SPE Newsletter

SPE(I), Vadodara Chapter
April 2026 Issue: 2/2026

Holi is all about colours, memories, and purity.
Paint your dreams with bright colours, and
Make this year amazing. Happy Holi to everyone!

JOIN NEXT EVENT - 2-DAY CONFERENCE ON

"DESIGN, ENGINEERING, ERECTION, TESTING, COMMISSIONING, OPERATION & MAINTENANCE OF THERMAL POWER PLANT"

AT FEDERATION OF GUJARAT INDUSTRIES (FGI),
GOTRI - SEVASI ROAD, GOTRI, VADODARA, GUJARAT.

21 & 22 MAY 2026

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

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CHAIRMAN'S DESK

Dear Members,

Good Day to all of you!

The financial year 2025-26 is coming to an end shortly in about 2 weeks.

Although India did very well last year in spite of multiple problems faced by the government, the current situation all over the word is not conducive to growth. Already we are facing shortages of LPG cylinders and many other essential commodities. Both Imports & Exports are seriously affected. Middle East war is going to affect business world over. Rupee value is going down; inflation is building up.

This year is going to be tough and we can only hope that things will improve soon.

Coming back to SPE(I), I am very happy to inform you that SPE(I) Vadodara Chapter organized **3-Day Non-residential Tutorial and a Conference** on **"Power Transmission Lines"** from **05 to 07 Nov 2025** (Wednesday to Friday) at FGI Auditorium, Sevasi Road, Gotri, Vadodara.

The 3-Day Conference was a thumping success, although, unfortunately, I could not attend the same, since I was in the USA.

Thanks to the painstaking efforts of all the committee members, patron members like Er. Prafull Rana, Er. SM Takalkar and many other sponsors, advertisers and well-wishers the conference proved a grand success.

I take this opportunity to thank all those who contributed their might in the success of the conference.

The SPE made a record surplus which was used to repay all loan amount of members who extended their helping hand for the purchase of new office at Manjalpur. It also helped to build some additional corpus.

Our master plan is to have FDs worth 60-70 Lakh, may be even a Crore, if everything goes our way, to make us self-sufficient. As a part of this plan, we have arranged a **2-Day Conference** on **"Design, Engineering, Erection, Testing, Commissioning, Operation and Maintenance of Thermal Power Plant"** in May-2026 at FGI, Gotri, Vadodara. I am sure that even this conference will be a grand success.

I request all members of SPE to contribute by way of donations, participating in the conference, delivering expert lectures or by helping SPE to add more members.

The New Year for people from Maharashtra, the GUDI PADWA, Karnataka The UGADI, or the CHETI CHAND for the Sindhis is on the 19th March 2026.

I wish a Happy New Year to all concerned. May the New Year bring you happiness, peace, prosperity and good health to all.

Er. MR Tilwalli

EDITORIAL

Dear Readers,

As per the projections of power ministry, the electricity consumption, this summer is expected to see phenomenal growth with demand expected to grow at 5.58 % driven majorly by industrial growth, urbanization and new developing Data Centres. As per the projection in the recently concluded Bharat Electricity Summit-2026, installed capacity is expected to be around 1121GW by 2035-36. The non-fossil fuel-based capacity will touch 786 GW *i.e.* around 70% of total energy mix and out of this solar alone will have stack of 509GW followed by wind at 155GW and hydro at 77GW. A key feature of future power system will be the large-scale deployment of Battery Energy Storage system (BESS) to address evening demand as well as to manage intermittent nature of RE power. Considering requirement of BESS, Govt. has already issued necessary guidelines and decided to provide viability gap funding (VGF) support to 15 states and NTPC for total deployment of 30 GW energy storage system. Out of these 15 states, majority of the states are on the verge of finalization of bid according to the capacity allocated to the respective states.

In the end of last December, Gujarat Govt announced Gujarat Integrated Renewable Policy-2025 which primarily focuses on three things, First Rooftop wind turbines under net metering arrangement in line with Solar rooftop. Second, hybridization of existing rooftop solar or wind and new rooftop wind-solar hybrid projects and third one Battery Energy Storage (BESS) is allowed for existing and new RE projects. The integrated policy is also applicable to installation and operation of BESS for Residential as well as C&I sector.

Last year, we have shifted to our new office at Manjalpur. It is need of the time for Chapter like ours to adopt technological advancement to cope with the ongoing activities, the SPE(I) Vadodara has upgraded its office premises at Manjalpur with new high end desktop computer system, wi-fi connectivity and air cooler for office room. The meeting room is also equipped with 55" LED TV screen and an air conditioner.

In a present-day scenario when we talk about non-fossil fuel-based energy, the significance of fossil fuel-based generation cannot be ignored. Thermal Generation is projected to continue as backbone of Indian Power Sector and will maintain its dominance in energy mix because of its round the clock availability as against intermittent availability of RE based Generation. Keeping this aspect in mind, SPE(I)Vadodara Chapter jointly with Gujarat State Electricity Corporation Limited have organised **2-Day Conference** on **"Design, Engineering, Erection, Testing Commissioning, Operation & Maintenance of Thermal Power Plant"** on **21st & 22nd May 2026** @ FGI, Vadodara. The conference will highlight our capabilities in thermal generation sector and addressing key challenges and emerging opportunities across the Generation sector.

The conference will convene a diverse spectrum of stakeholders including industry leaders, Students, Academicians, Practicing Engineers and Individuals from India. The conference is expected to feature more than 20 interactive sessions covering the entire thermal generation sector. The conference will serve as dynamic platform for knowledge exchange, collaboration and business engagement.

Members should not miss this opportunity and should participate in the conference to update knowledge in Thermal Power Generation and allied Engineering as well as supporting activities of betterment in the Power Sector and Industries**.**

Wishing all members and their families, a summer filled with laughter and unforgettable moments.

