



SPE Newsletter

**SPE(I), Vadodara Chapter
January, 2025 Issue: 1/2025**



WELCOME - 2025



HAPPY HOLI



LET ELECTRICITY GO UP UP & UP WITHOUT ANY CUT !!!

**2-DAY CONFERENCE ON INDUSTRIAL AUTOMATION MARCH 2025
ELOCUTION COMPETITION ON GREEN TECHNOLOGIES JAN to MAR 2025**

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

**414-415, Wing-B, Monalisa Business Centre, Near Saptarshi Samanvay
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CHAIRMAN'S DESK



Dear esteemed Members of the Society of Power Engineers (I) Vadodara & Readers,

Happy New Year 2025. As we step into 2025, I hope this year brings you renewed energy,

innovative ideas and continued success in your endeavors. Most important happening of the year is that we could move to our new office premises which is spacious and have all the infrastructure required for a corporate outlook. Besides the office is located in the prime area of city that is Manjalpur. I would like to appreciate all the members and well-wishers who contributed their might for this noble cause. I am sure the activities of the Chapter will gather better momentum while operating from the new premises.

Embracing the spirit of innovation, I would like to highlight the existing advancement in AI (Artificial Intelligence).

AI is transforming the power engineering landscape, enabling smarter grids, predictive maintenance and enhanced energy efficiency. Let us leverage these technological breakthroughs to drive growth, sustainability and excellence in our industry.

We are beginning the new year by conducting a Conference on 08 Jan 2025 on **“Renewable Energy”**. We will be conducting many such Seminars/Conferences this year. I request members to attend these events and enhance their knowledge. Expert members can contribute to the Seminars/Conferences by presenting papers and talks on relevant topics from time to time.

We lost many stalwart members of SPE last year. We offer deepest condolences to their family members on behalf of the SPE. Their contribution to the growth of the SPE cannot be underestimated.

Wishing you a Bright and Empowering Year ahead.

Er. Mohan R Tilwalli



CHAPTER MOVES ITS OFFICE TO A NEW PLACE

The Chapter's office has now been relocated to **B-414/415, Monalisa Business Centre, Near Samanvay Saptarshi, Near Avadhoot Railway Crossing, Manjalpur, Vadodara-390 011**. This premises is purchased with the help of generous donations and advances from the members and well-wishers.

The office premises is almost double in space and has all the infrastructure compitable to a business office.

It has 4 lifts, round the clock security, sufficient parking and wash room/ pantry.

We wish that the Chapter will be able to make good progress from this newly acquired premises.

EDITOR'S DESK



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

The landmark event in the journey of our chapter has occurred in preceding quarter.

The SPE(I) Vadodara Chapter has shifted its office from Avishkar Complex, Old Padra Road after a long stay of more than two and half decade and started functioning from new location at Monalisa Business center, Manjalpur. The office premises is quite spacious and having all basic amenities required by a corporate now a days. I take this opportunity to put on record, the selfless, dedicated services and guidance rendered by all past and present iconic personalities of power sector in nurturing the chapter from old office. Even industries around Vadodara have also supported the chapter by generous sponsorship and nominating delegates to the conferences/Seminars/workshops arranged by the Chapter. With this support, the Chapter has become sound and as a result, today new asset is acquired by the Society. I am confident that as we move forward, Team-SPE will rope in young and dynamic engineers having new ideas and collectively take Vadodara chapter to newer height.

Our chapter had organized, 2-Day conference on "Fire Protection System in Industries, Hospitals, Buildings and Power sector" on 15th and 16th Oct 2024 @ Vadodara. The conference has received an overwhelming response and registered 150+ delegates from across various sections of the society and received 28 technical papers from Industries and Academia. The Proceedings published in the conference is also available on our website for the reference of members.

Recently, standing committee on energy has presented a report in the Loksabha. We all are aware about the significance of performance parameter Aggregate Technical & Commercial

(AT&C) Loss for Distribution sector. The AT&C loss at national level is reduced from 27.8% for FY-2009 to 15.37% in FY-2023. Out of which state owned DISCOMs have reduced AT&C loss to 15.78% and private DISCOMs have reduced to 10.94% in FY-2023. The reduction of 12.43% loss at National level is mainly attributed to the various measures and key initiatives by the Government and utilities which includes timely payment of subsidies declared by Governments, Tariff and true up orders issued in time and Energy accounting and audit. It is a matter of concern that gap between Average Cost of Supply (ACS) and Average Rate of Realization (ARR) has increased considerably from Rs.0.10/Unit in FY-2022 to Rs. 0.46/Unit in FY-2023 at national level. Gujarat is one of the states where ACS-ARR gap has increased and collection efficiency has reduced in FY-2023. One more concern is, non-utilization of Revamped Distribution Sector Scheme (RDSS) funds by the utilities. As against allocation of Rs. 12,585Cr. for FY-2025, only 67.67% is utilized as of Sept-2024. It is high time for utilities to focus on these crucial operational parameters to improve their performance by utilizing funds available under various Government schemes. This will certainly provide quality and reliable service as well as competitive tariff to the end consumer.

Our chapter is organizing, 1-Day conference on "Renewable Energy" on 8th Jan 2025 @ Vadodara. The conference has an aim to discuss current and future renewable sector of India *vis a vis* Gujarat, latest issues and challenges in RE integration. It will also discuss Regulatory provisions and commercial issues associated with it, Grid connectivity procedures, applicability of various charges on green energy transactions along with case studies. It is worth for members to register for this conference and get updated with the latest trends in emerging Renewable Energy sector.

