MARCH 2024

# VIEWPOINT

OFFICIAL QUARTERLY MAGAZINE OF CEAI

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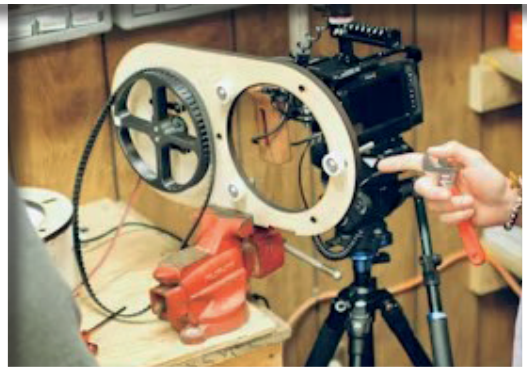
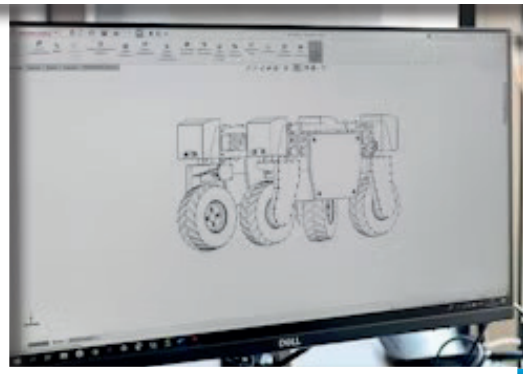
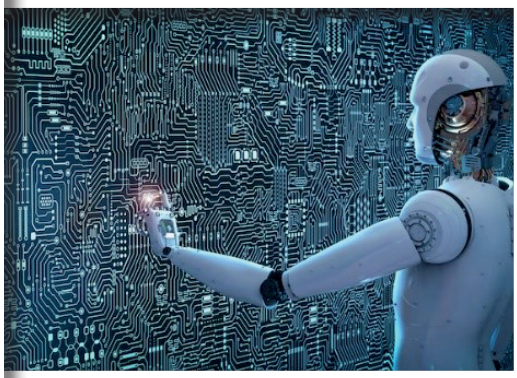
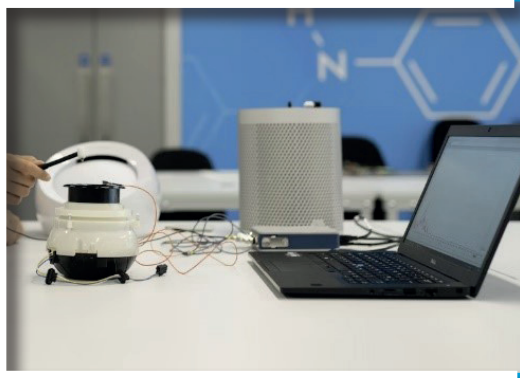
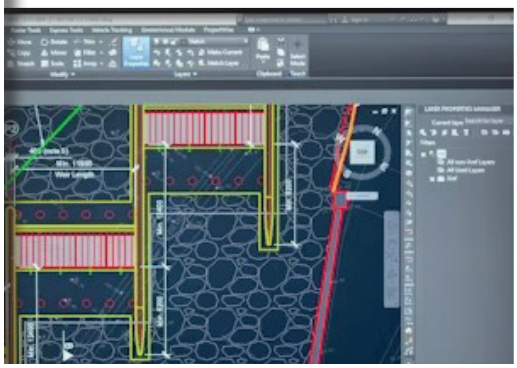
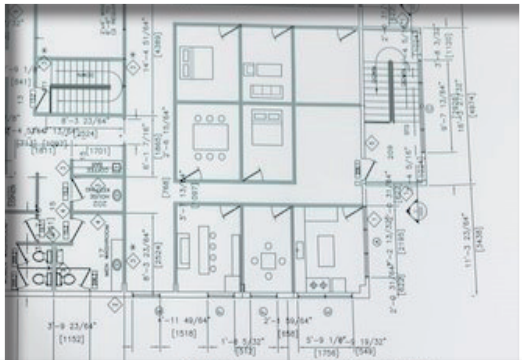
# Consultancy For Start-Up and MSME


CEAI Consulting Engineers Association of India

Creating Value Ethically for Engineers

Over 60 Years

Service to Consulting Engineers

ISO 9001:2015

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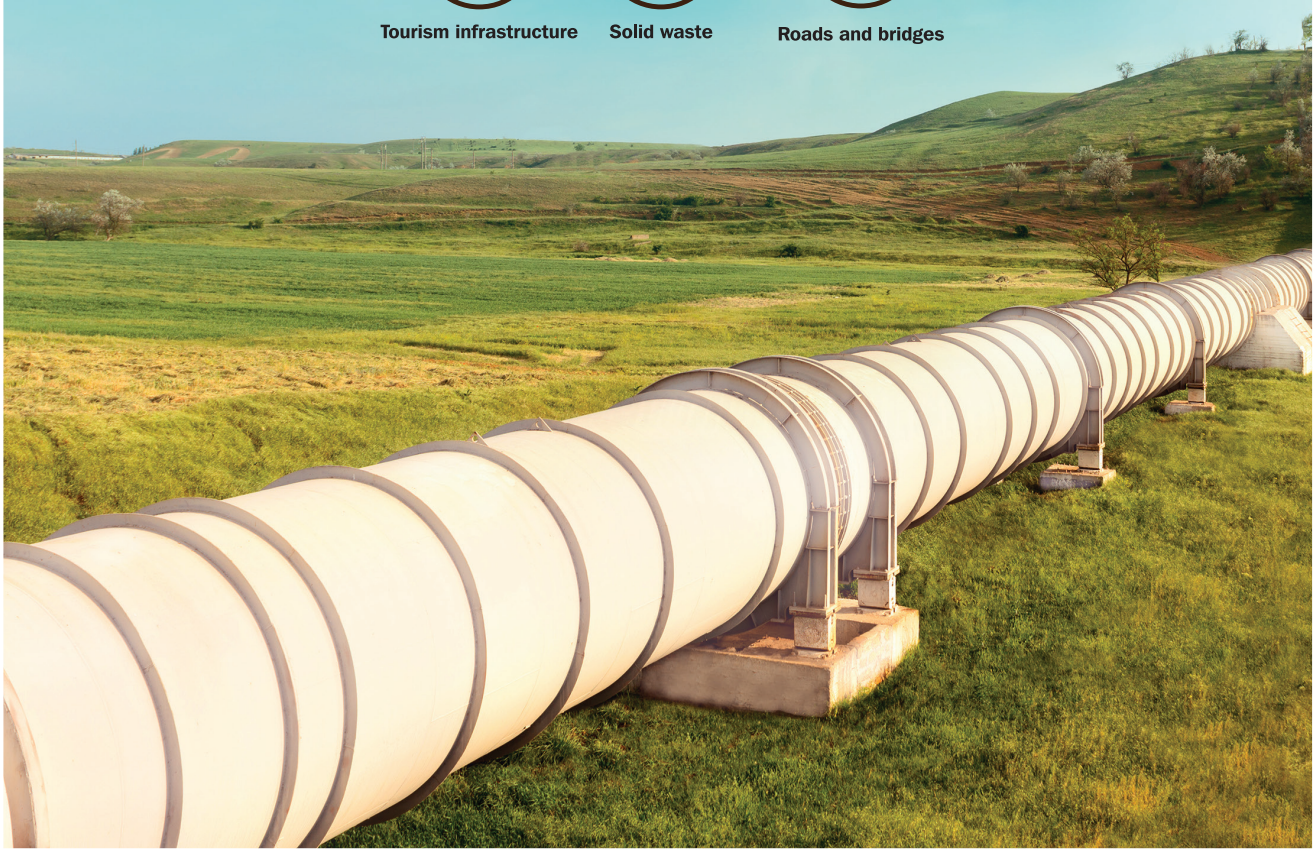

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# About CEAI

Consulting Engineers Association of India (CEAI) is the apex body of consulting engineers in India having membership of organisations as well as individuals. The membership represents large, medium and small consultancy companies/ organisations both in the private and public sector and eminent individual consultants. EPC organisations are also members of CEAI since they have planning and design engineers, apart from construction management consultants.

CEAI is the Member Association, of the International Federation of Consulting Engineers, commonly known as FIDIC, the acronym for Fédération Internationale Des Ingénieurs-Conseils, representing the Consulting Engineering Fraternity in India. FIDIC has membership of more than 100 Member Association of various countries and is headquartered in Geneva.

CEAI was incorporated in 1996, with the merger of two leading national associations Association of Consulting Engineers (India) {ACE(I)}, incorporated in 1960 and National Association of Consulting Engineers {NACE}, incorporated in 1976. Thus, CEAI has, behind it six decades of accumulated knowledge and experience.

- CEAI promotes the interest and works to enhance the status of the consulting engineering profession in India
- CEAI advocates global networking and co-operation
- CEAI's activities include:
  - Quality development of Consultants.
  - Productivity enhancement.
  - Promotion of ethical practices.
  - Facilitation and interaction with government and other authorities/ bodies to streamline and improve the system of engagement of consultants.
- Regional Centres in Jaipur, Bengaluru, Kolkata and Mumbai to broad base activities.

