about the initiatives taken by his company (TPEC) for development of redesign and re-engineering work with minimum cost. He presented case studies with photographs and explained in detail the tailor made solution for each site with minimum time and minimum labour / man-days & cost.

Paper-6: Case Studies on Enhancement of Power Transfer Capacity with application of New Generation Conductor
Author: **Er. Keval Velani**, Hitachi

The author explained 2 Case Studies in detail with sketches and drawings. He informed that the system study of the existing transmission

system / line is required before and after modification. He also proposed to consider availability of conductor with hard wares while making the proposal for new generation conductor and also dispose-off the existing conductors with hard wares of the existing transmission line.

Paper-7: Innovative Practices and Proven Technologies for enhancing the Safety, Reliability and Efficiency of the overhead Transmission Line.

Author: **Er. Ram B Jogdand**, Ramelex

The author delivered talk on the subject. He intimated the practices to be followed during construction and maintenance of transmission line. The construction practices shall be safe. The technologies adopted for maintenance of transmission line shall improve the efficiency and reliability of the same.

Paper-8: Engineering, Safety and Reliability of Transmission Line.

Author: **Dr. RP Rokade, Dr. R Balgopal,** CSIR

Dr. Rokade talked about the subject. He discussed about the safety points to be kept in mind while engineering of transmission line. The safety aspects shall be observed during construction and maintenance of power transmission line to increase the reliability as well as efficiency / availability of the same.

The questions answers were taken at the end of the session. There were very good interactions amongst participants and concerned authors of the paper.

Session III

Session Chair: **Er. BB Shah**
Jyoti Structures Pvt. Ltd.

Paper-9: Technical Aspects of Insulated Cross Arms.

Author: **Er. DPK Udas**, Modern Insulators

The author delivered expert talk on the subject. He explained the advantages of insulated cross arms on transmission line tower. Also, safety is increased due to application of insulated cross arms during maintenance. The interruption of transmission line reduces and thereby increases the availability

L to R
Er. DPK Udas, Er. BB Shah-Session Chair, Dr. Selvaraj, Er. PA Shah

Paper-10: Comparative Analysis of Transmission line Towers and Poles including 8 legged Tower, based on Key Structural and Operational Parameters

Authors: **Er. DK Yadav, Dr. M Selvaraj**

The author, Er. Durgesh Kumar Yadav shared experience on use of towers and poles. He presented the comparative analysis of advantages and dis advantages of use of towers and poles.

He also demonstrated 8 legged tower structure with its benefits of stability, geometry, centre of gravity etc. He too shared the structural data on the basis of results obtained during testing.

Paper-11: Deflection of Transmission Line Poles under Wind Loads across Wind Zones – PLS-POLE Based Approach

Authors: **Er. DK Yadav, Dr. M Selvaraj**

The author, Er. Durgesh Kumar Yadav shared experience about deflection observed during the testing of towers at different wind load on transmission line tower / poles / supports. He informed about classification of wind zones in the country and its effects on transmission line towers.

Paper-12: Disaster Mitigation – Experience on Transmission Line / System

Authors: **Er. SM Takalkar, Er. PA Shah**

The author, Er. PA Shah shared experience by

Quoting the various Disasters. He talked about disaster of Machchhu Dam, earthquake in Kutchh, heavy flood in Maharashtra etc. He explained the damages to the transmission system and mitigation thereof. He explained in detail with photographs.

Session IV

L to R
Er. Smeet Kulkarni, Er. (Ms) Kajal Patel,
Er. BP Soni-Session Chair,
Er. Sanjay Gajjar, Er. (Ms) Apexa Monani

Session Chair: **Er. BP Soni**
Retd. ACE(Tr)-GETCO,
Practicing Electrical Consultant

Paper-13: Construction and Classification of Cables

Author: **Er. Smeet Kulkarni**, DICABS

The author presented the paper on Construction and Classification of Cables. He gave brief account of various types of cables manufactured by Diamond Cables and its economic & efficient utilization. He elaborated type of construction technique and where to be applied depending upon the type of cable. He also informed that the construction / laying of cable is important as far as its size is concerned which tells about the bending radius and pulling tension. He displayed video on laying of cable.