Once again, Wishing all members and their families, a **Healthy & Happy New Year** of **2025** and the festival of Makarsankranti ahead.

Er. Umesh Parikh



CHAPTER'S ACTIVITIES

On **03 Oct 2024**, the **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 60 Members and their spouse attended Pooja. The members and their family availed Prasad and greeted each other. The Pooja was performed by **Er. Parag Parmar**, EC member and his better half.



L to R **Er. VB Harani**, **Er. Keyur Thakkar**, **Dr. SK Joshi**, **Er. Keyur Nanavati**, **Er. Mohan Tilwalli**, **Er. YV Joshi**

He explained about Earthing standards national as well as international. He also showed type of Earthing installation and their methods. He also explained Parts of Earthing, Earthing Rod, Chemical / Char Coal / Bentonite / Salt & Water, Earthing Plate, etc. Touch Potential and Step Potential were explained with pictures. He played videos on various types of Earthing and informed about merits and de-merits of each one of them. He talked about role of Earthing and difference of Earthing, Grounding and Bonding in the Power Network. Application of Earthing in Power Station, Substation, EHV Lines and Distribution Lines were also discussed. He gave brief about role of Lightning Protection in Industries. He shared an Information about Fortnightly Free Lectures conducted by him through web for the benefits of the Society, Students, Faculties and Practicing Engineers.

- On **17 Dec 2024**, the **Chapter**, jointly with **IE(I)**, Vadodara organised an evening lecture on **"Energy Audit in Process Industry and Power Station"** as a part of celebration of **"Energy Conservation Day"**.

The speakers were **Er. Ramkishor Jaiswal** and **Er. DM Jethwa**, former. Executive Director, GSECL

Er. VB Harani
I/c Secretary

- On **15 & 16 Oct 2024**, the **Chapter**, jointly with **CBI&P**, New Delhi organised a **2-Day Conference** on **"Fire Protection System in Industries, Hospitals, Buildings and Power Sector"** at FGI, Vadodara. A report on the same is brought out in this issue.
- On **09 Nov 2024**, the **Chapter**, jointly with **IE(I)**, Vadodara organised an evening lecture on **"Modern Earthing Practices for Reliable and Safe Power System"** as a part of celebration of **"Power Day"** at Vasvik Auditorium. The speaker was **Er. Keyur Nanavati**, Managing Director, ETP Earthing and LPS Solution Pvt. Ltd., Surat.

Brief Report of 2-Day Conference on “Fire Protection System in Industries, Hospitals, Buildings and Power Sector”

The Vadodara Chapter of SPE (I) organised a 2-Day Conference on **“Fire Protection Systems in Industries, Hospitals, Buildings and Power Sector”** on **15 & 16 Oct 2024** at FGI, Vadodara. More than 150 delegates from all over the country participated in the Conference. The delegates hailed from GETCO, GSECL, Academic Institutions, Constructing Firms, Individuals, Adani Energy Solutions, ERDA, Adani Power, Fire Experts etc.

The inaugural function was presided over by **Er. AB Chaudhari**, Chief Electrical Inspector, GoG; **Er. Upendra Pande**, MD, GETCO and **Er. Jethwa**, ED, GSCEL. Others on the dais included **Er. Mohan Tilwalli**, Chairman, SPE (I) Vadodara, **Er. PH Rana**, former Director-GUVNL and **Er. SM Takalkar**, Conference Convener.

Er. Mohan Tilwalli presented Welcome Address and highlighted the activities of SPE (I) Vadodara. **Er. Rana** delivered message for the Success of the Conference. **Er. SM Takalkar** gave brief about the Conference and basic theme of the Conference.

Er. Jethwa gave well wishes to the Conference and expressed his views on the Electric Fire in the Powerhouse. He shared his experience while working in the Thermal Power plant. **Er. Upendra Pande** praised SPE (I) Vadodara for organizing event on such an important topic which is a must for each project. He shared his views and experience on the topic. **Er. AB Chaudhari** expressed his happiness over being invited as a Guest of Honour for the event. He explained how Electrical Fires can be minimized in Transmission Network, Powerhouse and Distribution System. The un-veiling of the **Proceeding** was done by dignitaries on the dais. The Platinum Sponsors (Poly Cab & CTR Manufacturing) and Golden Sponsors (JVL Enterprise, Adani Energy Solutions, Adani

Power and NTPC-Jhanor) were felicitated by the dignitaries on the dais.

Er. YV Joshi, Secretary, SPE(I) Vadodara presented vote of thanks and thanked Sponsors, Donors, Advertisers, Authors, FGI authorities, MD-GETCO, MD-GSECL, Committee Members and delegates. The inaugural function was anchored by **Er. PA Shah**, Advisory Committee Member and an active member of SPE (I) Vadodara. The other members who supported **Er. Shah** were **Er. RM Athawale**, **Er. Gargey Bhatt** and **Shri Ajit Karode**. All audio visuals starting from prayer till Concluding Session were designed by **Er. PA Shah**, Advisory Committee member. He was actively supported by **Er. Gargey Bhatt** and **Er. Parag Parmar**, EC member. The logistics and other support were provided by **Er. YV Joshi**, **Er. Sanjay Shiledar Baxi** & **Er. VB Harani**, The proceedings was compiled by **Er NV Rede**.

After the inaugural session and a networking tea break, technical sessions for the first day were taken up one by one as follows:

Day-1

SESSION-I.