## *Aims & Objectives*

- Promote the professional interest and establish the rights and privileges of the status of consulting engineering profession in India
- Represent the consulting engineering profession within India and abroad. Connect the members locally and globally.
- Disseminate among the members information on all matters pertaining to engineering, especially knowledge and information related to consulting engineering profession by way of holding Conferences, Seminars, Courses, Workshops, Field/ Site Visits, etc. and thus assist in Continuing Education for the Professional Development of Members.
- Act as the principal champion for consulting engineering profession through constantly informing and educating the public and lawmakers about key engineering issues and making it possible to have the voice of the profession heard by the policy makers.
- Promote adoption of equitable forms of contracts and other documents used in consulting engineering practice.

## Vision

- To represent, promote and enhance the status of consulting engineers in India as an honoured and dignified profession for nation building and propagate Indian engineering consultancy globally.

## Mission

- Promote interests of the consulting engineering profession nationally and internationally.
- Promote sustainable, safe and sound engineering practices.
- Upgrade engineering knowledge and skill.
- Propagate code of professional ethics, safety, health and environment.

## Values

- Commitment with tenacity to high ethical values, integrity, professionalism and achieving technical excellence and inclusive development.

## Code OF Ethics

- CEAI has adopted a Code of Ethics, to which all members must abide. It is not just for the quality of the jobs they work on, but for the safety and well-being of the public at large.
- CEAI is the profession's most respected voice on the practice of ethical engineering.
- The code specifies the responsibilities of Consulting Engineers towards the society as well as the profession, to refrain from performing services unless competent to do so, to act in the legitimate interest of client, to be impartial, to maintain ethical relations with other consultants.

# Message from Chief Editor

***Dear Fellow Consulting Engineers & Readers,***

India has progressed and developed at a rapid pace and proved its mettle during the pandemic when its vaccines were the saviours not only for those residing in the country but even for over 150 countries to whom it supplied the vaccines. Another super leap that the pandemic triggered was digitalization on an unprecedented scale and that too at a very fast pace. That latter put another feather in India's cap and the world had to take note.

Several in the service sector who had been inching towards digitalization had to change pace and virtually gear up overnight to meet the challenges thrown up by the pandemic. Whilst the larger organization had already moved to digitalization in a big way it was those in the MSME sector that had to fast track to survive.

The country needs engineers to achieve its development goals in all sectors of the economy. The MSME sector constitutes a sizable share of the service sector of which consulting engineers are a part and thus also contribute to the country's development. It is they who make the ideas and aspirations of project owners a reality for many projects. A few of the consulting organisations who are in the MSME sector are proactive and keep reasonably abreast of the digital developments to improve their service, but the others need to invest. Funding the investments would of course be challenging but the overall gains would justify them. A second aspect that the MSME organisations need to invest in is continued professional development of their personnel. Those who imbibe and apply what they learn, help the organization reap the rewards.

The Start-ups are mostly in the IT sector through which they contribute to the other disciplines and sectors of engineering. They must work closely with the consulting engineering firms to understand the areas where their development would help the latter to be more productive. Most of the MSMEs are in the traditional engineering sectors although some are embracing, albeit gradually, the other disciplines and sectors of engineering. Needless to add, that it would be good if they could move faster, for that would enable development to also pick up pace.

The Government of India has initiated schemes to provide a boost for the Start-Ups and MSME organisations. It is up to them to register and avail of those benefits and also contribute to the country's economy.

***Engineers Must Strive***

***to Fulfil the Aspirations of the Country***

**Happy Reading & Learning**

**A P Mull**

01

# Innovations by a Consulting Organisation of the MSME Category


**Jeffrey Nambiar**
Director

**Prashant Manore**
A GM- Projects

Chempro Expertise Pvt. Ltd.


As Chempro Expertise Pvt. Ltd. (CEPL) approaches its Golden Jubilee it can look back with satisfaction and a sense of great pride at the contributions and achievements it has made with all the trials it has undergone since it was established as a Startup in 1977 by Mr. V.G. Nambiar. He fashioned the Company's service profile based on his core competencies, gained from his vast experience in Project Engineering and implementation post his 15 years tenure in the Indian Navy and by working for reputed companies like M/s UHDE.

CEPL gained recognition and clients' confidence by virtue of its key *mantra* which was value addition in its services to clients in the Chemical Plant sector. It has been giving total technical solutions, be it a greenfield or a brownfield project, in all engineering disciplines. The services include Basic and Detailed Engineering for new manufacturing units, debottlenecking existing manufacturing units, upgrading/ modernising with process improvements, need based automation, practical emission control methods for improvement of plant and surrounding environment, as well as providing necessary safety in operations, duly safeguarding plant personnel and equipment.

QMS Certification by TUV SÜD South Asia Pvt. Ltd. to ISO 9001:2015 in 2010 enabled better client focus, continual improvement and repeat orders to the tune of 80% +.

Third Party Inspection Services by sister concern M/s. Chempro Inspections Pvt. Ltd., adds value to project implementation enabling fit for purpose quality of plant equipment and machinery, thereby avoiding any unnecessary down time during commissioning.

Two challenging projects which also provided great learning opportunities are being shared in this article.

## Foundry for a Multinational Company, Maharashtra

The client had taken over an existing foundry in Maharashtra, to produce carbon silicon manganese alloys for the foundry industry. The process involved grinding, sieving, and packing, which created a lot of noise and dust due to which the plant had also faced some safety incidents.

Chempro was invited for the expansion of the plant and also to address the persistent issues of excessive noise and dust. The high level of dust generated inside necessitated that every operator wears earmuffs and a complete PPE kit covering all parts of the body and face. Besides, the dust was assessed to have specific explosive properties.

Chempro conceived and provided innovative solutions to address the issues being faced at the old manually operated plant, which also could not be properly maintained.

The old manually operated plant was re-engineered and modernised to make it safer, provide a healthier environment and also make it more efficient by automating the process, plus providing noise and dust suppression and elimination measures and systems. While doing all that the plant capacity was effectively doubled from 1000T/M to 2000T/M. Instead of the two manual production lines which were creating a lot of noise and dust for 1000T/M capacity, only one was required albeit for double the capacity. That resulted in reduction in equipment and manpower as well as saving in energy; plus it enabled environmental protection.

The necessary designs and specifications for each of the systems, material handling equipment, instrumentation and electricals were prepared to meet stringent requirements, the Kst values (the maximum rate of pressure rise of the ignited dust explosion) of the exposable dust and international ATEX conformance ATEX is an abbreviation from the French, ATmosphère EXplosible (or explosive atmospheres, translated into English).

The project also entailed vendor development and thinking outside the box, plus teamwork to ensure that the final objectives were met. Vendor submissions were thoroughly screened, at all the approval stages, prior to vendors' supplies/ implementation.

Since the project was being implemented during the Covid–19 lock down, only local manpower could be used, and none from the OEM's. Chempro went beyond the contracted design scope of work and supported the client and their contractors by means of continuous virtual support, to advise and help them to resolve issues at site. Hand holding of local contractors also involved educating them due to their limited experience and expertise. Detailed instructions had to be given as to how the work should be performed.

The client commissioned the plant on October 22, 2021, after necessary trials. At the opening ceremony the invitees who had visited the earlier plant were amazed at the cleanliness of the operations, as well as reduction in the noise to within acceptable levels. They also appreciated the drastic reduction in the dust levels. The new Control Room was another feature that was appreciated by all. The multinational owners participated virtually and declared wholeheartedly that the plant had set a new benchmark for their industry. They appreciated all the innovations, including that it was the first automated plant to be owned by them. The manpower reduction was greater than 60%.

Photos-1 to 3 depict the cleanliness, soundproof rooms, material handling and automation after the modernisation.

*Photo-1: Vibrating Screen Acoustic Enclosure rooms & conveyors inside the Main Building*

*Photo-2: Fe-Si-Mg Slabs charging Hopper*

*Photo-3: Dust Collection Silo with Barricades, Exhaust, Chimney and ID Fan Sound Enclosure*


*Photo-4: Commendation Certificate*

*Photo-5: Mr. Srinivas Iyer, MD, Elkem, Nagpur presenting "Certificate of Appreciation" to Chempro's Project Director Mr. Jeffrey Nambiar*


*Photo-6: Mr. Jeffrey Nambiar of Chempro Expertise Pvt. Ltd. receiving the "Excellence in Engineering Consultancy Services in "Engineering Innovation" award for CEAI National Award-2021*

## ABS Resin Plant Capacity Enhancement - 5,000tpa to 27,000tpa by De-bottlenecking

The capacity was required to be enhanced in a major ABS Resins manufacturing plant in India which was meeting the major market demand of high impact resins. The demand for the product was increasing very rapidly at that time and the Client wanted to retain their market position. It was not feasible for the client to expand the existing plant by acquiring new land. Thus, the project had many challenges and innovations were required at every step right from the start.

The client preferred Chempro Exp. Pvt. Ltd. as their consultant based on Chempro's track record of handling challenging projects within a short time span.

After studying and analyzing the plant process, the major 9 recommendations that were given resulted in the capacity increase by more than 500%.