Er. Umesh Parikh

CHAPTER'S ACTIVITIES

- On **24 Jan 2026,** the **Chapter** jointly with the **IE(I)** Vadodara and in association with **Poornawad Institute of Life Engineering (PILE)** and **Poornawad Life Foundation** organised a lecture cum award ceremony as a part of the **"12th Dr. RP Parnerkar Poornawad Award for Excellence in Engineering & Technology 2025"** at Vasvik Auditorium.

This time the award was conferred on **Er. Gautam Talati** for the recognition of his distinguished and enduring contributions to the field of **Civil**, **Structural** and **Industrial Engineering** and for his lifelong commitment to the professional excellence, integrity and Nation's industrial and infrastructure development.

During the event **Er. YV Joshi,** Vice-Chairman, **SPE(I)-Vadodara** was awarded title **"POORNAVAD ACHARYA"** for his translation of English book **"INTUITION"** by **Dr. Vishnu R Parnerkar** in to Gujarati.

The awardee, **Er. Talati** emphasized that apart from use of software, one should go through basics. For a professional career the courage and learning mindset is most important. **Dr. Laxmikant** said that **PP Dr. Ramchandra Maharaj** has developed the philosophy of **"Poornawad"** to connect the hard work and success in human life. Worship (Upasana) is a way to live a successful and contended life.

Er. YV Joshi presented **Vote of Thanks.**

The event was anchored by **Mr. Santosh Khare.**

Unveiling of English book **INTUITION** translated in **Gujarati.**
It is translated by **Er. YV Joshi (**extreme right**)**

- On **07 March 2026,** the **Chapter** jointly with the **IE(I)** Vadodara organised a lecture on **"Smart Engineering for Sustainable Future through Innovation and Digitalization",** to commemorate **World Engineering Day,** at Vasvik Auditorium. Key Note Speaker **Dr. Vijay Shah**, Global Expert on R&D, ABB India Ltd. delivered talk on the subject.

  In his presentation, he covered the following.

  - Climate change concern
  - Effect of human activities affecting the earth
  - Defining Sustainable Development
  - Difference between Discovery invention and innovation
  - Difference between Digitization and Digitalization
  - Global goals for Sustainable development.
  - What is linear and circular economy

  The lecture which was organized as a part of celebration of **World Engineering Day** was well received which was evident from the question & answer followed the presentation

Er. VB Harani

Gujarat Regulators have issued Tariff order for FY 2026-27. Changes in Rates for GUVNL DISCOMs are effective from 01 Apr 2026.

- No change in Retail Supply Tariff. Energy charges for all categories are stable since 2016-17.
- To incentivize consumers for installation of Smart Meter, Regulators have increased rebate to 3% from present 2% on energy charge for consumer having installed pre-paid Smart Meter.
- To Incentivize shifting of electricity consumption by consumers during day time, Regulators have expanded Period of Time of Use (TOU)-Rebate to 11:00Hrs to 17::00 Hrs from earlier 11:00Hrs to 15:00 Hrs for RGP-NRGP-GLP-LTMD, EVCS, HTP-I, HTP-II and HT-EVCS categories of consumers.
- TOU-Rebate is also applicable to postpaid smart meter.
- Green Energy premium is reduced to Rs 0.75/unit from Rs 0.90/unit.

Open Access Charges:

- Cross Subsidy surcharge is increased to Rs 1.33/unit from Rs 1.29/unit.
- Wheeling Loss (for 11/22/33kV) is reduced to 6.50 % from 7.25%.
- Wheeling charge (at 11/22/33kV) is marginally increased to 23.52Ps/unit from 20.53 Ps/unit.
- In a separate order, Regulators has reduced Additional surcharge to Rs 0.76/unit from Rs.1.00/unit for Open Access Transactions for H-1 of FY 26.

Er. Umesh Parikh

USE OF STONE COLUMN FOUNDATION FOR TRANSMISSION LINE TOWERS

Kajal Patel and Bipin Shah
Jyoti Structures Ltd., Ahmedabad, Gujarat

ABSTARCT

Stone columns are a widely used ground improvement technique suitable for strengthening weak, compressible soils that can't adequately support shallow foundations on their own. For the support of transmission structures, use of stone columns is increasing day by day. Stone columns are used for the improvement of settlement and bearing capacity of soft soils in reasonable fare and friendly towards the environment. In present paper, soft/ liquifiable soils for which stone columns can be used effectively is reviewed. Further, this paper deals with stone column installation procedure and its field tests for its validation.

1. INTRODUCTION

Ground improvement techniques are the techniques used to improve and alter poor ground conditions in order construction can meet project performance requirements in an economical way. The high cost of conventional foundations coupled with environmental concerns has made development of week soil deposits a necessity. Out of various techniques stone columns is trending technique for improving the weak strata. Based on past experiences the stone column design is still empirical and always needs field trials before execution. Stone columns are significant in soil stabilization and are ideally welcome for improvement of soft clays, silts and loose silty sands. They provide a cost-effective method for ground improvement. As India is a developing country, it requires more land for infrastructure development. For construction the availability of land is depleting, hence it is necessary to develop soil of low shearing strength, bearing capacity and high compressibility. Stone columns work more effectively in large area of stabilization of soil mass. On the load application column rapidly drains the excessive pore water pressure originated. Stone columns behave as rigid element to carry higher shear stresses to reduce settlement and improving the deformability and strength properties of soft soil. Stone column techniques are proved successful in improvement of stability of slopes, increasing the bearing capacity, reducing the differential and total settlements, reducing liquefaction property of sands and increasing the settlement time. This method was initiated in France in 1830's and is widely used especially in Europe since 1950's.