Session Chair: Er. PH Rana

**Paper-1 Condensed Aerosol Systems –
Basic Design Consideration**

Author: Shri Sameyak Sabadra
FirePro Systems

Paper-2 Hydrogen Safety in Industry

Author: Er. LR Patel
Retired Safety Officer, GSECL

**Paper-3 Advantages of NASA Fire
Technology Ltd. Solution over
Traditional Fire extinguishers**

Author: Er. Pratik Trivedi

**Paper-4: Enhancing Electrical Fire
Safety in an Industrial Facility**

**Authors: Dr. Hetal Prajapati,
Er. Parth Bhatwadekar**, Parul Uni.

SESSION-II

Session Chair : Dr. AJ Chavda

Paper-1 Fire safety prevention in Sub-station equipment FOCUS on Instrument Transformer

Author: Er. GV Akre

M/s Hivoltrans, Halol

Paper-2 Enhancing Fire Protection Strategies in Lignite Open-Cast Mines

Authors: Mr. Sumankumar Goswami, Mr. Rahulkumar

GPCL, Gandhinagar

Paper-3 General Safety & Fire Safety in the Extra High Voltage Substation

Authors: Er. Ishan Desai, Ms. Binal Modi, Parul Uni. Er. SM Takalkar, MD, TPEC

SESSION-III

Session Chair: Er. AB Chaudhari, GSECL

Paper-1 Fire Safety Measures for Hospitals

Author: Mr. Rajesh G Shirke

Paper-2 Causes and mitigating measures of rising fire incidents in Hospitals way to prevent Fire Accidents in Hospitals

Author: Er. Gaurang Bhavsar

Assistant Electrical Inspector

Paper-3 Fire in Industrial, Commercial and Residential Installations due to Electricity

Author: Ram Pravesh Sharma

Day-2

SESSION-IV

Session Chair: Er. MR Tilwalli

Paper-1 Fire-Survival Cables: An Essential aspect for fire & safety

Author: Bharat Sehgal,

Associate Vice-President & HOD, Polycab India Ltd., Vadodara.

Paper-2 Lessons Learnt from Electrical Fire Incidences

Author: Er. HR Raval, Advisor,
Gujarat Safety Council, Vadodara

Paper-3 Change your Safety Attitude

Author: Er. AB Chaudhari,
Sr. Safety Officer, GSECL, Vadodara

SESSION-V

Session Chair: Er. RP Sharma

Paper-1 Legal Provisions in CEA Regulation 2023 for Fire Protection in Power Sector

Author: Er BN Raval Ex CEI,
Er. PA Shah

Practicing Electrical Engineer

Paper-2 Electric Fire and Explosion Hazard Prevention:

Authors: Ishan Desai, Ms. Binal Modi, Parul Uni. Er. PA Shah

Practicing Electrical Engineer

Paper-3 Electrical Safety and Fire Hazards with reference to Ear System

Authors: Er. SM Takalkar MD-TPEC
Er. **Keyur Nanavati**, ETP Solutions

SESSION-VI

Session Chair: Er. YV Joshi

Paper-1 Prevention of Transformer Explosion and Fire

Authors: Er. SK Shelgaonkar, Er. Amit Jaiman,
CTR Manufacturing

Paper-2 General Fire Safety in Industries, Hospitals, Buildings and Power Sector

Author: Er. DM Patel, Fire Advisor

Paper-3 Provisions under National Building Code for Safety of Buildings

Authors: Dr. Rital Gajjar Ms. Binal Modi
Parul University

Session-VII

Session Chair: SM Takalkar MD, TPEC

Paper-1 Fire in Floating Roof Tank Due to Lightning Strike

Author: Er. Krishna Kumar Roy
Chief Consultant

Paper-2 Power Transformers Fire Root Cause Analysis

Author: Dr. AJ Chavda, Ex. CE, GETCO

Paper-3 Various Technologies on Fire Protection of Reactors and Transformers to prevent Fire, Failure and Explosion

Authors: Dr. CD Kotwal, SVIT
Er. PA Shah

Practicing Electrical Engineer

The last session was a Concluding session. **Er. MR Tilwalli**, **Er SM Takalkar** & **Er. YV Joshi**, were on the dais. **Er. SM Takalkar** briefed about the entire conduct of the Conference. The other SPE members expressed their views and thanked all the stake holders of the Conference.

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

1. M/s PC Patel Mahalaxmi
2. Takalkar Power Engineers & Consultants Pvt Ltd.
3. FCG Hitech
4. Shaligram Associates
5. KV Fire Chemical Pvt Ltd
6. KSR International Consultants and Engineers
7. Soham Technologies
8. Gururaj Engineers Pvt Ltd.

The presentation of each paper and Author's biodata were nicely compiled and presented by **Er. PA Shah** and **Er. YV Joshi**. Anchoring of Technical Session was done in a rotation by **Er. Shah** and **Er. Joshi**. Viewing in totality, the Conference was a Grand Success

MEMBERS IN NEWS

- **Prof. Awadhesh Kumar Singh** (Prof. AK Singh), former **Vice-Chairman of SPE(I) Vadodara** was recently conferred distinguished **Alumni Award-2024** by Malaviya University of Technology, Gorakhpur
Congratulations to Prof. AK Singh
- **Er. BP Soni**, SE, GETCO-Corporate Office, **Life Member** and Advisory Committee member of **SPE(I) Vadodara** is elevated to the post of **Additional Chief Engineer**.
Congratulations to Er. BP Soni.