**Recommendation-1: Cycle time reduction for all 6 Basic Reactors along with implementation of improved EHS.**

The current infrastructure had one common Raw Material (RM) feeding system for 2 Reactors. As a consequence, there was reactor downtime since one reactor had to wait for RM additions until the second reactor was finished loading. Chempro proposed to install independent feed loops for each RM for all the Basic Reactors to eliminate the 21% downtime loss. New feed loops were provided with state of art automation and latest safety concepts to SIL-2 (Safety Integrity Level) and as well as environment and health improvements. That increased the Overall Base Rubber production capacity by 30%.

**Recommendation-2: Improvement of Agitator design for better mixing and batch temperature control.**

The existing agitator in that reactor was of a poor design providing poor heat transfer during reaction and poor mixing. Besides, there were frequent leaks from the gland packing. These resulted in poor process control, requiring the reactor to be opened and manually cleaned after every 3 batches, resulting in excessive reactor downtime and EHS concerns about material being handled by operating personnel. The agitator was redesigned with a mechanical seal to give much better mixing and batch temperature control, which increased the cleaning frequency to once in every 15 batches and reduced the reactor downtime. The benefits were reduction in batch time and reactor

cleaning time plus EHS improvements and there was consistency in the quality. The production capacity was increased by another 25%.

**Recommendation-3: Improvement of Cycle Time by Direct Steam Injection.**

Reactor time was being lost for preheating the process batch from 30°C to 57°C before the next reaction could start. Hence, instead of preheating the reactor the steam jacket system it was changed to direct steam injection. The result was excellent, providing reduction in the process cycle time by 2.5 hours. That resulted in a 30% increase in the batch process capacity.

**Recommendation-4: Reduction of oversize particles in the process batch by installation of a special pump.**

The plant was suffering from particle oversize upset in the slurry after a particular batch process. Hence, a special pump that could break down the oversize particles in the slurry before the dewatering step was installed. The benefits were slurry homogenization before dewatering and consequent reduction in product loss and avoidance of process upsets. That increased the production capacity by another 35-40%.

**Recommendation-5: Improvement in Cooling and Reliability.**

The old cooling system of 160TR was replaced by a new 300TR system. One spare motor was procured for the existing system. That resulted in increased base rubber production.

**Recommendation-6: Replacement of two small drying lines with one new larger capacity FBD system.**

The existing dryers had been built with 2 independent drying lines, each having a flash dryer (FD) and a fluid bed dryer (FBD), with dust emission control by means of dust collectors. Both the drying lines were replaced with a single Larger Capacity FBD system and a water scrubber for dust emission control. The major benefits were significant EHS improvements (explosion & fire prevention) - elimination of fire hazards associated with dust collectors by replacing them with a wet scrubber. It also resulted in reduction in energy cost, product loss, lesser number of maintenance and operating personnel, etc. The installation of the dryer and wet scrubber ensured that 27,000T/year of rubber production was available as required by the client's business plan. The estimated payback period was 1.8 years.

**Recommendation-7: Installation of one larger capacity conveying system in place of 2 smaller systems.**

The powder conveying systems and the dust collectors of the existing powder silos were in bad shape with product leaks and problems with the dust collector bags fixing, giving rise to powder dust emissions. By providing a single new conveying dense phase system from the new dryer to the existing powder silos and replacing the dust collectors, the issue was mitigated. An automated powder truck loading with safety interlock was provided for grounding to avoid static electricity buildup. That increased the reliability and reduced the product losses and at the same time improved the EHS aspects.

**Recommendation-8: Replacement of Motor Control Center (MCC) for one section.**

The MCC of one section was very old and had a number of EHS issues. Most of the components were obsolete and maintenance was carried out just to keep the panel functional. Besides being of an old design, the panel had a number of issues with respect to EHS (cable termination design, bus bar arrangement, etc.). These were resolved by installing a new IMCC (Intelligent MCC) Panel for better reliability and safety.

**Recommendation-9: Improvement in Power Load distribution and DCS system.**

Distribution of total power load was given in a new transformer and from a new PCC (Power Control Center) with addition of cards in the existing Distributed Control System (DCS) panel. That increased the reliability of the power feed system to the basic reactors and other equipment.

The benefits from all the changes were that the production went up from 5,000TPA to 27,000TPA without any expansion, which was beyond the expectations of the client and that strengthened the market dominance of their product.

02

# Consultancy for Startups & MSMEs

Latha T
Former MD & CEO
Dhanlaxmi Bank
GM (Retd) Punjab National Bank

## Introduction

The year 2020 was a year of ups and downs, due to the COVID-19 pandemic, which hit across the globe. Many strong entrepreneurs in India have dived into business opportunities and tested their ideas. While some failed, others thrived. India supports the rise of Startups because they employ low-cost skilled labour, bring in funding from national and international investors, and provide growth opportunities. According to the Financial Express, Startup funding reached a new high in 2023. In addition to the huge venture capitalists, institutional investors and pension funds are also investing in many new online businesses. During the period of January-March 2021, around $4.4 billion was infused by investors into Indian Startups, which is 26% more than the investments made in the previous year for the same quarter. The top gainers in the funding deals were the Fintech and Financial Services companies (123), followed by Retail and Ecommerce companies (99) and EdTech companies (84). That shows that Startups have found a way to stay aloft even after the turbulence due to the pandemic in India.

## What is a Startup

A Startup is defined as an organisation which develops a repeatable and scalable business model. Startups typically pursue novel ideas that have the potential to generate larger employment, productivity improvements, and transformational technologies to drive the economy and lifestyles.

The Legal definition of a Startup as per the Ministry of Commerce and Industry, Government of India is:

a) The Startup should be incorporated as a private limited company or registered as a partnership firm or a limited liability partnership.

b) Turnover should be less than Rs. 100 Crores in any of the previous financial years.

c) An entity shall be considered as a Startup up to 10 years from the date of its incorporation

d) The Startup should be working towards innovation/ improvement of existing products, services and processes and should have the potential to generate employment and/ or wealth creation. An entity formed by splitting up or reconstruction of an existing business shall not be considered a 'Startup'.

**Startup India:** It is a flagship initiative of the Government of India, intended to build a strong eco-system for nurturing innovation and Startups in the country that will drive sustainable economic growth and generate large scale employment opportunities.

The Salient features that investors look for in a Startup are:

- Objective & Problem-Solving capability
- Management & the Team
- Market Landscape
- Scalability & Sustainability
- Customers & Suppliers
- Competitive Analysis
- Sales & Marketing
- Financial Assessment
- Exit Avenue

## Incorporation & Registration: Means & Methods

Startup Advisory personnel provide a whole array of solutions to make Startup establishment easier. They facilitate right from name approval to DIN (Director Identification Number) allotment, and beyond. Besides those there are many factors to be considered while launching a Startup. The Advisor helps to choose the right establishment type, obtaining the recognition number, trademarks, patents, taxation, and compliance.

The role of Advisor in a Startup can be the real differentiator. The Advisor can help to empanel a circle of Startup advisors to fill critical gaps. They also help the Startup understand the role of the Advisory Board apart from making the whole process straightforward and easy.

A key step, which is crucial in any Startup advisory is the correct estimation of the Startup. That plays a major role in establishing stake dilution when an investor buys a stake in the Startup enterprise. It also helps during mergers, joint ventures, and releasing an IPO. Hence, accurate valuation must be conducted by a registered Valuer/ Auditor leveraging internationally accepted methods of valuation and then provide the Startup with a validation certificate that will be accepted by Venture Capitalists, Angel Investors, PE firms, and statutory bodies.


Early-stage startups might find fundraising overwhelmingly lengthy and tedious which frankly speaking, it is! The consultants help the Startup get investment much faster if the pitch is strengthened to what that investors would appreciate and accept.

## Market Research

Competition is inevitable hence market research with in-depth analysis is essential so as to have an edge in the competition. The experts from the Advisor help explore newer markets and opportunities apart from determining a pricing strategy that works after gauging the target customers' willingness to pay for the product being offered. They take care of right from identifying target demographics to recruiting subjects, and gathering insights to determine the actionable items.

Startups looking to spread their wings can make the most of the latest taxation policies that are quite favourable to new enterprises. Some Startup advisory services also include assistance with Angel tax and its modifications.

There are entities whose turnover is more than Rs. 100 crores but they are still Startups when one looks at the most significant deals between companies in India, e.g., Walmart and Flipkart (having Myntra and Phone Pe), it

is not at all surprising to see that India is growing up as a hub of the biggest Startups. Ola cabs, Dream 11, Swiggy, and Razorpay are a few of the rich valued Indian startups across the world. The country is now getting more Startup unicorns, including companies from sectors like health, social commerce, finance, and more. Unicorn companies in the business are those Startups that are valued at more than $ 1 billion. As of April 2021, there are more than 600 unicorns across the globe. According to Inc42, India has 10 Startups listed in the list of Unicorns in 2023. With digitalisation becoming all pervasive and AI set to make sweeping changes in all spheres of human activities, there will soon be many Startups in this sector.

## Why do Investors Invest in Startups?

Investors essentially buy a piece of the company with their investment by providing capital, in exchange for equity: a portion of ownership in the Startup and rights to its potential future profits. Investors form a partnership with the Startups they choose to invest in – if the company turns a profit, investors make returns proportionate to their amount of equity in the Startup. However, if the Startup fails, the investors lose the money they've invested.