A stone column foundation refers to a ground improvement technique used to enhance the load-bearing capacity of weak or soft soils (like clay or loose silt) by installing vertical columns made of crushed stone or gravel and compacted by a shaker.

2. LOCATION

Stone column foundation was used by Jyoti Structures Ltd. recently for Creek Area in 765kV Khavda-Bhuj Transmission Line.

3. TYPES OF SOILS

Stone columns are most commonly and effectively used in the following soil types:

Cohesive Soils (Fines)

Stone columns are very effective in treating soft, cohesive soils. In these soils, the stone columns function as both reinforcement and vertical drains, accelerating the consolidation process and increasing shear strength.

- **Soft Clays**: Including marine clay deposits, soft silty clays, and expansive soils like black cotton soil.
- **Silts**: Especially soft and loose silts.

Cohesionless Soils (Granular)

Stone columns can also be used to densify loose granular soils, particularly to mitigate the risk of liquefaction.

- **Loose Sands and Silty Sands**: The vibration during installation helps to compact the surrounding soil, increasing its density and stiffness, which reduces the

potential for liquefaction during an earthquake.

Soil Strength Considerations

The technique is generally suited for soils with a low undrained shear strength but with some limitations at the extremes:

- **Suitable Range:** Subsurface soils whose undrained shear strength typically ranges from **10kPa to 50kPa** are prime candidates for stone column treatment.
- **Soils Not Suited:** Stone columns are generally **not recommended** for:
  - **Very Sensitive Clays and Silts** (sensitivity ratio greater than 2.4), as the vibration from installation can cause a significant loss of strength.
  - **Very Soft Clays** (undrained shear strength less than 10kPa) due to inadequate lateral confinement and failure by bulging.
  - **Very Stiff Soils** (undrained shear strength greater than 50kPa), as the improvement is often not necessary or the high lateral stiffness makes installation difficult.

4. LIQUEFACTION CRITERIA FOR SOIL

In terms of the soil types most susceptible to liquefaction, Ishihara (1985) states: "The hazard associated with soil liquefaction during earthquakes has been known to be encountered in deposits consisting of fine to medium sand and sands containing low-plasticity fines. Occasionally, however, cases are reported where liquefaction apparently occurred in gravelly soils." Thus, the soil types susceptible to liquefaction are non-plastic (cohesionless) soils. An approximate listing of cohesionless soils from least to most resistant to liquefaction is clean sands, non-plastic silty sands, non-plastic silt, and gravels. There could be numerous exceptions to this sequence. For example, Ishihara (1985, 1993) describes the case of tailings derived from the mining industry that were essentially composed of ground-up rocks and were classified as rock flour. Ishihara (1985, 1993) states that the rock flour in a water-saturated state did not possess significant cohesion and behaved as if it were a clean sand. These tailings were shown to exhibit as low a resistance to liquefaction as clean sand. Seed et al. (1983) stated that based on both laboratory testing and field performance, the great majority of cohesive soils will not liquefy during earthquakes. Using criteria originally stated by Seed and Idriss (1982) and subsequently confirmed by Youd and Gilstrap (1999), in order for a cohesive soil to liquefy, it must meet all the following three criteria:

- The soil must have less than 15% of the particles, based on dry weight, that are finer than 0.005mm (i.e. percent finer at 0.005 mm <15%).
- The soil must have a liquid limit (LL) that is less than 35 (i.e. LL < 35).
- The water content w of the soil must be greater than 0.9 of the liquid limit [i.e. w> 0.9 (LL)].

If the cohesive soil does not meet all three criteria, then it is generally considered to be not susceptible to liquefaction. Although the cohesive soil may not liquefy, there could still be a significant undrained shear strength loss due to the seismic shaking.

COMPONENTS

- Crushed stone (typically 20–40mm in size)
- Compaction equipment (vibratory probes or mandrels)

ADVANTAGES

- Faster and more economical than deep foundations
- Environmentally friendly (uses natural materials)
- Minimal excavation and spoil generation
- Effective in improving soft soils

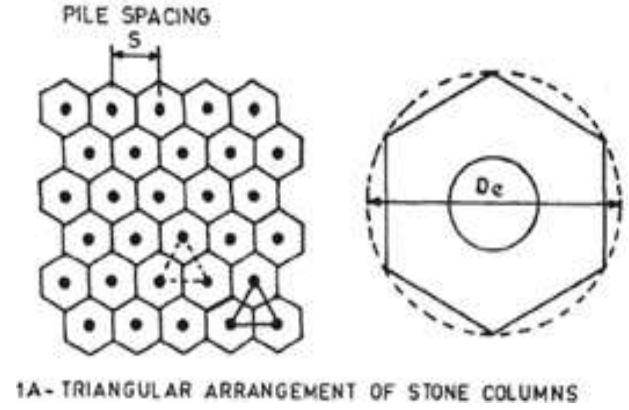
5. STONE COLUMN INSTALLATION TECHNIQUE

The construction of stone columns involves creation of a hole in the ground which is latter filled with granular material. The granular fill

consisting of stone or stone sand mixture of suitable proportion, is compacted by suitable means to create a compacted column of required strength. The recommended installation technique of Vibro-replacement method was recommended as ground is silty sand in nature and detailed description is given in Annex-C (C-3) of IS-15284 (Part-1) – 2013.

A granular Blanket layer of 500mm thickness is laid over the top of the stone columns which consist of clean medium to coarse sand compacted in 2 to 3 layers to a relative density of 70 to 80 %. After ensuring complete removal of slush deposited during boring operations, a minimum depth of 500mm below the granular blanket should be compacted by suitable means such as rolling/tamping to the specified densification criteria.