Paper-14: Condition Assessment and Life Extension of Transmission Line Tower Stubs using advanced NDT and Retrofitting Techniques.

Author: **Er.(Ms) Apexa R Monani,**
GETCO, Vadodara

The author disclosed why tower stubs are damaged or destroyed, including environmently damaged or destroyed. She explained various techniques for prevention of stubs from damage i.e. NDT testing, retrofitting etc. She too informed that by applying these techniques, there is life enhancement of tower stubs and ultimately extension of life of transmission tower and the line.

Paper-15: Integration of Advanced Technologies for Hotline Maintenance and Preventive Fault Management in HV Transmission Line.

Author: **Er. Sanjay Gajjar**
Madhav Engineers Pvt. Ltd.

The author delivered expert talk explaining how the Hotline maintenance is being carried out in the country. Further, he talked about the advanced technologies being developed and adopted for Hotline maintenance of HV transmission line. He also talked about action to be taken in-case of possibilities of fault in the line by using advanced technologies for maintenance of the same.

Paper-16: Use of Stone Column Foundation for Transmission Line Towers.

Author: **Er.(Ms) Kajal Patel**
Jyoti Structures Pvt. Ltd.

The author explained with sketches and stated that this Stone Technique is used for weak and compressible soil to strengthen the soil. Stone columns are used for the improvement of settlement and bearing capacity of the soil. This will sustain the foundation against the settlement.

The questions answers were taken at the end of the session. There were very good interactions amongst participants and concerned authors of the paper.

Session V

Session Chair: **Er. YV Joshi**
Retd. ACE(Tr)-GETCO,
Practicing Electrical Consultant

Paper-17: Seismic Resilient Foundation Systems for Transmission Line Towers in Liquefiable Soils

Author: **Er. PP Shah,** Consultant

L to R
Er. PP Shah, Er. BD Gour,
Er. YV Joshi-Session Chair,
Er. Jagdish Sandhanshiv,
Er. Karanvir Singh Pundir

The author, while delivering his speech on subject, explained difficulties faced for design of tower foundation in soils where seismic force and resilience chances are more. He explained in detail the approach for design of tower foundation for reliable and long life of the transmission line. He informed that the foundation design is critical in the Seismic Zone V and also liquefaction prone areas. He shared his field experience and explained the design with relevant codes for guidance.

Paper-18: Design & Construction of Srinagar -Leh Transmission Line in High Altitude, Extreme Cold Weather, Snow Bound and Avalanche Prone Areas.

Authors: **Er. Karanvir Singh Pundir, Er. Nilesh Kumar Sinha, Er. Abhishek, Er, Abhay Kumar**
Power Grid Corporation

The author, Er. Karanvir Singh Pundir shared experience of Power Grid on the subject. He explained challenges of inclement weather and hostile terrain faced by the construction agencies during the project execution. He gave detailed account of the Special Foundation designs adopted on elevated locations.

Paper-19: Overcoming Cable Installation Challenges in MV, HV and EHV Transmission Systems: Friction Management and Project optimization using Polywater Technologies.

Author: **Er. Jagdish Sandhanshiv**
Knowledge Cluster & Polywater

The author delivered expert talk on how to overcome challenges on installation of MV, HV and EHV cables in transmission system. He also detailed the practical approach to project management and optimization by using Polywater technologies.

Paper-20: Importance of Earthing and Lightning Protection System in Transmission Line.

Author: **Er. BD Gour**
ETP Earthing & LPS Solution

The author delivered expert talk on the subject

The questions answers were taken at the end of the session. There were very good interactions amongst participants and concerned authors of the paper.

Session VI

L to R
Er. Naga RMSR Murty,
Er. E Venkateshwara Rao,
Er. Ravi Kiran Vaidya,
Er. SM Takalkar-Session Chair,
Er. KG Gaikwad, Er. Rajesh Chakarvartty

Session Chair: **Er. SM Takalkar, MD**
Takalkar Power Engineers & Consultants & Convener of Conference

Paper-21: Optimization of Right of Way in Overhead Power Transmission Line.