Investors realise their return on investment from Startups through various means of exit. Ideally, the venture capitalist firm and the entrepreneur should discuss the various exit options at the beginning of the investment negotiations. A well-performing, high-growth Startup that also has excellent management and organizational processes is more likely to be exit-ready earlier than other Startups. Venture Capital and Private Equity funds must exit all their investments before the end of the fund's life.

Mergers and Acquisitions: The investor may decide to sell the portfolio company to another company in the market. In essence, it entails one company combining with another, either by acquiring it (or part of it) or by being acquired (in whole or in part).

IPO: Initial Public Offering is the first time that the stock of a private company is offered to the public. It is issued by private companies seeking capital to expand. It is one of the most preferred methods by investors to exit a startup organization.

Selling shares: Investors may sell their equity or shares to other venture capital or private equity firms.

Distressed Sale: Under financially stressed times for a Startup company, the investors may decide to sell the business to another company or financial institution.

Buybacks: Founders of the Startup may also buy back their shares from the fund/ investors if they have liquid assets to make the purchase and wish to regain control of their company.

## Startup Schemes

There are two schemes – Startup India and the Credit Guarantee Scheme For Micro & Small Enterprises.

**1. Startup India:**

The initiative aims:

a) To provide financial assistance to SC/ST and women entrepreneurs;

b) Facilitates Loan from Rs. 10 lakhs to Rs. 1 crore, inclusive of term loans or working Capital or a combination of both;

c) These funds are earmarked for Greenfield projects spanning manufacturing, services, or trading sectors;

d) The Loan under this scheme can be provided without any collateral or security under the guarantee of Credit Guarantee Fund Scheme;

e) In the case of a partnership or multiple business owners, it's mandatory that the SC/ST or female entrepreneur holds a minimum ownership share of 51%;

f) Meeting the eligibility criteria for the loan involves maintaining a clear track record and ensuring no default history with any bank or financial institution; and

g) Entrepreneurs meeting these criteria can explore this scheme through various commercial banks.

2. Credit Guarantee Scheme For Micro & Small Enterprises (CGTSME):

Objective: The scheme aims at motivating first generation entrepreneurs towards self-employment by providing credit guarantee funding for third-party guarantee-free/ collateral free loans.

**Benefits:**

- Income Tax Exemptions: Eligible startups can avail of income tax exemptions for the first three consecutive years.
- Capital Gains Tax Exemption: Exemption on capital gains for investments in eligible startups.
- Simplified Compliance: Quarterly filing of GST returns for reduced compliance burden.
- Composition Scheme: Allows eligible businesses to opt for a simplified tax structure.
- Startups can self-certify compliance with labour and environmental laws for the first three years of their existence.
- Startups can fast-track the examination of their patent applications to expedite the protection of their innovations.
- Facilitates funding through various channels, including the Fund of Funds.
- Connects startups with investors, mentors, and incubators through the Startup India Hub.
- Provides financial support to startups for proof of concept, prototype development, product trials, market entry, and commercialization.

By availing these schemes and benefits, company businesses, especially startups and MSMEs, can enjoy a range of benefits, including financial support, tax exemptions, technology upgradation, and streamlined processes. It's crucial for businesses to assess their eligibility and take advantage of the available opportunities to foster growth and sustainability.

## Why Every Startup needs Consulting Services

Startups being entrepreneurs who desire to create, develop, and execute their brand or service, are not aware of the processes, procedures and the way to go about. Hence, they are uncertain; and seek guidance in the beginning. To be successful they need to know how to proceed. That is where consultants come in. The latter guide their clients, evaluate their ideas, and show them the right direction.

Many universities provide courses for Startups, but that is not at par with the personal touch that a consultant brings in.

There are different types of consulting services for Startups that are needed to improve their brand visibility and profit.

## Types of Consulting Services for Startups

There are various types of services consultants offer as well as the roles that they can assist in. The Startup owner needs to make sure that the consultant that is to be appointed would be the right one possessing the niche expertise that is required. The services that are provided include the following.

### 1. Strategy

Strategy consultants help in working on the startup's strategy and improving the company's development. They help to turn leads into clients with the right set of strategies that work for that context. They have a holistic approach to the problems that Startups face and provide solutions to them.

### 2. Marketing

A marketing consultant helps in promoting and selling products. They help reach the target audience and improve the Startup's brand's visibility on other important platforms as well.

### 3. Compliance

Compliance consultants help Startups be aware of government regulations and rules. They make sure that the Startup brand adheres to the laws and standards of the country. They also check that the materials used for manufacturing conform to the company policies.

**4. Financial**

Financial consultants provide the right financial advice and train the Startup to deploy their funds in the right place. They guide and help to make the right decisions when it comes to financing and investing with their knowledge about the current stock values, tax and the other economic structures about the market and everything about finance.

They chalk out the right plan to manage the finance, expenses, income and profit to reach the intended goals and thus save a Startup from scammers and fraudsters.

They also help the Startup by identifying problems and the manner in which profit could be increased.

**5. IT/ Technology**

Digitalisation has made data management, designs, and software programming and good knowledge of hardware essential. The IT/ Technology consultant suggest the right computer hardware and software so that the Startup has requisite and reliable systems and thus assist in turning vision into reality plus improve the organisational performance.

**.6. Legal**

A consultant for legal advice is also necessary. They offer specialisation in various forms like contract, banking, tax, real estate, and other legal measures.

## The Benefit of Consulting Services for Startups

From the foregoing it can be seen that appointing consultants for various services is essential for guidance to make the correct choices and decisions. It reduces the work load on the Startup owner so that the owner can concentrate on the bigger picture and pursue the objective.

## Micro, Small & Medium Enterprises

The Indian MSME sector is the backbone of the national economic structure and has unremittingly acted as the bulwark for the Indian economy, providing it resilience to ward off global economic shocks and adversities. The sector drives innovation, employment, and growth. Governments worldwide, including India, recognize their significance, offering diverse schemes to bolster their progress. From Udyam Registration to Startup India and Credit Guarantee Schemes, this comprehensive guide outlines how these initiatives sculpt success for businesses, emphasizing the importance of embracing these opportunities for sustainable growth.

The MSMEs are also the base for economic vitality in India face a multitude of challenges that hinder their growth and sustainability. From strategic planning and human resource management to finance and compliance, these enterprises encounter obstacles that require effective solutions.

India has a large number of registered Micro, Small, and Medium Enterprises (MSMEs) which amount to 7.9 million. These enterprises are significant contributors to the country's economy, accounting for 33% of the GDP. They also create more than 120 million jobs across various industries and regions, playing a crucial role in generating wealth at the grassroots level. The MSME sector provides opportunities for entrepreneurs who are often overlooked, such as women and marginalized individuals, empowering them and contributing to wealth creation. In the fiscal year 2022 alone, 8.59 lakh MSMEs led by women were registered on the Udyam portal, accounting for 17% of the total MSME registrations. Overall, 63.4 million MSME units contribute 6.11% to the manufacturing GDP and 24.63% to the services GDP.

## Partnering with a Business Consultancy

A significant challenge faced by MSMEs is the absence of strategic planning. Many entrepreneurs venture into their businesses without a well-defined roadmap, leading to inefficiencies and missed opportunities. Business consultancies offer expertise in formulating tailored strategic plans, help identify goals, assess risks, and develop actionable strategies for growth.

Efficient human resource management is another common challenge. Limited resources and the lack of dedicated HR personnel often result in ineffective talent acquisition, training, and retention processes. Business consultancies can streamline HR functions, ensure compliance with labour laws, and implement performance management systems. They provide guidance on creating a conducive work environment, fostering employee engagement, and facilitating skill development to enhance productivity.

Keeping pace with technological advancements and market trends is crucial for MSMEs. However, upskilling, and reskilling employees can be challenging due to time and resource constraints. Business consultancies can identify skill gaps and design customized training programs, collaborating with industry experts to empower MSMEs with a highly skilled workforce capable of meeting market demands.

Inefficiency in resource utilization plagues many MSMEs due to the need for robust systems and processes. Disorganized workflows and redundant tasks hinder productivity. Business consultancies guide MSMEs in establishing streamlined processes, optimizing resource allocation, and implementing effective project management methodologies. Leveraging technology solutions and best practices, consultancies transform fragmented operations into efficient and productive systems.

Managing cash flow is a perpetual challenge for MSMEs. Limited working capital and an inadequate sales funnel can disrupt business operations. Business consultancies assist in creating a robust sales funnel, optimizing pricing strategies, and implementing credit control measures. By analysing market trends and devising tailored marketing and sales strategies, consultancies help MSMEs stabilize cash flow and ensure better-working capital management.

In addition to management aspects, MSMEs face challenges in finance, technology adoption, skilled labour availability, and compliance. Access to affordable finance options, reluctance to embrace technology, difficulties in finding and retaining skilled labour, and navigating complex regulations pose additional hurdles. Business consultancies provide valuable insights, connect MSMEs with financial institutions, advise on technology adoption, facilitate talent acquisition, and ensure compliance with legal requirements.

**Partnering with a business consultancy** can prove to be a game-changer for MSMEs. By addressing strategic planning, human resource management, skill development, process optimization, and sales funnel management, consultancies offer holistic solutions for growth. Moreover, they assist in overcoming challenges related to finance, technology, skilled labour, and compliance. With the right guidance and support, MSMEs can unlock their full potential and contribute to India's thriving economy.