Stone columns should be installed preferably in an equilateral triangular pattern which gives the densest packing although a square pattern may also be used. A typical layout in an equilateral triangular pattern is shown in figure below:



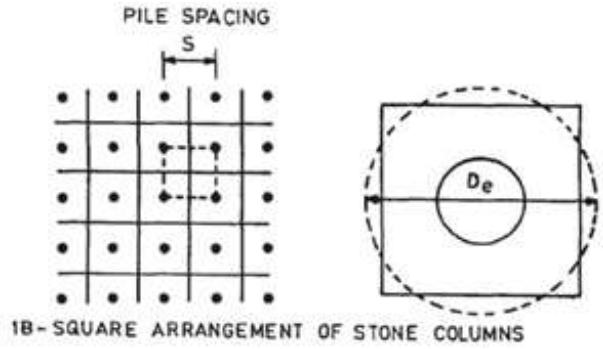


Fig.1 Various Patterns of Stone columns

The general practice is to provide stone columns up to a compact stratum with N value of Standard Penetration test around 15. However, if compact stratum is not available at greater depth, and strength of subsoil is found to increase gradually with depth, stone columns can be terminated at critical length.

6. DESIGN OF C/C SPACING OF STONE COLUMN USING IS-15284 (PART-1) - 2013:

Load Capacity of treated ground using stone columns may be obtained by summing up the contribution of each of the following components as:

a) Capacity of the stone column resulting from the resistance offered by surrounding soil against its lateral deformation/bulging under axial load,
b) Capacity of stone column resulting from increase in resistance offered by the surrounding soil due to surcharge over it, and
c) Bearing support provided by the intervening soil between the columns.

1.1 Capacity based on Bulging of columns:

Limiting axial stress is given by following:

$\sigma v = \sigma rL\ Kpcol$

$\sigma v = (\sigma ro + 4\sigma ro)pcol$

where, σv = Limiting axial stress in column when it approaches shear failure due to bulging

σrL = limiting radial stress

σro = initial effective radial stress
= Ko. σvo
Ko = average co-efficient of lateral earth pressure for clays equal to 0.6 or alternately determined from the relationship as
Ko = 1 – sinØ, where Ø is effective angle of internal friction of soil
σvo = average initial effective vertical stress considering an average bulge depth as 2 times diameter of column

$Kpcol = \tan^2(45 + \emptyset/2)$

Yield load = $\sigma v.\ \pi/4\ D^2$
Safe load on column alone $Q_1 = (\sigma v.\ \pi/4\ D^2)/2$ where, 2 is the factor of safety.

1.2 Capacity based on Surcharge Effect:

The increase in capacity of the column due to surcharge may be computed in terms of increase in mean radial stress of the soil as follows:

$\Delta\sigma ro = qsaf(1 + 2Ko)/3$

where $\Delta\sigma_{ro}$ is the increase in mean radial stress due to surcharge, and qsafe is the safe bearing pressure of soil with the factor of safety of 2.50
$qsafe = CuNc/2.5$

Increase in ultimate cavity expansion stress = $\Delta\sigma_{ro}$. Fq'

where, Fq = vesic's dimension less cylindrical cavity expansion factor Fq' = 1 for ∅ = 0

Increase in yield stress of column = $\Delta\sigma ro\ Kpcol$
Increase in safe load of column $Q2 = (Kpcol\ \Delta\sigma ro\ As)/2$, where, 2 is the factor of safety.

1.3 Bearing support provided by the Intervening Soil:

This component consists of the intrinsic capacity of soil to support a vertical load which may be computed as follows:

Effective area of stone column including the intervening soil for triangular pattern
= 0.866
S^2 Effective area of stone column including the intervening soil for square pattern
= 1.0 S^2

Area of intervening soil for each column for triangular pattern
$Ag = 0.866\ S^2 - \pi D^2/4$

Safe Load taken by the intervening soil,
$Q_3 = qsafe\ Ag$

Overall Safe load on each column and its tributary soil = $Q_1 + Q_2 + Q_3$

7) SETTLEMENT ANALYSIS BY HEINZ J. PRIEBE APPROACH:

This approach of settlement analysis is given by Heinz J. Priebe for the design of stone column for vibro-replacement method of installation.

2.1 Determination of Basic Improvement Factor

$$n_0 = 1 + \frac{A_C}{A}\cdot\left[\frac{1/2 + f(\mu_s, A_C/A)}{K_{aC}\cdot f(\mu_s, A_C/A)} - 1\right]$$

$$f(\mu_s, A_C/A) = \frac{(1-\mu_s)\cdot(1-A_C/A)}{1-2\mu_s + A_C/A}$$

$$K_{aC} = \tan^2(45° - \varphi_C/2)$$

where, Ac = c/s area of column
A = grid area
Kac = co-efficient of active earth pressure

$$n_0 = 1 + \frac{A_C}{A}\cdot\left[\frac{5 - A_C/A}{4\cdot K_{aC}\cdot(1 - A_C/A)} - 1\right]$$

2.2 Consideration of Over-burden pressure

$$\left(\frac{A_C}{A}\right)_1 = -\frac{4\cdot K_{aC}\cdot(n_0 - 2) + 5}{2\cdot(4\cdot K_{aC} - 1)} \pm \frac{1}{2}\cdot\sqrt{\left[\frac{4\cdot K_{aC}\cdot(n_0 - 2) + 5}{4\cdot K_{aC} - 1}\right]^2 + \frac{16\cdot K_{aC}\cdot(n_0 - 1}{4\cdot K_{aC} - 1}}$$

$$n_1 = 1 + \frac{\overline{A_c}}{A} \cdot \left[\frac{1/2 + f(\mu_s, \overline{A_c/A})}{K_{ac} \cdot f(\mu_s, \overline{A_c/A})} - 1 \right]$$