Author: **Er. Venkateshwara Rao**
KEC International

The author delivered lecture on the subject.

Paper-22: Construction Monitoring and Inspection of Transmission Line using Drones

Author: **Er. KG Gaikwad**, Manager
Takalkar Power Engineers & Consultants

The author delivered lecture on the subject.

Paper-23: Navigating Urban and Aviation Challenges in Donau Tower for Height Restricted Transmission Line

Author: **Er. Naga RMSR Murty**
Power Grid Corporation

The author delivered expert talk on the subject and explained how special towers can be designed for height restricted locations.

Paper-24: Electrical Field Measurement in Sipat Transmission Line at Truncated Tower.

Author: **Er. Rajesh Chakarvartty**
Adani Power

The author delivered talk on the subject.

Paper-25: Testing of Pile Foundation for Transmission Line and Power Projects with Case Studies

Author: **Er. Ravi Kiran Vaidya**
Geo Dynamics

The author explained in details various tests and their methods adopted for testing the transmission line tower pile foundations at site.

The power point presentations were compiled by Er. PA Shah, Er. KG Shah, Er. Keyur Nanavati, Er. BP Soni and Er. PP Shah. The entire technical sessions including question answer were conducted nicely and smoothly by above engineers.

The logistics during technical sessions were provised by Er. VB Harani, Er. Rajendra Athavale and Er. Devendra Kothari

The Conference ended with Vote of Thanks presented by Er. YV Joshi, Vice-Chairman, SPE(I) Vadodara.

He thanked the following:

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The Vote of Thanks was followed by the National Anthem.

The following organizations supported the event through the sponsorship, co-sponsorship, donation and sponsoring advertisement.

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5. RR Ispat (a unit of GIPL), Raipur
6. Soham Technologies, Vadodara

GRATITUDE

(Contd. from page-1)

one month. The sponsorship, delegate registration and donations kept on pouring.

As usual, the flow of technical papers was very slow in the beginning but at the end we received 23 nos. of papers for conference and 5 nos. for presentations for tutorials.

The delegates who attended the event organized by SPE for the first time were overwhelmed with the logistic and time management by various committee members of the Chapter. I really appreciate the team work of all the committees.

A detailed report on the event is already covered in the issue. However, I wish to express my gratitude to one and all who fulfilled my dream to organise a mega event covering Tutorials and cultural evening (for delegates, invitees and SPE members with spouse). The support received from Er. Upendra Pande, MD (GETCO), Er. SK Negi, COO (KP Energy) and various transmission line utilities in the country is noteworthy.

My Best Wishes to all the committee members and other members of the Vadodara Chapter for the New Year of 2026. May Gad give Good Health, Wealth and Happiness to everyone.

Er. SM Takalkar
Patron

TECHNICAL ASPECTS OF INSULATED CROSS ARMS

Er. D.P.K. Udas Power Professional
Vice President, Modern Insulators Ltd.
dpk.udas@rediffmail.com

Abstract:
This paper discusses about challenges faced in designing and making Insulated Cross Arms & Methodology followed to test and validate the design.

Introduction

The utilities world over face following issues in their existing network

1) Need to transmit more power in the same corridor.
2) Increase ground clearance due to human activity under the tower
3) Right of Way

Now more power can be transmitted by upgrading voltage of the line. We can upgrade 66kV to 132kV and 132kV to 220kV and so on.

The ground clearance can be increased by raising height of the conductor.

Right of Way issue can be resolved by making line compact and doing work on the same tower without any need to put another tower.

All of above can be achieved by putting **"Insulated Cross Arms"**

WHAT IS INSULATED CROSS ARM?

The metallic Cross arm of tower is removed and replaced with long Rod Insulators. This enables raising of the conductor from ground level. It also helps in Upgradation to next level. (See image 1)

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Image 1

STATIC LOAD ANALYSIS

First thing which was done was to find out as to what loads the Cross Arm of tower is subjected to.