Business Consulting for MSMEs: - Complete consulting and professional services for MSMEs to adopt the latest technologies and strategies for growing to SME 4.0 global standards and MNC level. Of course, along with system development, the consultants provide low-cost automation and digitalisation technology.

## What is 360-degree Consulting for MSMEs?

360-degree consulting is for MSMEs to adopt Industry 4.0 and grow to SME 4.0. In the 4$^{th}$ industrial revolution stage, the consultants provide holistic consulting, technology, growth strategy, market, and professional business services for MSMEs "to grow to SME 4.0" at an affordable cost.

While Startups represent a relatively new business model, Micro, Small and Medium Enterprises (MSMEs) have long been steady growth engines for India by being one of the top five employing sectors of the Indian industry. Startups are generally launched to propel technological growth and innovation with less emphasis on making profits in the initial phases of the company, while the goal of the MSMEs is generally to start making profits from the first day itself. Startups and MSMEs have been given clear definitions in legal parlance in India, in terms of annual turnover, age, and the size of the investment into the company.


*Requirements for Startups and MSMEs (The requirements are common for both)*

While selecting a business consultant there are 7 Qualities that need to be checked for.

i). Can one gain knowledge and expertise in a particular field or niche area?

ii). Can the consultant help one in learning the tricks and give tips to reach organic growth?

iii). Can one make better decisions from the start without experimenting and wasting time and energy?

iv). Can they help in planning, researching, branding, and advertising?

v). Can you get to know more about the dos and don'ts?

vi). Does the consultant give honest feedback and will let one know where one is lacking? Adding on to that they ought also to tell one the ways to solve and overcome the problem.

vii). Can they provide one with management advice based on their years of experience gained in finance, planning, marketing, and the right set of strategies?

The right business consultants will create a good road map and checklist and be with the entrepreneur at every stage and keep renewing the progress.

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ETPrime

Fab dream: Government and private players have to come together for made in India semiconductors

Synopsis

To leapfrog in the semiconductor products business, the process of setting up business needs to be swift, and the logistics process needs to be expedited. The government has to play a bigger role directly.


THE ECONOMIC TIMES Epaper

English Edition | 06 March, 2024, 03:02 PM IST | Today's ePaper

Govt Focuses on 13 High-flier States for Apprentice Training

By Yogima Seth Sharma, ET Bureau • Last Updated: Mar 05, 2024, 04:56:00 AM IST

Synopsis

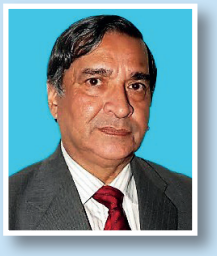
The government is focusing on 13 high performing states to step up engagement of apprentices across establishments in industrial clusters.

The government is focusing on 13 high performing states to step up engagement of apprentices across establishments in industrial clusters.

The skill development and entrepreneurship ministry is finalising the process of selecting industry clusters across the identified states and handholding them through financial aid as well as infrastructure creation to help them participate in a formal apprenticeship system, said a senior government official.

03

# Consultancy by Start-ups and MSME in the Digital Eco-System



Pradeep Chatruvedi
Vice President
Institute of Directors

The most dynamic and highly vibrant sector of the Indian economy is emerging out of the MSME and Startups. It supports the changing the face of India for tackling the twin problems of unemployment and poverty. This sector has been one of the largest employers for semiskilled and skilled manpower. The MSMEs are playing an important role in developing the self-reliant system. They are considered as the backbone of Make in India particularly in producing defence equipment. The Government is also assisting them with infrastructure, technical and financial support.

Recently it has been observed that the MSME sector has brought credit to the Government of India in the export sector as well, by making the Make in India programme a reality. In another recent survey in Abu Dhabi and Dubai showed that a large number of new companies were set-up in that area during the last two years and most of them are MSMEs and owned by Indians. Indian entrepreneurship is really creating an international outlook for Indian manufacturing as well as the Service sector thus improving India's global competitiveness. Leading training companies and institutions in India have played an important role in upscaling the local skills and capacities to enable Indian enterprises to reach a level of global recognition.

Unlike large corporations, MSMEs are deeply rooted in local communities, often serving markets, and catering to the unique needs of diverse populations. That type of localisation fosters economic development at the grassroots level, empowering individuals from various socio-economic backgrounds to participate in the growth story of the nation.

Furthermore, MSMEs are known for their remarkable agility and resilience. In an ever-changing business environment, these enterprises possess the flexibility to adapt quickly to market dynamics, innovate, and seize emerging opportunities. That not only drives economic progress but also fosters a culture of entrepreneurship, nurturing the spirit of innovation and creativity among the citizens. The industry has played an important role in developing modern defence equipment at a cost-effective level and promoting exports of defence equipment, where also the MSME sector has played a significant role. The Defence Research and Development Organisation (DRDO) has promoted Indian MSMEs including the consulting companies to launch innovative and enterprising approaches.

Moreover, the role of MSMEs extends far beyond mere economic contributions. Those enterprises serve as catalysts for social empowerment by promoting inclusivity and diversity in the workforce. They provide avenues for women, minorities, and marginalized groups to enter the formal economy, thus reducing inequalities and promoting social cohesion.

However, despite their immense potential, MSMEs face numerous challenges that hinder their growth and sustainability. Access to finance, inadequate infrastructure, regulatory bottlenecks, and lack of technological adoption are some of the key hurdles that need to be addressed to unleash the full potential of these enterprises.

As one looks ahead, it is imperative for policymakers, industry leaders, and stakeholders to collaborate effectively to create an enabling ecosystem for MSMEs to thrive. That entails simplifying regulatory frameworks, enhancing access to credit, investing in infrastructure, fostering innovation, and providing skill development initiatives to equip the MSMEs with the tools they need to succeed in the digital age.

Consultancy organisations must play a leading role and stay ahead of the curve with 'generative AI' creating excitement across industries. The demand for professionals skilled in AI and Machine Learning (ML) is soaring in India. Staffing firm Randstad says hiring for AI and ML roles has been increasing by 30% each year since the pandemic, while demand for other digital skills has been growing at half that rate. It estimates there are about 200,000 professionals skilled in AI/ML in India. India's staffing data indicates that AI jobs are growing twice as fast as other digital roles. That throws open the debate - whether someone would end up losing their jot to AI or wield AI to create far more value than ever before. A little reasoning would show that it depends on the human efficiencies that a person possesses. Those conditioned to simply follow instructions, and move in a rut, would probably lose their job at AI, whereas those who are in command of what they do, within their context, would find that AI tends to enhance their creativity and output.

Developing AI would entail writing smart code, testing the results for hallucination, bias, and consistent reliability, producing AI tools, and things like that. That means high-end jobs, calling for high levels of education and innovation. It would generate a fair number of traditional manufacturing, managerial-administrative, marketing, logistics jobs, as well.

Every individual who loses a job to AI would not need to be a creative genius who can come up with new, AI-enabled economic opportunities. But there must be a large number of creative minds taking up the challenge, and succeeding.

AI needs a global oversight body, on the lines of the International Atomic Energy Agency for nuclear energy. The AI industry is keen to outsource regulation to governments and transnational bodies - it does not want to be held accountable for the things that go awry, it just needs to claim to have complied with the applicable regulations.

## India's Engineering Consultancy Firms at a Cross Road

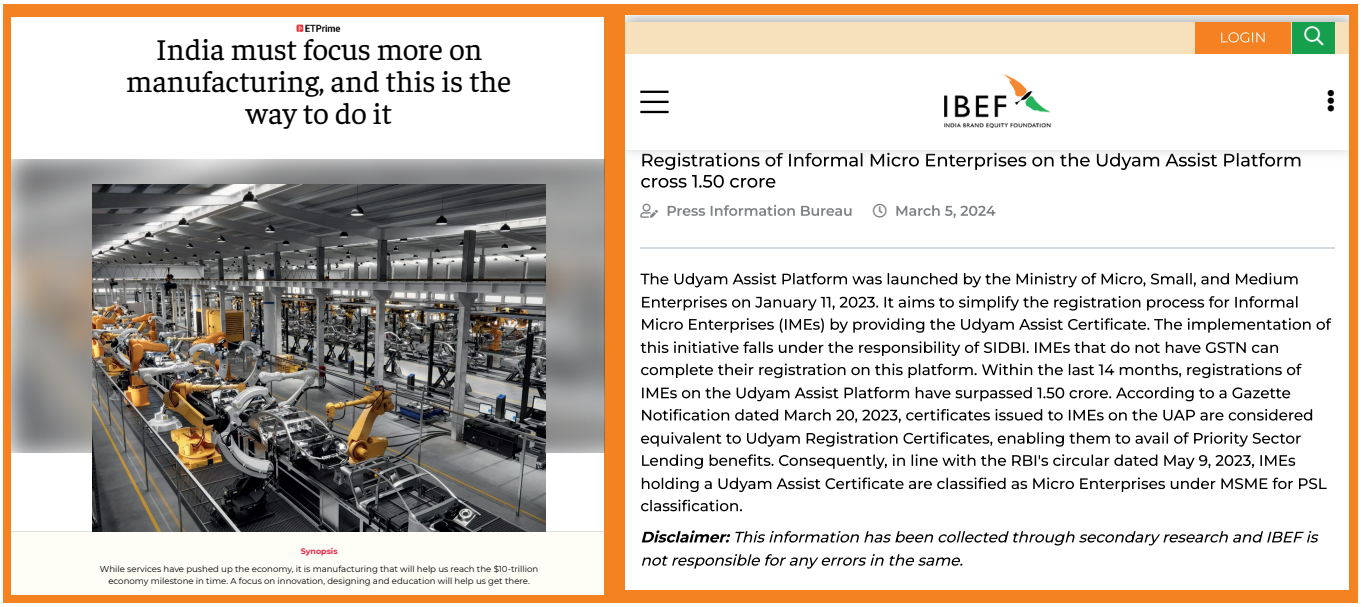
India's engineering consultancy firms have established their image in India and abroad because of their lifelong competitive status. It has been observed that major economic development during the 10 years had substantial contributions for Indian engineering consultancy agencies. A large number of small-scale enterprising consultancy companies have emerged and are now playing a leading role. It is really a tough call for established large engineering consultancy companies to face these small-scale enterprising consultancy companies. The major reason is that the large established consultancy companies which are not nimble to have the staff attuned to technology and move out of the approach of yester years, loose out to the new small scale consultancy firms established by those who are competent in digital technology applicable to their business. The present-day international business eco-system calls for working efficiently on digital platforms and that needs reskilling manpower of the existing large companies. There is no firm data on how many of the large India's engineering consultancy companies have trained their manpower to be competent to work in the new environment, but from the interaction with them it is apparent that many of them have migrated either pre-pandemic or post the start of the pandemic restrictions. There is sufficient data to show that the start-ups on a large scale have established themselves and have become a threat to those who have not migrated to the digital platform and kept abreast of its development.