$$\frac{\overline{A_c}}{A} = \frac{1}{A/A_c + \Delta(A/A_c)}$$

$$f_d = \frac{1}{1 + \frac{K_{0c} - W_s/W_c}{K_{0c}} \cdot \frac{W_c}{p_c}}$$

$$p_c = \frac{p}{\frac{\overline{A_c}}{A} + \frac{1 - \overline{A_c/A}}{p_c/p_s}}$$

$$\frac{p_c}{p_s} = \frac{1/2 + f(\mu_s, \overline{A_c/A})}{K_{ac} \cdot f(\mu_s, \overline{A_c/A})}$$

$$W_c = \Sigma(\gamma_c \cdot \Delta d), \qquad W_s = \Sigma(\gamma_s \cdot \Delta d)$$

$$K_{ac} = 1 - \sin\varphi_c$$

where, fd = depth factor, Ps = external load on footing, kPa

γS = unit weight of soil, kN/M^3

γC = unit weight of granular material in column, kN/M^3

1.4 Shear values of improved ground

$$\tan\overline{\varphi} = m' \cdot \tan\varphi_c + (1 - m') \cdot \tan\varphi_s$$

$$m' = (n - 1)/n$$

$$c' = (1 - m') \cdot c_s$$

Total settlement of ground is calculated as:

$$s_\infty = p \cdot \frac{d}{D_s \cdot n_2}$$

8) FIELD LOADING TESTS

Irrespective of the method used to construct the stone columns, the initial load tests should be performed at a trial test site to evaluate the load settlement behavior of the soil-stone column system. The tests should be conducted on a single and also on group of minimum of three columns.

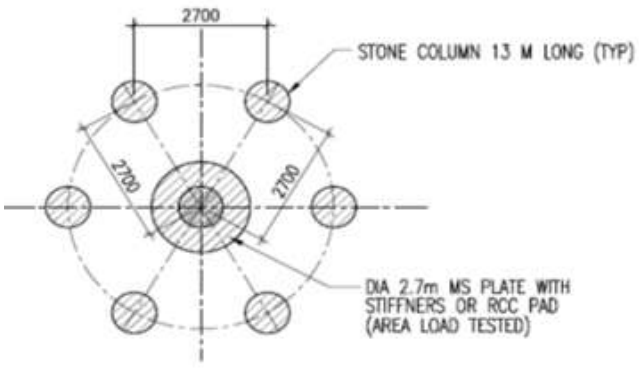
The initial and final soil conditions at the trial site should be investigated by drilling at least one borehole and one static cone test / pressure meter test/dynamic cone test prior and subsequent to the installation of columns as per Fig.- 2. All these tests Including the standard penetration test, field vanes hear tests and collection of undisturbed/disturbed samples and laboratory testing on the samples should be as per relevant Indian Standards. The load test site shall be closer to critical loading locations as far as possible. Blanket of stone / sand, minimum 500mm thick shall be spread over the test area before the commencement of the load tests. The blanket shall be compacted to a relative density of 80%. Rigid reinforcement concrete footing of required / appropriate size shall be either cast over the stone columns as per the specifications or may be cast away from the test site and transported to the test location so as to fix it properly over the sand blanket. Design and details of the footing shall

be furnished by the contractor for approval. The diameter of the reinforced concrete footing shall be equal to tributary area of single stone column area. The spacing of stone columns in the case of a single column test with the center of the concrete footing coinciding with the center of the stone column. In the case of a group column test the diameter of the concrete footing shall be equal to 3 times tributary area of single stone column area. The spacing of the columns with its center coinciding with the center of area of the three columns laid in a triangular pattern. If the area is waterlogged, the water level shall be maintained at the concrete footing base level throughout the tests by dewatering. However, care shall be taken to prevent drawing out of water by centering the blanket or the subsoil.

Following procedure should be followed for application of load: The load should be applied to the footing by a suitable kentledge (see Fig. 3), taking care to avoid impact, fluctuations or eccentricity. The kentledge should be minimum 1.30 times the maximum test load. Load settlement observations should be taken to 1.5 times the design load for a single column and three column group test respectively. The settlements should be recorded by four dial gauges (sensitivity less than or equal to 0.01mm) fixed at diametrically opposite ends of the footing. Each stage of loading should be near about1/5 of the design load and should be maintained till the rate of settlement is less than 0.05 mm/h at which instant the next stage of loading should be applied. The design as well as the maximum test load should be maintained for a minimum period of 12 hrs. after stabilization of settlement to the rate as given in the above clause. Load settlement and time settlement relationships should be plotted from the settlements observed for each increment of load at intervals of 1 min, 2 min, 4 min, 8 min, 16 min, ½H, 1H, 1½H, 2H, 3H, 4H, and so on till the desired rate of settlement has been achieved. The time intervals maybe suitably modified if so desired after getting prior approval from the EIC. The test load should be unloaded in five stages. At each stage enough time should be allowed for settlements to stabilize. The load test should be considered acceptable if it meets the following settlement criteria: ➢ 10 to 12 mm settlement at design load for a single column test, and ➢ 25 to 30 mm settlement at the design load for a three-column group test.

9) LOADING TESTS ON WORKING STONE COLUMN

In order to ascertain the quality of job columns, a few single column tests shall be performed on the working columns depending upon the discretion of the Engineer-in-charge. For routine load test few job columns maybe tested up to 1.1 times the design load intensity with minimum kentledge of 1.3 times the design load.