NEW LIFE MEMBERS

GR No.	Name	Grade	GR No.	Name	Grade
2456	Shiva S Mishra	LM	2459	Sanjay D Gajjar	LM
2457	Sachchidanad S Shelgaonkar	LM	2460	Shrirang P Karkar	LM
2458	Shashank Malpande	LM	2461	Hitesh M Mehta	LM
			2462	Kalpesh N Brahmabhatt	LM

GLIMPSES OF 2-DAY CONFERENCE



REGISTRATION OF PARTICIPANTS



AUGUST GATHERING

INAUGURAL SESSION – A BEGINNING OF THE EVENT



DIGNITARIES ON DIAS

L to R **Er. SM Takalakar**, **Er. Jethwa**,
Er. AB Chaudhari, **Er. Upendra Pande**,
Er. MR Tilwalli, **Er. PH Rana**



LIGHTING OF HOLY LAMP

L to R **Er. AB Chaudhari**, **Er. SM Takalkar**,
Er. MR Tilwalli, **Er. PH Rana**



WELCOME ADDRESS

Er. MR Tilwalli
Chairman, SPE (I) Vadodara

FLORAL WELCOME OF DIGNITARIES & FELICITATION



Er. MR Tilwalli presenting Bouquet & Memento to Er. AB Chaudhari, Chief Electrical Inspector



Er. MR Tilwalli presenting Bouquet & Memento to Er. Upendra Pande, MD-GETCO



Er. MR Tilwalli presenting Bouquet & Memento to Er. Jethwa, Ex. ED-GSECL

ABOUT THE CONFERENCE, BASIC THEME & WISHING ITS SUCCESS



Er. SM Takalkar, MD-TPECPL
Briefing about the Conference and its Basic Theme



Er. PH Rana, Ex. Director (Tech)-GUVNL
Wishing Success to the Conference

UNVEILING OF PROCEEDINGS



Proceeding unveiling by dignitaries on dais

ADDRESS BY DIGNITARIES



Er. Jethwa extending Well Wishes



Er. Upendra Pande praising SPE(I) for organising the event on such an important topic

CONCLUDING INAUGURAL SESSION



Er. AB Chaudhari expressing happiness being invited as Guest of Honor



Er. YV Joshi, Secretary, SPE (I) Vadodara extending Vote of Thanks

PAPER PRESENTATION



Er. GV Akre, past Chairman SPE(I)
Vadodara presenting paper



Prof. Binal Modi presenting paper



Er. BN Raval presenting
paper



Er. RP Sharma presenting paper



Dr. AJ Chavda presenting paper

EVENT ANCHORING



Er. SS Shelgaonkar presenting paper



Dr. Rital Gajjar presenting paper



Er. PA Shah anchoring the
event

FIRE-SURVIVAL CABLES: AN ESSENTIAL ASPECT FOR FIRE & SAFETY

Bharat Sehgal

Associate VP & HOD, Polycab India Ltd., Vadodara

Abstract

Fire Survival cables are designed to maintain the circuit integrity of the cable even during fire conditions. In general, the fire-Survival cables are made up of flame retardant zero halogen materials, so that the fire hazard such as flame propagation and smoke release of these cables are controlled. However, one more fire hazard of these fire-survival cables is nothing, but the heat released from these cables during a fire. Heat release of these cables depends upon the fuel loading of the cables and the energy available in the materials of these Fire

Resistant or Fire Survival (FS) cables. In this paper, construction & salient attributes of FS cables are presented.

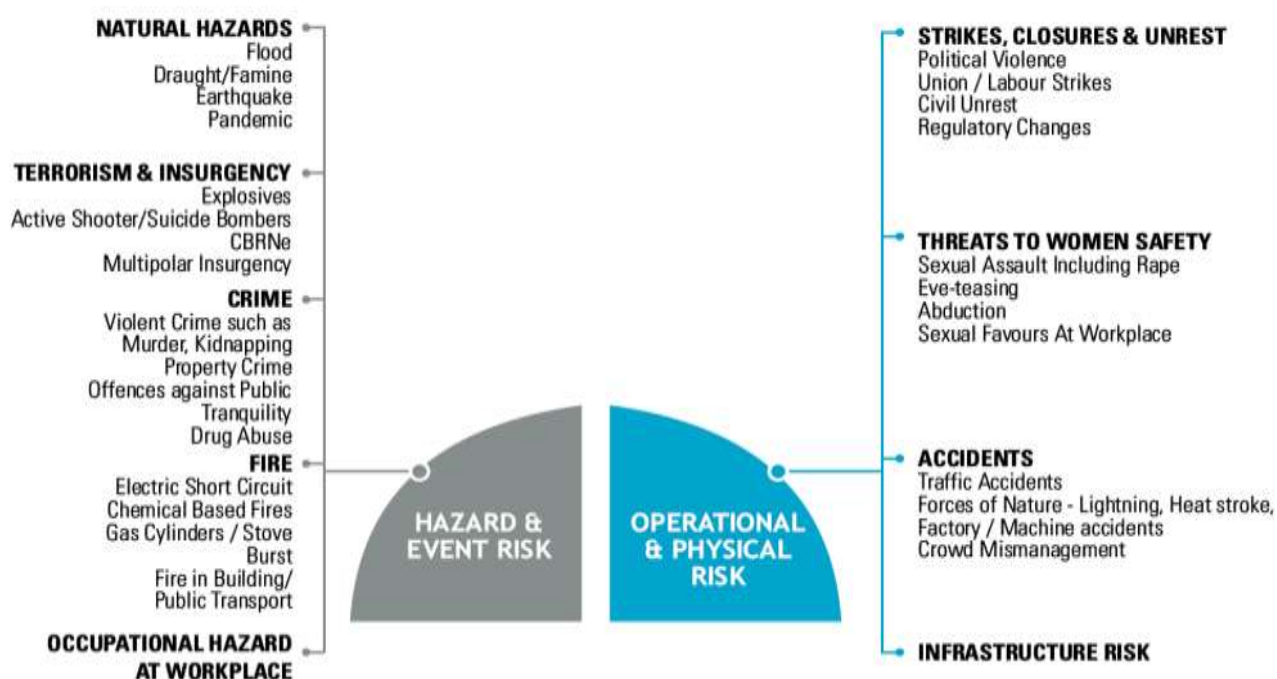
Keywords:

Fire Resistant or Fire Survival Cables, Glass-Mica Insulation, test methodologies

1. Introduction

Referring to the black past & basis recent FICCI-Pinkerton "The India Risk survey", Fire has become a bigger threat to human life since the time, living spaces become limited & human population density increasing every passing day

FICCI-Pinkerton's - "The India Risk Survey"



Numerous numbers of control & power cables of 1.1kV rating are being used in control & power panels of critical equipment and control devices that are housed inside the closed buildings and industries. Control cables are of low voltage rating and

specially designed for the centralized control of electrical equipment. Hence control cables play an important role in life safety and firefighting applications which includes the delivery of power and auxiliary control in fire alarm systems, voice alarm systems, and

emergency lighting systems. The hazardous effect of fire involved in the cables is flame spread, the release of smoke and toxic gases, and heat release. In order to improve the flame retardancy and to make it less smoke emission, various thermoplastic materials such as FR PVC, FRLS PVC, HFFR, and LSZH materials are used in sheathing applications of the Fire-Resistant cables. However, the Fire resistance property is not the same as that of flame retardancy of cables. Flame retardant cables are designed to retard the spread of fire and control the flame spread. Fire resistant cables are designed to maintain circuit integrity and continue to work for a specified period of duration under the normal operating voltage and specified flame temperature conditions. Fire Resistant cables are mainly used in hospitals, underground railway stations, metro coaches, and hazardous environments such as oil and gas platforms.

2. Overview of Fire Survival Tests and Applicable Standards

The fire-resistant cables are of single-core and multi-core cables are suitable for use within a number of Control Circuit categories. The fire-resistant cables are required to withstand four different categories of Fire Resistance tests as per national and international standards. They are as follows:

2.1 Fire Resistance Test with Fire Alone

In this category, the cable shall maintain the circuit integrity throughout the prescribed test duration under the fire application alone with a specified flame temperature.

2.2 Fire Resistance Test with Fire and water

In this category, the cable shall maintain the circuit integrity throughout the prescribed test duration under the fire application of specified flame temperature and also water spray or water jet application for a prescribed duration and at specified intervals.

2.3 Fire Resistance Test with Fire and Mechanical shock

In this category, the cable shall maintain the circuit integrity throughout the prescribed test duration under the fire application of specified flame temperature and also an indirect mechanical impact application for 20 seconds duration and at specified intervals of either 5 minutes or 10 minutes. As per BS 6387, Category Z, the fire is applied for 15 minutes duration and the mechanical impact is applied for every 30 seconds once.

2.4 Fire Resistance Test with Fire, Mechanical Shock, and Water Spray

In this category, the cable shall maintain the circuit integrity throughout the prescribed test duration Under the fire application of specified flame temperature and also an indirect mechanical impact application for 20 seconds duration and at specified intervals of either 5 minutes or 10 minutes. However, during the last 5 minutes duration of the test, a burst of water of 5 s duration at 60 seconds intervals is applied for at least 5 bursts of water application.

The applicable standards and the fire resistance test requirements are described in Table 1.

Sl.No	Standard	Name of the standard	Duration of the test
1	IEC 60331-11-1999 & IEC 60331-21-1999	Fire Alone at 750° C, rated voltage up to 0.6/1 kV	90 minutes
2	BS 6387-2013 Category C	Resistance to fire alone test at 950 °C	180 minutes
3	BS 6387-2013 Category W	Resistance to Fire with Water at flame temperature of 650 °C	15 min – flame 15 min – flame and water
4	BS 6387-2013 Category Z	Resistance to fire with mechanical shock at 950 °C	15 min – flame and impact for every 30 secs
5	IEC 60331-1 -2018	Fire with shock at 830 °C for rated voltage of upto 0.6 / 1 kV & diameter exceeding 20 mm	30 min, 60 min, 90 min or 120 min- Impact of 20 secs at 5 min intervals
6	IEC 60331-2 -2018	Fire with shock at 830 °C for rated voltage of up to 0.6/1 kV & diameter not exceeding 20 mm	30 min, 60 min, 90 min or 120 min-flame, Impact of 20 secs at 5 min intervals
7	IEC 60331-3 -2018	Fire with shock at 830 °C for voltage up to 0.6/1 kV tested in a metal enclosure	30 min, 60 min, 90 min or 120 min- flame, Impact of 20 secs at 5 min intervals
8	BS 8491-2008	Assessment of fire integrity of large diameter power cables of safety systems – Fire, Water & Mechanical shock	30 min, 60 min or 120 min-flame, Impact of 20 secs at 10 minutes intervals, 5 mins before the end of the test, at least 5 bursts of water application of 5 secs at 60 secs intervals.
9	IS 17505 (Part-1)-2021 Category F	Resistance to fire alone test at 950 °C	180 minutes
10	IS 17505 (Part-1)-2021 Category W	Resistance to Fire with Water at 650 °C	15 min – flame At least 5 bursts of water of 5 s duration at 60 seconds intervals.
11	IS 17505 (Part-1)-2021 Category S	Flame and Shock application at 950 °C	15 min –flame Impact for 20 secs at 5 min intervals
12	IS 17505 (Part-1)-2021 Category F-30 F-60 F-120	Flame, Shock, and water jet application at 830 °C	30 mins, 60 mins, 120 mins – flame, the impact of 20 secs at 5 min intervals. 5 mins before the end of the test, at least 5 bursts of water application of 5 secs at 60 secs intervals
13	BS EN 50200: 2015 Annex E 30 minutes	Flame, Shock, and water jet application at 830°C	30 mins-flame, Impact every 5 minutes throughout the test, water spray for the final 15 minutes of the test.
14	BS EN 50200: 2015 PH 30 PH 60 PH 120	Flame and mechanical shock	30 mins, 60 mins, 120 mins - Flame, Impact at 5 every mins interval