Following 4 situations were studied

1) Reliability Condition
2) Security Condition
3) Safety Normal Condition
4) Broken wire condition

It was observed that while rigid Assembly will be able to take first 3 conditions the broken wire condition was the issue. It was not possible for the Cross arm Assembly to withstand the reverse load which it would be subjected to.

The various options like increasing core diameter of strength member and reducing size of the inclined member considered. After much deliberation the solution of providing " hinges " was selected. The hinges to be mounted on tower so that the whole cross Arm Assembly can sway without subjecting the same to sudden impact.

DESIGN OF ASSEMBLY

While designing Insulated Cross Arm which is combination of Long Rod Insulators following general guidelines were followed.

1) The hardware components were selected which were available in the market.
2) Same insulator was used as strength member and inclined member to avoid any interchange while erecting in the field.
3) We opted for tongue & clevis arrangement.

LOADS ON CROSS ARM ASSEMBLY

The Cross Arm Assembly is subjected to Wind Pressure , Self-Weight , Electromagnetic force & sag tension.

1. **Loads on Strength Member**
   (Horizontal Member)
   a) Trans Load = 869 kg
   b) Vertical Load = 447 x (1700 /1200)
   = 623 kg
   Total Load = 1492 kg
   Ultimate Load = 1.05 x 1492 = 1567 kg
   15.36 kN is safe
2. **Load on Tie Member**
   (Inclined Member)
   a) Trans Load = (2092/1700) x 869/2
   = 535 kg
   b) Vertical Load = 447 x (1700/1220)
   = 623 kg
   Total Load = 1158 kg
   Ultimate Load= 1.05 x 1158 = 1216kg
   11.92 kN is safe

THE DESIGN OF HINGE

This is most crucial part of Insulated. Cross Arm. The hinge was required to hold the dead weight of the Insulator, conductor clamp and yoke plate.

It was also required to withstand wind load, self-weight of assembly & electromagnetic force which it is subjected to.

The component was made considering all these aspects.

It was also subjected to field test by actually erecting.

THE MOUNTING OF HINGE ON THE TOWER.

This was another challenge as tower is normally made of L angles and sufficient width is not available.

We planned to install the steel plate of 80 mm width and 10 mm thickness on the tower. The fixing bolt of M12.

Hinge bolt of M16. (See Fig 2)

STANDARD COMPONENTS

The other components selected were yoke plate, expansion joint, nuts and bolts, conductor clamps as available in the market.