Typical layout of load test on a single column

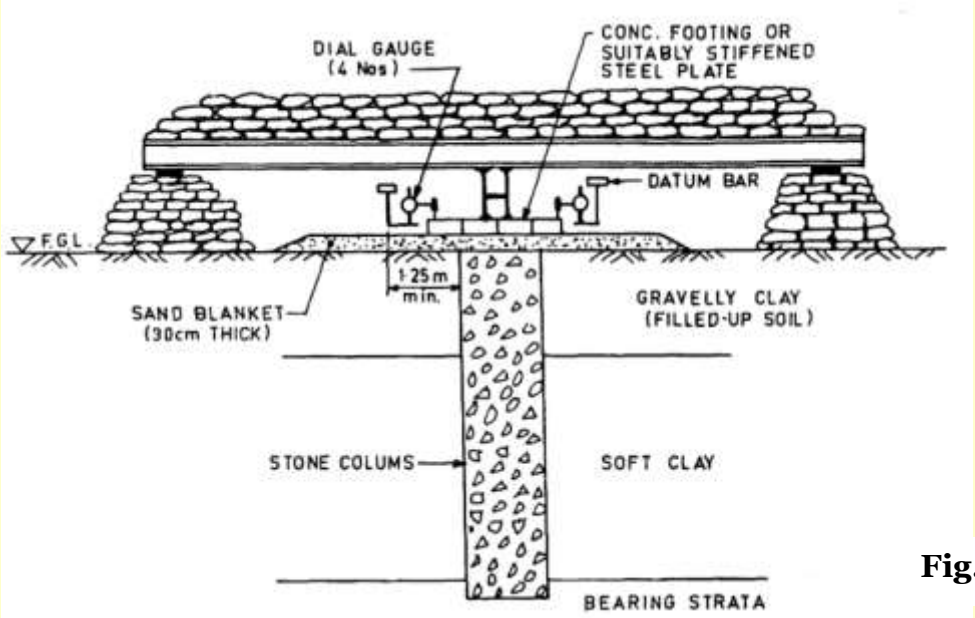
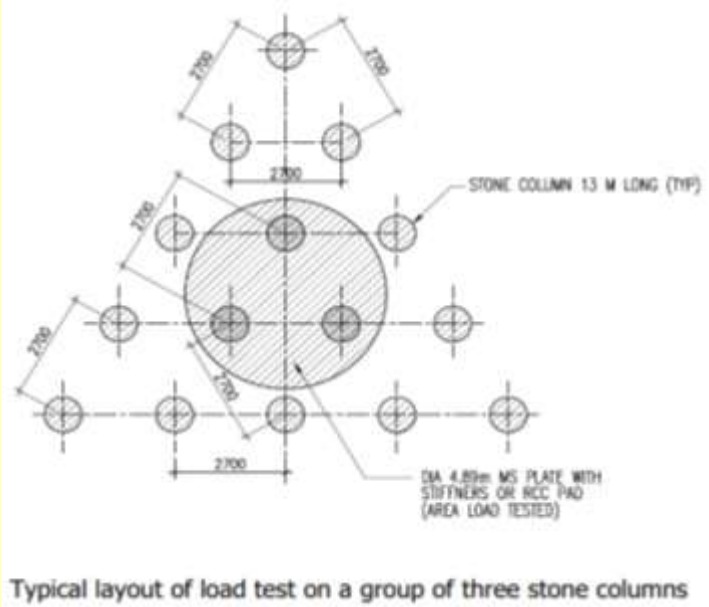