One has to wonder as to whether such a competition should be considered as a threat or an opportunity to work in a collaborative manner. The latter would be a wise move. That means that the existing companies with vast experience in working and processing with various major project owners should work in unison with start-ups thereby creating a win-win situation for both. That collaboration would mean integration of Start-ups with knowledge of cutting-edge digital operations with the experience and knowhow that the established companies have. It is time that the established companies realise the way ahead and convert every threat into an opportunity.

It would be prudent to understand that Generative AI has now been established and anyone ignoring it would be a loser. No living person can remember a technology that has swept through the business community with such speed and impact. Hardly a day passes without a new development hitting the headlines. While still blanketed with caveats and unknowns, Generative AI stands to have a profound impact on how one lives and works. However, at the same time, it should not distract business leaders from some other core business imperatives and the importance of rewiring their companies.

The consultancy Start-ups have taken many steps which could be called innovative. The government support in terms of policy and funding has motivated and facilitated Start-ups to be proactive in the engineering consultancy area. The Start-ups have been undertaking innovation not only on new products but also new processes and operating models that can create a competitive advantage by making them fluid, adaptive, or cost-effective. Innovation is also about new customer experiences and ways of engaging with them, and new business models and value propositions. In the past 10 years many companies have shifted from selling products to selling services, or adopted subscription-based approaches. Which means that they are taking care of capital cost and sharing the responsibility of performance of their idea and approach.

Business model innovation can also include different routes to market or using one's assets in new ways. The global business is transitioning to a new era shaped by new technology platforms and demographic shifts. To thrive in this world, one has to innovate, because as Marshall Goldsmith has said "What Got You Here Won't Get You There" meaning thereby that it may not take you further. The Start-up and MSME engineering consultancy companies should work in unison to fully gear up to work in a new environment and march into the global arena at a rapid pace. Needless to add, they should all be willing to be innovative, digitalise, collaborate and train their personnel continuously to remain in the forefront worldwide.



ETPrime

India must focus more on manufacturing, and this is the way to do it

Synopsis

While services have pushed up the economy, it is manufacturing that will help us reach the $10-trillion economy milestone in time. A focus on innovation, designing and education will help us get there.

LOGIN

IBEF
INDIA BRAND EQUITY FOUNDATION

Registrations of Informal Micro Enterprises on the Udyam Assist Platform cross 1.50 crore

Press Information Bureau March 5, 2024

The Udyam Assist Platform was launched by the Ministry of Micro, Small, and Medium Enterprises on January 11, 2023. It aims to simplify the registration process for Informal Micro Enterprises (IMEs) by providing the Udyam Assist Certificate. The implementation of this initiative falls under the responsibility of SIDBI. IMEs that do not have GSTN can complete their registration on this platform. Within the last 14 months, registrations of IMEs on the Udyam Assist Platform have surpassed 1.50 crore. According to a Gazette Notification dated March 20, 2023, certificates issued to IMEs on the UAP are considered equivalent to Udyam Registration Certificates, enabling them to avail of Priority Sector Lending benefits. Consequently, in line with the RBI's circular dated May 9, 2023, IMEs holding a Udyam Assist Certificate are classified as Micro Enterprises under MSME for PSL classification.

***Disclaimer:*** *This information has been collected through secondary research and IBEF is not responsible for any errors in the same.*

04

# Legislation for Professional Engineers

**A P Mull**
Past President CEAI
Chief Editor CEAI ViewPoint
Former CEO & MD TCE Consulting Engineers Limited

## Preamble

Every time a project is inaugurated, the engineers and others get the accolades but when a failure occurs, it is invariably attributed to the consulting and construction engineers. The past issues of ViewPoint over the decade have also carried articles dealing with the matter relating to engineering being made a legally recognized profession.

The number of professional engineers in the country are in lakhs, tending to reach over a crore, whereas all the other professions, (Advocates, Architects, Chartered Accountants, Doctors, Company Secretary, and Cost & Works Accountants) which are covered by various Acts have much fewer numbers, mostly in tens of thousands, and their career paths starting with internship/ training are well defined and monitored. However, all that is lacking for professional engineers.

## History

Buildings and builders were governed by rules, codes, and laws from ancient times - Vishwakarma, Kautilya, Hammurabi, and others. In India, the establishment of the Public Works Department gave rise to Civil Engineering. With the passage of time as knowledge grew other branches of engineering emerged - Mechanical and Electrical. The discovery of oil necessitated another branch – Chemical. Thereafter other branches of engineering have been added.

The engineers who passed out from the engineering college went on to serve in the PWD or some other government department, since buildings and all other infrastructure were constructed by the government. All those engineers were governed by the rules, processes, procedures, and the codes of conduct of the department and the government as enacted.

Private practice in India started much later but has grown considerably. Municipalities also, over a period of time, introduced building rules/ bye-laws and requirements of registration by architects, surveyors and structural engineers. The National Building Code of India 2016 dwells into more detailed requirements regarding professionals engaged in building construction. However, all the other branches and sectors of engineering are still not governed.

## Why Legislation for Professional Engineers?

The necessity for legislation for the profession of engineering was acknowledged around the 1970s, but half a century later it's still not in sight. The Ministry of Education (formerly Human Resource Development) of the Government of India which was identified for the purpose, has been approached time and again for legislation for the profession of engineering. This has been going on for decades but except for drafts being made every time there is no other progress. No reason for this has been given by the Ministry.

Legislation is necessary so that there is an authorised body (association or institution) which has the legal mandate to:

- regulate the profession of engineering and create a cadre of engineers of high calibre in all the disciplines in a sustained manner by suitable training process through certification.
- restrict the usage of the title and style of "Engineer".
- uniformly decide across the country on the qualification, competency, and experience requirements of engineers for a particular work.
- direct that each and every engineer continuously updates knowledge and skills.
- regulate entry of foreign professionals and, also have a reciprocal arrangement for acceptance of Indian engineers in other countries.
- discipline engineers and bring in accountability and responsibility, and
- take up the issues of the engineers with any authority.

## Training

With digitalization becoming ubiquitous it is seen that the younger engineers tend to become overdependent on the computer results. With no practical experience it is difficult for them to discern whether the results are appropriate. For them to develop that acumen they must undergo at least a year of training and remain as an understudy for five years under the guidance of an experienced and knowledgeable engineer, who himself is preferably certified by an accredited Institution/ authorized body. Only some organizations have a defined training scheme. The rest just deploy a fresher straight on a job under the notion that on-the-job training would be adequate. If a person walks through a cotton field, the person does not come out wearing a garment. So also, just acquiring a degree does not make a person a ready professional engineer.

A professional engineer also needs to be well versed in the relevant areas of finance, project accounts, correspondence, recording and writing minutes of meetings, drafting technical specifications, project scheduling and monitoring, drafting and scrutinizing contract documents, administration of contracts, arbitration, other legal aspects, human relationship, soft skills, etc.

On the job field training and field experience is also essential – the engineers must get their hands dirty at the site, at the workshop, on assembly lines, etc. It is only them that can truly design, construct, build or create what will be fit for use for the purpose intended.

## Database of Professional Engineers

The MoRTH has time and again been faced with the matter of authenticating the Curriculum Vitae of professional engineers.

One way would be for each accredited university or institute issuing the Degree Certificate to upload the particulars of the person to whom it is awarded on a common portal of the Ministry of Education, Government of India. A passport photograph of the person together with the Aadhaar Number should also be uploaded.