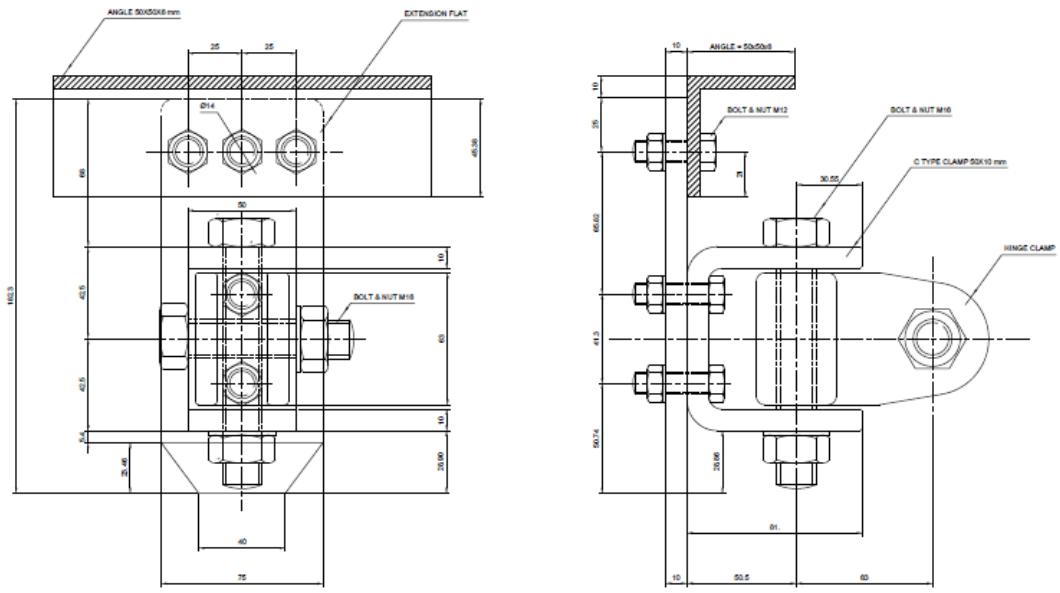
TESTING

The entire Assembly was tested at NABL approved lab.

TEST PROCEDURE

1) Mechanical Strength Test

Insulator and hardware were subjected to tensile load of 70% value than what was specified.



TITLE :- MOUNTING ARRANGEMENT
TOWER.

Fig. 2

2) Slip Strength Test

Conductor fixed at the clamp on Cross Arm Assembly.

Load at one end applied Value at which conductor or clamp slips is noted.

3) Mechanical Test on Assembly

Complete Cross Arm Assembly was erected. Load applied at fulcrum point. The value of load was 25% of conductor UTS.

The load was held for 1 minute and then released.

TEST RESULTS

All tests were passed successfully.

INSULATED CROSS ARMS USING COMPOSITE INSULATORS

ICA with porcelain long Rod Insulators is called PICA.

ICA with Composite Insulators is called CICA.

The advantage of Composite Insulators is that it is light in weight. This makes the product easy to install and corresponding weight which gets transmitted on other tower members is less.

However, it has buckling phenomenon and same needs to be overcome.

In case of CICA there are 4 members which are required to make Cross Arm Assembly. Also mounting is rigid.

The strength member used is Composite Post Insulator and not Composite Long Rod Insulators.

CONCLUSION

The product Insulated Cross Arm is the field innovation. There are no standards available. It was a big challenge which was overcome by tenacity, experience & field trials.

AUTHOR

Er. DPK Udas

The author is having 40 years of experience in Power Sector.

He has worked for EPC. Also worked with companies manufacturing hardware, Insulators etc.

He has been active in Industry associations like IEEMA and has taken part in various technical event and seminars.

THEMES FOR POWER SECTOR FOR THE YEAR 2026

The overarching themes for the power sector in 2026 are **resilience, integration of diverse energy sources, and digital transformation, driven by surging electricity demand and the global energy transition**. Key industry events and outlook reports highlight the following specific themes:

Global Themes

- **“Inspiring Transformations, Delivering Transitions"**: This is the official theme for the 27th World Energy Congress in Riyadh (October 12–15, 2026), focusing on turning visionary thinking into pragmatic actions for a better energy future.
- **Resilience and Energy Security**: Geopolitical tensions are prioritizing energy independence and supply chain resilience. Countries are diversifying energy mixes and reducing dependence on single fuel sources or suppliers, with renewables offering a pathway to self-reliance.
- **Surging Demand (AI and Electrification)**: Rapid growth in data centers, AI technologies, electric vehicles (EVs), and heat pumps is driving unprecedented demand for power, straining existing grid infrastructure.
- **Renewables Dominance**:

Renewables are expected to become the world's largest source of electricity by 2026, with solar and wind leading the growth.

- **Storage Integration**: Battery energy storage systems (BESS) and long-duration energy storage (LDES) are critical for managing the intermittency of renewables and ensuring a stable, continuous power supply.