Fig.-2



Typical layout of load test on a group of three stone columns

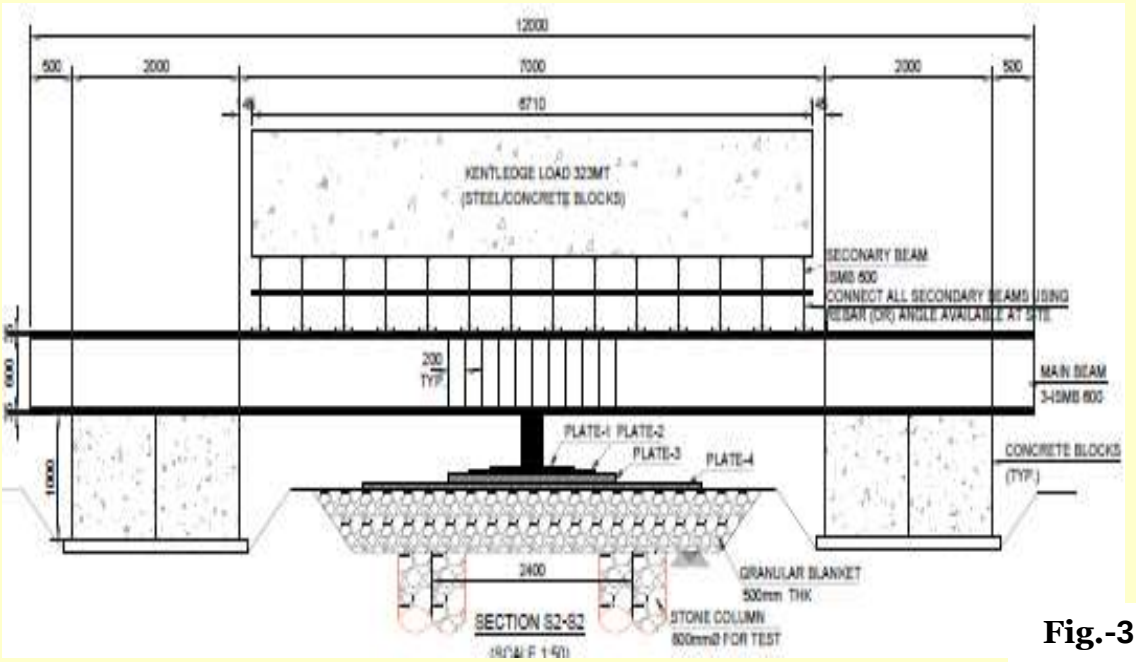
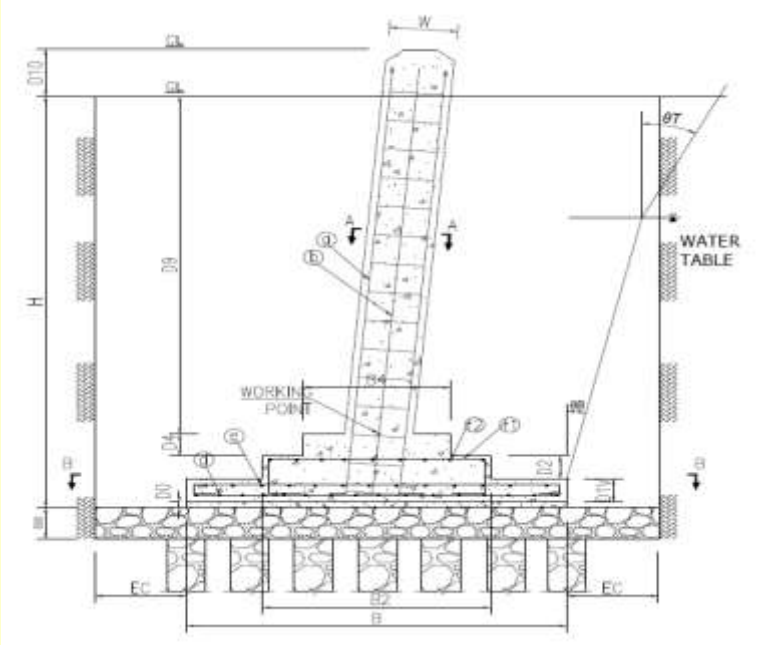
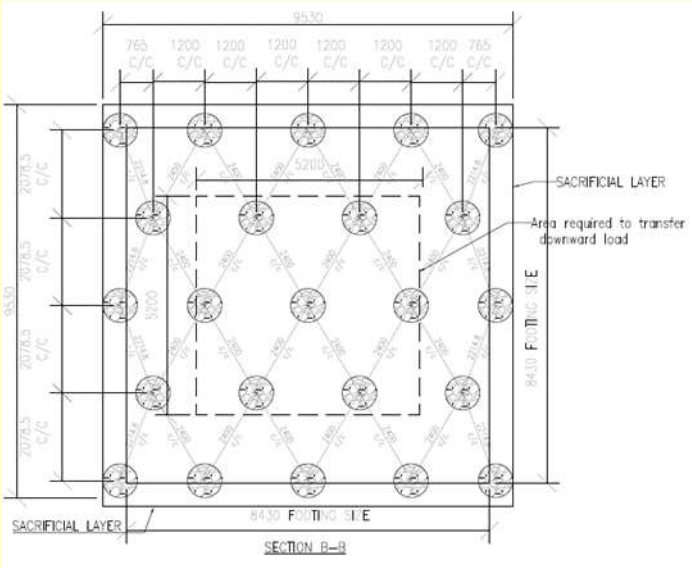
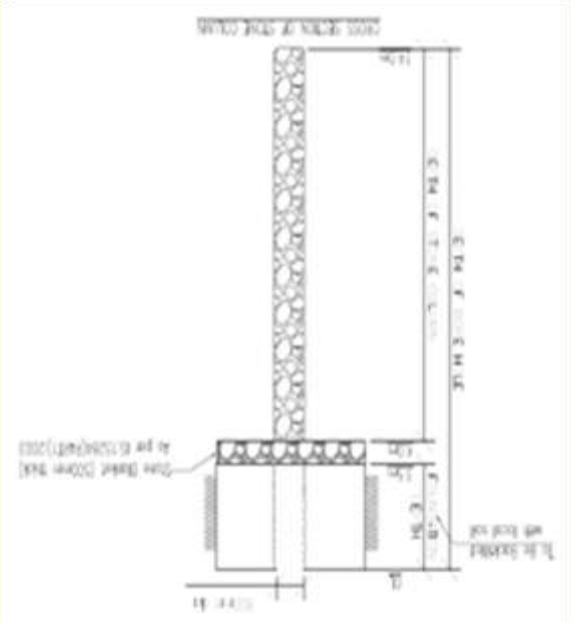


Fig.-3







Stone Column Foundation of 765kV D/C Khavda- Bhuj Transmission line

10) CONCLUSION

Stone columns provide an economical and effective alternative to traditional deep foundations (like driven piles or large drilled shafts) by creating a composite soil-stone mass with significantly improved geotechnical properties. After installation of stone columns, soil bearing capacity have increased from 3 to 5 T/M² to 12 to 15 T/ M². Also, foundation volumes have decreased considerably due to increase in bearing capacity of soil strata on which foundation rests. Stone columns are a preferred ground improvement solution for transmission line foundations where poor ground conditions (e.g., loose sands, soft clays) exist. The final decision requires a thorough geotechnical investigation and design that accounts for the specific tower loads (vertical, uplift, and lateral), soil profile, and seismic risks.

COVER PAGE STORY

Holi, the vibrant Hindu "Festival of Colours" celebrated in March 2026, commemorates the victory of good over evil through the legend of Prahlada and Holika. It honours devoted Prince Prahlada, who survived a burning fire meant to kill him, while his evil aunt Holika perished, symbolising the triumph of faith and righteousness.

Andhra Pradesh and Telangana: Holi is called as Kamuni Punnami/Kama Purnima or Jajiri in Telugu. Hindus celebrate Holi as it relates to the legend of Kamadeva. Holi is also known by different names: Kamavilas, Kamuni Panduga and Kama-Dahanam.

Bihar, Eastern Uttar Pradesh and Jharkhand: Holi is known as Phaguwa or Fagua in the Bhojpuri language.

Goa: Holi is locally called Ukkuli in Konkani. It is celebrated around the Konkani temple called Gosripuram temple.

Gujarat: In Gujarat, Holi is a two-day festival. On the evening of the first day, a bonfire is lit and raw coconut and corn is offered to the fire. The second day is the festival of colour or "Dhuleti", celebrated by sprinkling coloured water and applying powdered colours to each other.