That portal could then also be used to track the employment and even the work experience of the person. Each entry of degree and work experience would have to be certified and ratified by the University/ Institute/ Employer in India, as the case may be, with the necessary data. It would then enable all the relevant experience as well as the continued professional development courses, workshops, seminars, etc. attended, papers written and/ or presented, to be extracted. Such a process would also help to keep data on as to how many persons graduating have gone abroad for further studies or employment.

The process would go a long way to ensure the lakhs of crores of rupees being spent on projects in the country are being handled by competent professional engineers of the right calibre from different disciplines of engineering and who are abreast of the latest developments in science and technology in their respective fields.

Another essential record that the database as mentioned earlier could provide is how well and how many of the

next generation of Engineers have been mentored by the person, so that the country is never in want of them.

## The Way Forward

To bring in accountability and responsibility amongst the professional engineers, the Ministry of Education, Government of India should post haste move forward with the legislation for professional engineers.

That would go a long way in minimising failures and save huge amounts which could be more appropriately deployed for other essential use.

The professional engineers should also be encouraged to interact with the academia as a part of the curriculum to bring in the practical aspects of each engineering trade and also be a part of the research work so that more patents, copyrights, etc. can be obtained to raise the stature not only of professional engineers in India but also the research work being done to yield positive gains. The country could then be a beacon for others.

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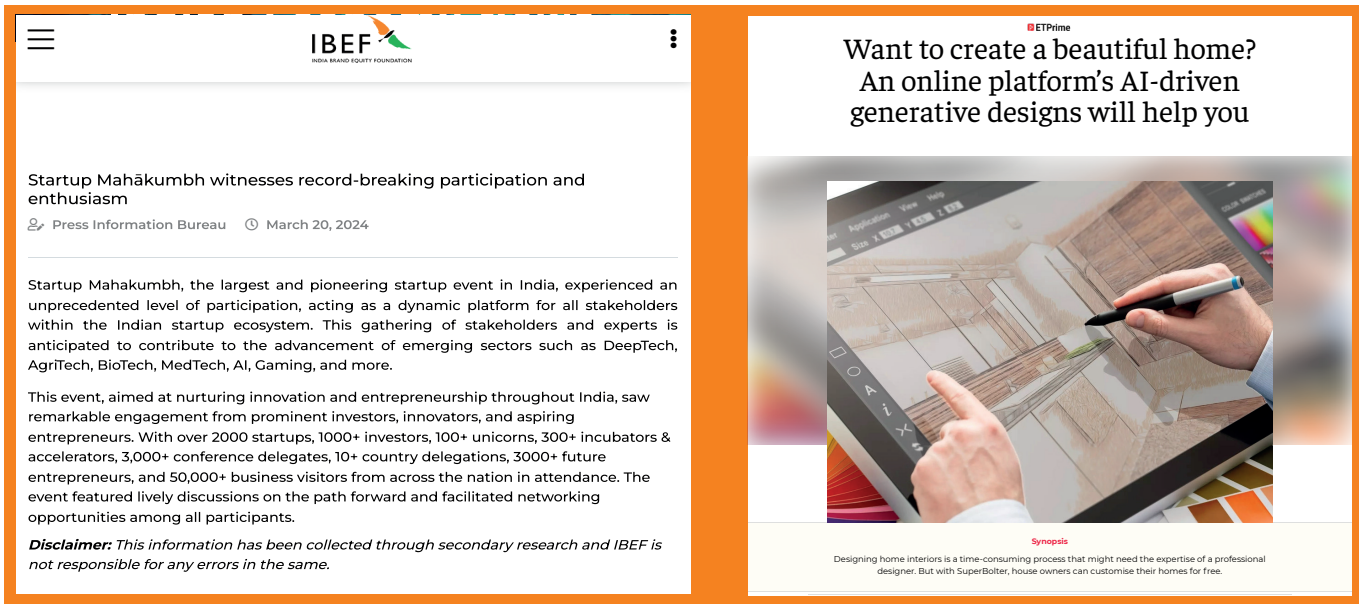


IBEF
INDIA BRAND EQUITY FOUNDATION

Startup Mahākumbh witnesses record-breaking participation and enthusiasm

Press Information Bureau  March 20, 2024

Startup Mahakumbh, the largest and pioneering startup event in India, experienced an unprecedented level of participation, acting as a dynamic platform for all stakeholders within the Indian startup ecosystem. This gathering of stakeholders and experts is anticipated to contribute to the advancement of emerging sectors such as DeepTech, AgriTech, BioTech, MedTech, AI, Gaming, and more.

This event, aimed at nurturing innovation and entrepreneurship throughout India, saw remarkable engagement from prominent investors, innovators, and aspiring entrepreneurs. With over 2000 startups, 1000+ investors, 100+ unicorns, 300+ incubators & accelerators, 3,000+ conference delegates, 10+ country delegations, 3000+ future entrepreneurs, and 50,000+ business visitors from across the nation in attendance. The event featured lively discussions on the path forward and facilitated networking opportunities among all participants.

***Disclaimer:*** *This information has been collected through secondary research and IBEF is not responsible for any errors in the same.*

ETPrime

Want to create a beautiful home? An online platform's AI-driven generative designs will help you

Synopsis

Designing home interiors is a time-consuming process that might need the expertise of a professional designer. But with SuperBolter, house owners can customise their homes for free.

05

# Funicular Railway - Easy and Comfortable Ride to Steep Hill Tops


Shivshankar Lature
Director
Suyog Gurbaxani Funicular Ropeways Ltd.

M R Moorthy
Principal Director
(Business Development)
Noble Geo Structs


## Introduction

The Funicular Railway transportation system is a unique facility to ferry passengers to reach hill tops comfortably taking care of safety factors. The system is popular in many parts of the world where there are tourist spots. However, in India the first Funicular Railway system was implemented successfully at the Saptashrunghi Vani Maata Temple near Nashik in 2018. A similar project is to be commissioned soon at the Shri Malangadh Shiva Temple at Kalyan, Thane District, popularly known as Haji Malang as there is a dargah also at that location.

Earlier this technology was provided by experts from Ukraine experts but today Indian engineers have also the expertise and experience gained out of practically operating the Funicular Railway system for more than five years. They are based on the knowledge and experience gained and the expertise developed together with the innovations done for safety. They thus provide cost effective solutions to implement such projects with attractive economic viability. To ensure that all safety precautions are incorporated and taken while in the project, the technology partner from Ukraine continues to be associated.

The business investment is of a long-term nature similar to small hydroelectric power projects, i.e., once the site is allotted for implementation by the State Government Temple Trust, then the benefits accrue for more than 35 to 40 years to the developer on mutually agreed terms.

## How the System Works

The Funicular Railways are inclined Cable Railways with a swivelling mechanism (it turns around a central point so that it is facing in a different direction). The Railway Trucks or Cars that are Slanted, tiered (arranged in rows or levels and placed one behind the other) and supported by a wedge (to remain in a particular position tightly to prevent from moving) so that the passengers remain in an upright position while transporting them up/ down slopes. A Funicular Railway uses the technology of an elevator (a cable pulling a car or cabin up). The technology can also be described as a car on a track, a combination of road and rail.

The Railway Car is pulled up the slope or hill or mountain by a cable which loops over a pulley wheel at the upper end of the track. The Funicular Railway operates on two cars at the same time, one on each side of the track by balancing the weight of the other. i.e. counter balancing each other. The weight of the descending cars drags the ascending cars to move towards the top of the slope or hill. Simultaneously the ascending cable cars keep control of the speed of the descending cars from a safety point of view. However, to avoid friction on the

system, there is a Motor Powering the system (pulley) to ensure enough energy whenever there is imbalance in weight between ascending and descending cars due to the weight of the passengers in the two cars.

The funicular railway can operate with or without an attendant. That is possible due to safety controls. The cars are controlled by safe brakes which clamp to the rail track and stop the car immediately in the event of any failure thus ensuring that it does not falls.

*Saptashrungi Devi Temple Funicular Railway in Operation*

## Advantages of a Funicular Railway System

1. Best suited for ferrying or moving or transporting passengers and goods or both combined from ground/ lower level to a higher level or top of a steep hill or mountain.
2. Operates under all weather conditions; even during windy days as the system is designed to be strong enough to resist wind upto a speed of 170 km/h.
3. Provides a high level of Rider Comfort and is comparatively very Safe.
4. Best solution for mountain regions and even for crowded urban transportation. Highly flexible to negotiate straight routes, bends, etc. so that tailor made solutions according to terrain and topology can be devised.
5. Reasonably high transport capacities with long life.
6. In peak season like Navaratri days more than 23,000 passengers were ferried on a single day and night, which is nearly 1000 passengers per hour. That was possible due to special efforts of the operating professionals.
7. Economic feasibility is very good since the ROI (Return on Investment) improves considerably over a period of less than ten years.

## Risk Factors

a. In unforeseen circumstances like the COVID-19 pandemic or heavy rains or any other natural calamities there can be considerable reduction in passengers whereby revenue loss could occur and hence affect cash flow whereby breakeven may extend, resulting in reduction of ROI.

b. A general question is asked about Safety. Proper preventive and periodic maintenance ensure an accident-free service. Proper caution and care need to be taken by regular periodic by reviewing and monitoring so that operational efficiency and life of the system and the facilities are maintained.

c. For safety there are two provisions to stop the vehicle for any urgency. One is an automatic system, the second is manual. After the car has stopped, the passengers can get out of the bogey and walk on the pathway or walkway provided adjacent to the railway track.