India-Specific Themes

- **"Energising Growth. Securing Economies. Enriching Lives."** This theme underpins the India Energy Week 2026 (January 27–30, Goa), focusing on balancing energy access with de-carbonization goals and highlighting India's growing leadership in the global energy transformation.
- **Energy Addition**: A pragmatic strategic shift toward incorporating a diverse, integrated mix of conventional, renewable, and alternative fuels to meet rapidly rising demand, rather than simply replacing hydrocarbons.
- **Green Hydrogen Leadership**: India's National Green Hydrogen Mission is a key initiative positioning the country as a global leader in production and export, leveraging over ₹8 lakh crore in total investments by 2030.
- **Smart Grids and Digital Transformation**: The focus is on transitioning from traditional grids to smart networks using AI, machine learning, and data analytics to optimize distribution, improve reliability, and manage energy consumption.
- **Rural Electrification and Equity**: A strong focus on achieving universal energy access and addressing the energy divide, including the use of mini-grids and standalone solar systems to empower remote communities.

Overall, the power sector in 2026 is defined by the need for **agile and innovative strategies** to meet growing demand while accelerating the transition to a resilient, sustainable, and digitized energy system

Chapter's Activity

(**Contd. from page -3**)

- On **14 Dec 2025,** as a part of **"Energy Conservation Day", Chapter** jointly with **IE(I)** Vadodara organised a lecture session at Vasvik Auditorium.

  The eminent speakers were **Dr. Monika Shah,** Prof. - Navrachana University and **Er. Bhavesh Mehta** (IGBC fellow).

  The topic of the day was **"Energy Conservation–Tools and Techniques for Engineers".**

  Dr. Monika Shah talked about Energy in humans and machines, Laws of Conservation of Energy. She described various Energy Conservation Tools like use of Natural Lighting, Appliances and Electronics, HVAC system, judicious use of Energy and Energy Conservation versus sustainable development.

  Er. Bhavesh Mehta covered the following:

  - India's leadership in achieving Net Zero by 2070.
  - Role of Indian Green Building Council in Energy Conservation
  - India's population & weather condition and avenues for Energy Saving.
  - IGBC's green building ratings.
  - IGBC's certified projects.
  - Measurable benefits of green buildings
  - Approach towards enhancing HVAC

Dr. Monika Shah delivering lecture

Er. Bhavesh Mehta delivering lecture

Both the presentations were well received. Chapter was represented by Er. YV Joshi, Vice-Chairman and Er. VB Harani, Secretary

- On **20 Nov 2025**, at the special invitation of Shri Mahendrabhai Shroff, President, VCCI, Vadodara, to attend a lecture session on **"Towards Better Living"** by HH Swami Dr. Gnan Vatsaldasji, BAPS, Atladara, about 30 SPE members with their spouse attended the session. The members and their spouse also took the benefit of Abhishek on "Nilkanth Varni" in the basement of the temple. The lecture was excellent and well received by the members & their family.

  Er. SM Godkhindi, ACM had a pivotal role in organizing the event. Er. SM Takalkar, Er. SM Godkhindi and Er. VB Harani felicitated Swami Dr. Gnan Vatsaldasji on behalf of SPE(I) Vadodara Chapter.

Swami Dr. Gnan Vatsaldasji delivering lecture

Er. VB Harani & Er. SM Takalkar felicitating Swami Dr. Gnan Vatsaldasji

Er. VB Harani

OBITUARY

Er. Pravinchandra R Navadia, Retd. Superintending Engineer, GEB and **Life Member** of **SPE(I)** Vadodara left for his heavenly abode on **22 Oct 2025.**

After passing his BE(Elect.) from Lakhdhirji Engineering College, Morbi, he joined erstwhile GEB as Deputy Engineer in Porbandar (O&M) Circle. He has significant role of electrification of entire costal belt from Porbandar to Veraval.

He regularly attended events organised by SPE(I) Vadodara.

A jovial and mixing nature person, he was friendly to all.

May God give peace to the departed soul and strength to his family members to bear the impact.

Er. Bhupendrakumar C Gajjar, **Life Member** of **SPE(I)** Vadodara left for his heavenly abode on **30 Oct 2025.**

He regularly attended events organised by SPE(I) Vadodara.

May God give peace to the departed soul and strength to his family members to bear the impact.

Disclaimer

The views expressed in this newsletter are solely of the author and do not necessarily reflect the views of the editorial committee and Society of Power Engineers (I), Vadodara