TESTING INSTRUMENTS

- ☐ Circuit continuity checking and voltage withstand arrangement
- ☐ Source of heat
- ☐ Shock producing device
- ☐ Circuit diagram
- ☐ Gas Flow Console
- ☐ Electric Load Operation Device
- ☐ Water Spray
- ☐ Water Jet
- ☐ Water Sprinkler



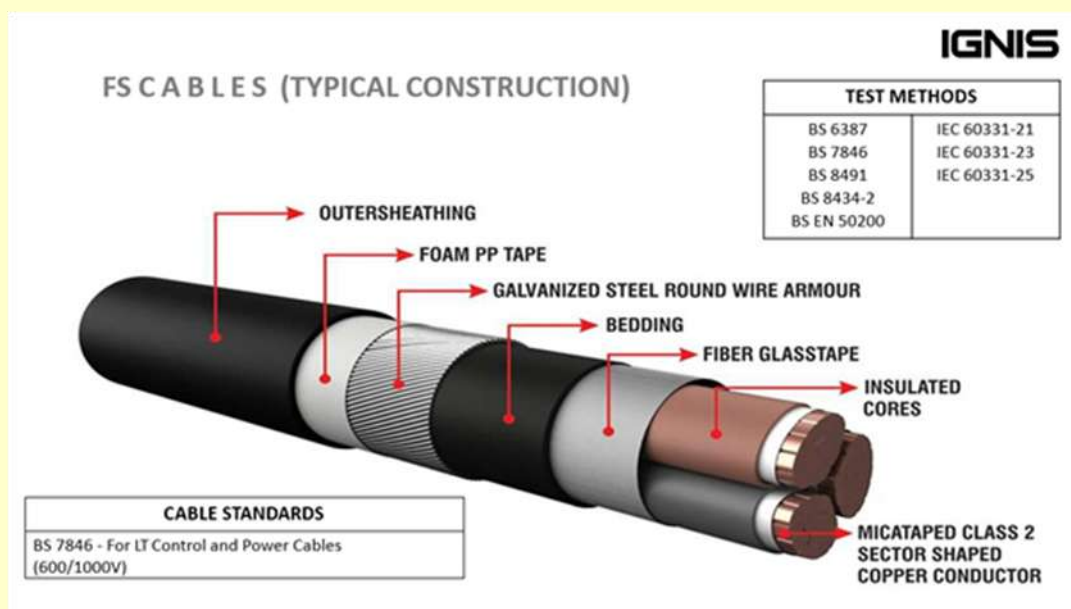
3. Construction of Fire-Survival Cables

In the case of Fire-Resistant cables, to maintain the circuit integrity and to avoid conductor to conductor short circuits, the conductors of the cable should be protected by high-temperature insulation. The mainly used high temperature insulations are Mica/glass tape, XLPE & silicon insulations etc.

3.1 Mica/Glass Tape insulation

In this type of construction of the Fire-Resistant cables, the conductor is of either stranded/flexible Annealed copper conductor, followed by Glass Mica Tape as fire resisting barrier, followed by XLPE/EPR/EVA as primary insulation Material, and Flame Retardant LSZH, HFFR as sheathing material.