Jammu and Kashmir: In Jammu and Kashmir, Holi celebrations are much in line with the general definition of Holi celebrations: a high-spirited festival to mark the beginning of the harvesting of the summer crop, with the throwing of coloured water and powder and singing and dancing.

Karnataka: Holi celebration depicted on stone relief 15th century, Karnataka Children playing holi, Karnataka. Traditionally, in rural Karnataka, children collect money and wood in the weeks prior to Holi, and on "Kamadahana" night, all the wood is put together and lit. The festival is celebrated for two days.

Maharashtra: In Konkan region of Maharashtra, Holi season is also celebrated as Shimga or shimgo, festivities that lasts for almost a month. Traditional Dance of Men during Holi festival are common.

Manipur: Manipuris celebrate Holi for 6 days.

Odisha: An 1822 drawing showing elevation of a black stone arch in Puri, Odisha. It carried Vaishnavite gods and goddess, the ritual noted to be a part of the Holi festival. The people of Odisha celebrate Dola or Pushpadola (Dola Jatra purnima) on the day of Holi where the icons of Jagannath replace the icons of Krishna and Radha.

Punjab: In Punjab, the eight days preceding Holi are known as luhatak.

Tripura: In Tripuri language spoken natively in Tripura, Holi is known as "Pali", which means colour. It is celebrated all over the state.

Uttarakhand: Kumaoni Holi in Uttara-khand includes a musical affair. It takes different forms such as the Baithki Holi, the Khari Holi and the Mahila Holi.

West Bengal: In West Bengal, the tradition of Dol Jatra (meaning Swing procession) or Dolotsava (meaning Swing Festival) or Dol Purnima - (Swing Full Moon) is common among Gaudiya Vaishnavs just like among Vaishnavs in Braj region and other Krishna centric sampradays all over India.

Western Uttar Pradesh: It is celebrated by colour drenched devotees in Radha Krishna Temple, Mathura, India. In the Braj region of North India, women have the option to playfully hit men who save themselves with shields; for the day, men are culturally expected to accept whatever women dish out to them. This ritual is called Lath Mar Holi.

Holi encourages us to:

- Value togetherness and let go of negativity.
- Forgive people and move past old misunderstandings.
- Embrace change, as spring transforms nature and herald's new life.
- Respect tradition while accepting new environmental friendly practices

Lesson Learning from Holi:

- **Triumph of Good Over Evil**: Based on the legend of Prahlad and Holika, the festival reaffirms that truth and righteousness always defeat evil.
- **Forgiveness and Letting Go**: Holi is a time to mend broken relationships, let go of past grudges, and start fresh with a clean slate.
- **Unity and Equality**: The festival breaks down social barriers of caste, age, and status, uniting people in laughter and play.
- **Celebrating Diversity and Nature**: Colours represent the vibrant, blooming nature of spring, teaching us to appreciate diversity and harmony.
- **Kindness and Sharing**: Sharing sweets, food and colours fosters kindness and compassion, reinforcing community bonds.
- **Safety and Respect**: Modern celebrations emphasize using natural, safe colours, showing respect for both people and the environment.
- Holi encourages a positive, joyous outlook on life, reminding us to celebrate life's moments with friends and family

MEMBERS IN NEWS

Er. YV Joshi, Vice-Chairman, **SPE(I)-Vadodara** was awarded title **"PORNAVAD ACHARYA",** for his translation of English book **"INTUITION"** by **Dr. Vishnu R Parnerkar** in to Gujarati, in the Award Ceremony was held on **24 Jan 2026**.

He has translated many other books of **Poornavad** in Gujarati.

Congratulations to **Er. YV Joshi**

Dr. Anil S Khopkar, Asst. Director and Head of Division R&D & Expert Services, ERDA, Vadodara, **Life Member** & **Advisory Committee** member of **SPE(I)-Vadodara** was awarded **Ph.D**. by Department of Electrical Engineering, Charotar University of Science and Technology (CHARUSAT), Changa, Dist: Anand for his research work on **"IMPROVED METHOD FOR CONDITION MONITORING OF METAL OXIDE SURGE ARRESTERS"** under the guidance of **Dr. Kartik S Pandya,** in Dec-2025

He, jointly with **Dr. Kartik S Pandya**, has following Journal & Conference Publications at his credit:

Journal Publications:

(i) Novel Approach for Condition Monitoring of Metal Oxide Surge Arresters based on Frequency Variation Technique
(ii) Novel Approach of Ageing Process for Metal Oxide Surge Arrester
(iii) Advance Technique for Online Condition Monitoring Surge Arresters
(iv) Online Condition Monitoring Technique for Metal Metal Oxide Surge Arresters based on Leakage Current Components.

Conference Publications:

(i) Comparative Analysis of various Condition Monitoring Technique for Metal Oxide Surge Arresters.
(ii) Technique for Online Condition Monitoring Surge Arresters.
(iii) Online Condition Monitoring Technique for Surge Arresters based on Leakage Current Components.

Congratulations to **Dr. Anil S Khopkar**

NEW LIFE MEMBERS

GR No.	Name	Grade	GR No.	Name	Grade
2478	Gambhirsinh V Jhala	LM(G)	2480	Vivek T Sharma	LM(G)
2479	Prasad V Pachegaokar	LM(G)	2481	Dr. Surendra Pal K Singh	LM(G)

OBITUARY

Er. Rameshchandra K Kothari, Retd. Executive Engineer, GETCO and **Life Member** of **SPE(I)** Vadodara left for his heavenly abode on **21 Jan 2026.**

He was a good transmission Engineer having expertise in Sub-station construction and maintenance.

He was a good Bridge player. A 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.