Figure 1 shows the Fire-Resistant cables with mica/glass tape construction

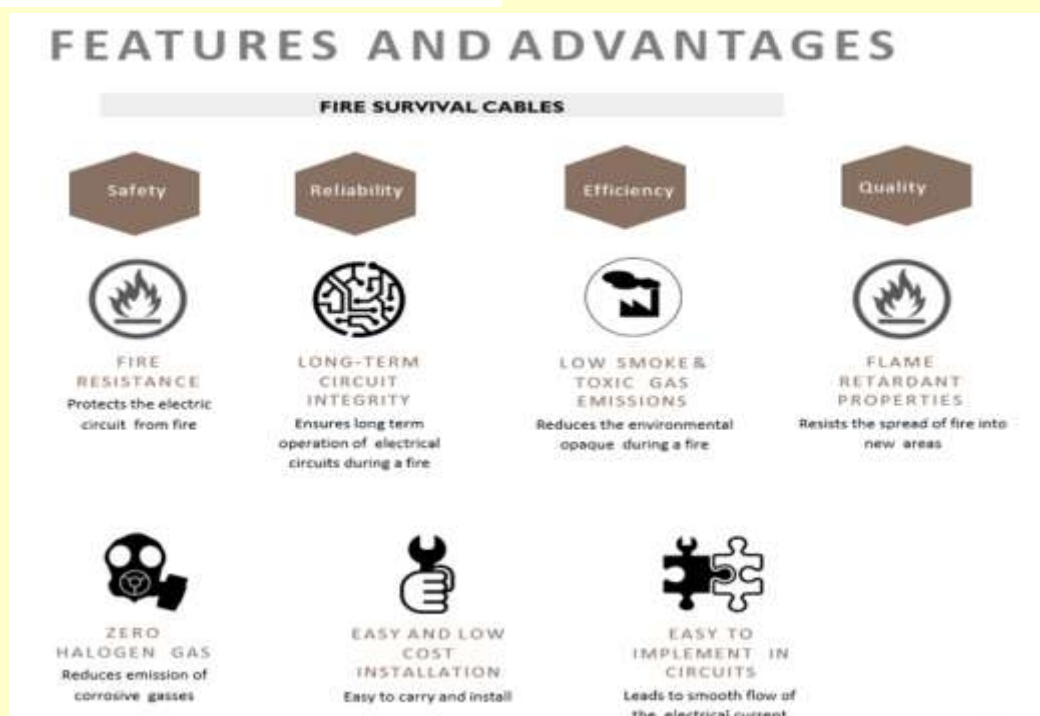


4. Fire Hazards of Cables during the Fire

When fire safety is considered, the first and foremost point is to classify the hazards involved during the fire of cables. Most of the fire deaths are caused by the inhalation of toxic smoke and gases, rise in temperature, and depletion of oxygen concentration. The emission of toxic gases is reduced by Using halogen-free materials and the impact of the fire is reduced by using the flame-retardant Property of the halogen-free materials. In general, if the fire spread in the cables is controlled the hazards of the fire in cables can also be reduced to a greater extent. Apart from flame retardancy and smoke release, one of the fire hazards is heat or temperature

release from the cables during a fire. Heat release is directly proportional to the oxygen consumed by the burning cable. Hence certain materials release more heat thereby consuming more oxygen available in the atmosphere which in turn creates an increase in the temperature and depletion of oxygen concentration in the environment. If the cable jacketing or sheathing material releases more heat which is also dangerous to humans causing fatality. Heat release of any material is nothing but the energy or fuel content available in the material. In general materials such as polyethylene, polypropylene, and ethylene-propylene rubber have higher fuel content in them

even though the smoke release of these materials is very less. When cables are installed inside the theaters, high-rise buildings, underground installations,



6. Conclusion

From the heat release parameters of FS cables, it is evident that the heat release of individual material in the construction of the FS cable plays an important role in determining the overall heat release of the entire FS cables. Materials that are used in the construction of FS cables to maintain the circuit integrity should not pose another threat of heat release when the FS cables are under fire. During the design of the FS cables along with the properties of fire resistance, flame retardancy, and low smoke emission, heat release from the FS cables also needs importance

About the Author



Er. Bharat Sehgal, BE (EE), MBA (Mktg)
Associate Vice President,
Head of Department
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Polycab India Ltd.

27+years presence in Cable Industry with wider experiences in Technical, Design, Engineering, Quality Systems, New product development.

Instrumental in designing & execution of Low, Medium and Extra High Voltage cable systems up to 220/400 kV, experienced in development & prequalification of cable systems up to 500kV.

Existing member of technical committees for development of standards on cables i.e. Bureau of Indian Standards (ETD9), International Electrotechnical Commission (IEC TC20) & IEEMA.

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MECHANICAL TRANSFORMERS

Application of force causes displacement.
Multiplication of Force and Displacement is Energy Delivered OR Work Done
Time Rate of Energy Delivered OR Work Done is Power.

Electric Force (Electro Motive Force) causes the flow of electrons in the circuit.
Electric force is Voltage “V” and rate of electron flow is current “I”
Hence power is product of electrical force “V” and rate of flow “I” (or component along the force “V”)

Known about Electrical Transformers

1. Transformers are member of electrical power Transmission and Distribution system.
2. Transformers are used to change Voltage (Force) as per application.
3. Voltage changes as per turn ratio.
4. Input Power = Output Power (Neglecting losses)
5. $\text{Voltage}_{\text{primary}} \times \text{Current}_{\text{primary}} = \text{Voltage}_{\text{secondary}} \times \text{Current}_{\text{secondary}}$
6. Step-up transformer is used to increase voltage and reduce current for long distance power transmission with reduced losses and voltage drop.
7. Step-down transformer is used to reduce voltage and increase current for different applications such as welding work at high current but safe operating voltage.
8. Transformers have tap-changer to vary transformation ratio.
9. Transformers may be Generator Transformer, Inter Bus Transformer, Power Transformer, Distribution Transformer, Current Transformer Potential Transformer, etc.
10. Transformers may be single winding (auto), double winding (primary & secondary) or triple winding (primary, secondary & tertiary)

Similar Devices are Mechanical Transformers

1. These devices are members of mechanical power transmission system.
2. Devices are used to change Force as per application
3. Force changes as per gear ratio
4. Input Power = Output Power (Neglecting losses)
5. $\text{Force}_{\text{input}} \times \text{Speed}_{\text{input}} = \text{Force}_{\text{output}} \times \text{Speed}_{\text{output}}$
6. Reduction gear is used to increase force with reduced speed as in Hoist to lift heavy load with less effort.
7. Multiplier gear is used to increase speed with reduced force as in Bicycle for fast movement with extra force.
8. Step Gear is used to change force/speed as in automobiles.
9. Devices may have simple levers, fix & moving pulleys sets, Small-big pulley belt drives, Unequal teethed wheels, worm pinion set etc.
10. Gear may be single stage or multiple stages as required

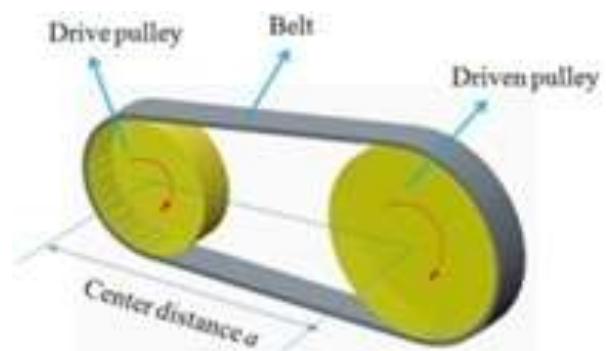
Mechtrans Specimens



Spur Set



Worm Gear



Belt Drive



Er. ND Makwana
former **Secretary**,
SPE(I) Vadodara

ER. PP WAHI APPRECIATES SPE(I) VADODARA



Dear Friends,

SPE.. Society of Power Engineers

Vadodara has been nearest to my heart as I was closely associated with its activities as Director CBIP, New Delhi.

It is working under the aegis of CBIP since years together.

Its role in Gujarat is to spread knowledge amongst Power Engineers, help each other and ensure excellent development of Power Sector especially in Gujarat.

What I have to appreciate is that SPE is a unique organization in our country and its members are having tremendous zeal and are immense dedication working together as a well-knit team to take Power Sector in Gujarat to greater heights.

They have many firsts to the credit like creating independent agricultural feeders in Gujarat, creating Smart Grids, Digital Stations and many other innovations even patents on Distribution Transformers.

They organize such Conferences every month invariably get together and disseminate knowledge amongst each other on some topic or other.

Moral, we have to learn a lot from them in various aspects and above all emulate their unique example. I understand that the Chapter has acquired a larger premises in Vadodara and has moved to it recently.

Many Congratulations and Best Wishes to all of them.

Regards,

Er. PP Wahi
former Director(Energy)
CBIP, New Delhi

OBITUARY



Er. Vinod G Dave, Retd. Chief Engineer (P&P), GEB and **Life Member** of SPE(I) Vadodara left for his heavenly abode on **17 Oct 2024** in USA.

Despite moving to USA, he was active in the WhatsApp Group of SPE(I) Vadodara

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

RMEMBERING Dr. BG DESAI



Er. (Dr.) Bipinbhai G Desai, Consultant and **Hon. Life Fellow** of SPE(I) Vadodara left for his heavenly abode on **08 Nov 2024**.

He was a veteran **Energy Conservation** leader in India and specifically in Gujarat. He was a great engineer and had immeasurable eagerness to learn new things pertaining to the power sector. He had pioneered awareness of Energy Conservation and campaigned for it not only in Gujarat but entire nation. He published leaflets, case studies, reports etc. advocating the urgent need to save Energy. Over a Million units are estimated to be saved by his simple tips to save energy by large numbers of

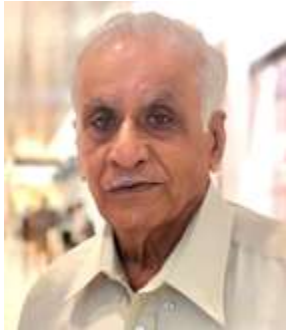
consumers. He was synonyms for Energy conservation. The society owes a lot to his untiring efforts. He was simple, humble and great personality. He was a doyen of Energy conservation. He was omnipresent during events organised by SPE(I) Vadodara.

In the passing away of **Dr. BG Desai**, the Chapter has lost a Well-Wisher of SPE(I) Vadodara. On my personal account. I have lost a very good mentor and also a guide. He used to enquire about my company's progress every time we met. He visited my office many times and spent many hours with me. He donated many books & IEEE volumes for the benefit of my employees and also for the students who come to my office for projects, internship and Ph.D. persuasion (which is like a CSR for me). Last time may be in Jun 2024, he phoned me to collect books and journals from his home. I offered him to send a vehicle for his to & fro travel to my office (which was very usual for me) but he said he will visit latter but insisted to pick up the material from his home. I sent my personnel to his home. There after I met him last in Vadodara Innovation Council in Subhanpura where he was honored for his contribution to the Energy Management Sector.

He attended almost every event organised by SPE(I) Vadodara. I remember that he even travelled with our team (of SPE) in at many places Gujarat for 1-Day/2-Day Conferences.

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

Er. SM Takalkar, Patron



Er. Jyotindra R Shah, Retd. Addl. Chief Engineer (LD), State Load Despatch Centre, GETCO, Jambuva and **Life Fellow** of SPE(I) Vadodara **Chapter** left for his heavenly abode on **06 Jan 2025**.

Er. Shah did his under graduation in Electrical Engineering from BVM, VV Nagar and Post-Graduation in Electrical Power System from FT&E, MSU, Vadodara. He was absorbed as Deputy Engineer directly in erstwhile GEB. He was instrumental during initial computerization of LDC undertaken by BBC-Mumbai. He was deputed for training at BBC-Baden, Switzerland. On superannuation he retired as Addl. CE(LD).

A soft spoken and mixing nature person, he was friendly to all. He was present in most of the monthly lectures and also other events organized 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