## Saptashrungi Devi Temple Funicular Railway in Operation

There is an atmosphere of satisfaction among the devotees as the Funicular Ropeway with all the facilities has been introduced in the service of the Devotees making darshan easier and time saving.

- Salient feature of Funicular Railway

- Special facilities for the elderly and physically challenged persons
- Separate bogies to going and coming
- Darshan of Goddess Mata Saptashrungi in three minutes
- Braking systems: Computer System Automatic Brake; By Monitoring from the Desk controlling the Vehicle; The Driver can insert a long steel rod into the holes in the rails, on both sides, to stop the vehicle; and, Passengers can, if required, walk along the adjoining Walk Way after stopping the train.
- Safety facilities using the latest technology
- Accommodation for devotees
- Food mall for devotees
- Parking arrangement
- A waiting room
- Kids market
- Selfie Points

## Project ready for Use

The funicular railway project at the Shri Malangadh Shiva Temple also known as Hazrat Haji Malang Dargah atop the steep hills near Kalyan, in Thane District of Maharashtra was a challenging one. Safety trials have already been carried out and the project will be opened for public use once Government permission is received. It is expected to be put it into operation by June 2024.

Plans are being made to address the practical needs of passengers - the devotees and tourists by improving the operational efficiency to ferry passengers faster during festivals when the numbers are large.

## Future of Funicular Railway Business in India

After the outbreak of the Covid 19 pandemic, there have been changes in the way of addressing business development and related matters including looking at Business Opportunities per se. It is not only the technology trends such as the emerging technologies like Artificial Intelligence, 5 G, etc. `that are evolving even the customer demands, societal demands, etc. are changing whereby business entrepreneurs have to study, analyse, and look at growth from a sustainable future point of view. It is there that the Funicular Railway business plays a key part by supporting the revenue generation through some sort of locational monopoly. In this peculiar business-like hydro, the investor/ developer do not pay for raw materials like other manufacturing enterprises and so attraction for profit making enterprises is more because of depreciation, taxation benefits, etc.

## Conclusion

Funicular Railway enterprises are an opportunity to provide a much-needed facility for the pilgrims and tourists for accessing steep slopes or high hills and mountains.

Video link:
https://drive.google.com/file/d/1r1Ech-k0Phko9Ypgf-C6GAMmiIrJi5p-/view?usp=drive_link

## About Suyog Telematics Ltd./ Suyog Gurbaxani

Suyog group has been able to successfully build up in-house operation and maintenance facilities including manufacture of spare parts in India.

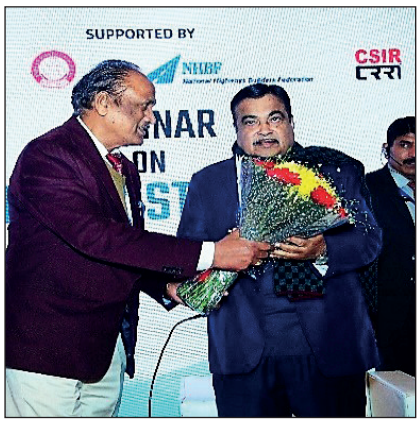
# CEAI NEWS

## SEMINAR ON "QUALITY OF DPR AND CONSTRUCTION OF HIGHWAYS"

The Consulting Engineers Association of India organised a Seminar on the ***"QUALITY OF DPR AND CONSTRUCTION OF HIGHWAYS"*** on 9th and 10th January 2024 at Hotel Le Meridien, New Delhi. The seminar was supported by the Ministry of Road Transport and Highways, National Highways Builders Federation, Indian Roads Congress and the Council of Scientific and Industrial Research - Central Road Research Institute.

The Seminar was inaugurated by Mr. PVVSS Ravi Prasad, Director General (RD) & SS, Ministry of Road Transport & Highways. Mr R S Sharma, President CEAI welcomed the Chief Guest and participants and gave a brief about the Seminar. Mr K K Kapila, Chairman ICT Pvt Ltd delivered the Keynote Address.

**Mr. Nitin Gadkari, Hon'ble Union Minister of Road Transport and Highways addressed the delegates during the concluding session of the first day of the seminar**. He urged the participants to design safe highways conforming to world standards.




*President CEAI welcoming the Chief Guest*


*President CEAI delivering his Welcome Address*


*Hon'ble Minister of Road Transport and Highways Addressing the gathering*

*Shri PVVSS Ravi Prasad, DG(RD) & SS delivering Inaugural Address*


*Shri KK Kapila Chairman ICT Ltd delivering Key Note Address*


*Shri JVL Narayana Vice President CEAI proposing Vote of Thanks*

The Seminar was aimed at identifying the issues which are responsible for the poor quality of DPRs as well as construction especially in the Highway sector and come out with possible solutions for their improvement.

The Seminar comprised 7 sessions in addition to the Inaugural and the Concluding Sessions. The first day of the seminar was devoted to the Quality of DPRs with a session exclusively on Innovative Materials and Technology.

The second day was focused on the Quality of Construction. Considering the premature failure of Pavements and Reinforced Earth Walls, and Bridge Structures, a dedicated session was held on that subject in which case studies were presented by eminent scientists and engineers.

**There was a consensus from all concerned was that the quality of DPRs and the Construction were not up to the mark and there was an urgent need for improving the quality and bringing them up to specified standards and requirements adopted across the world.** A number of factors which are responsible for the current state were identified and the possible ways for improvement and overcoming them were discussed. It was evident that all stakeholders would have to work together to bring about the change which necessitates strong determination and resolve, specially from the top management of the government departments, authorities, bodies, consultants, investigation agencies, and contractors for improving the quality.

**Sponsors:** There were two Platinum, two Gold, five Silver and one Bronze sponsors who provided a great help in organising the event.

A few photographs showing various sessions, speakers and participants are given below:

*Lighting of the Lamp*

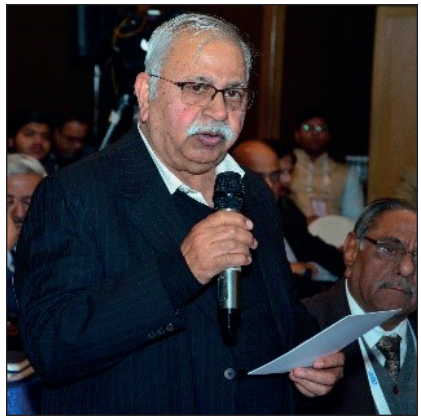
*A View of participants*


*Mr. Navneet Sharma welcoming the Session Chair, Mr G Sharan, Former DG Road Development*

| | |
|---|---|
| **Platinum Sponsors**<br>1. Aarvee Associates Architects, Engineers & Consultants Pvt. Ltd.<br>2. G R Infraprojects Limited | **Gold Sponsors**<br>1. Intercontinental Consultants & Technocrats Pvt. Ltd.<br>2. Lion Engineering Consultants Pvt. Ltd. |
| **Silver Sponsors**<br>1. Maccaferri Environmental Solutions Pvt. Ltd.<br>2. Oriental Structural Engineers Pvt. Ltd.<br>3. Strata Geosystems India Pvt. Ltd.<br>4. Sugam Technocrats Pvt. Ltd.<br>5. TechFab (India) Industries Ltd. | **Bronze Sponsor**<br>1. Theme Engineering Services Pvt Ltd |


*Mr. Sanjeev Kumar,*
*Director IAHE making his presentation*

*Mr. R K Pandey, former Member NHAI*
*making his presentation*



*Q&A session*


*Session Chair & Speakers –*
*Session 1 Quality of Design*


*President welcoming Chairperson and Speakers – Session 2*
*Quality of Design – Improvement*


*Mr. M Kishore Kumar of Aarvee making his presentation*

*Mr. Indrajit Ghai of GHAI Pvt. Ltd. making his presentation*


*President welcoming Chairperson and speakers for Session 3: Innovations, New Materials & Technologies*

*Prof. Manoranjan Parida, Director CSIR-CRRI, chairing Session 3*

*Mr. Shahrokh Bagli of Strata making his presentation*


*Mr. Vibhu Kapila of Theme Engineering making his presentation*


*Ms. Atasi Das of GR Infra making her presentation*


*Q&A session*


*M.s Ridhima Solanki of WWF making her presentation*


*President, CEAI in discussions with the Hon'ble Minister*


*Discussions with the Hon'ble Minister*

*Q&A Session*


*Mr. Manoj Shukla of CRRI making his presentation*


*Dr. Jagdish Shahu of IIT Delhi making his presentation*

*Dr. Kunwar Singh of CRRI making his presentation*


*Chairperson Mr. Dhanraj Tawade of NHAI and speakers for Session 6: Quality of Construction – Case Studies*

*Mr. Sudip Chaudhary of MoRTH making his presentation*


*Mr. JVL Narayana, Vice President CEAI welcoming the Session chair Mr. PVVSS Ravi Prasad, DG(RD) SS and other speakers*

*Mr. R C Jain of NHBF making his presentation*

*Mr. Navneet Sharma, Secretary CEAI gave the Vote of Thanks*

## CEAI NATIONAL AWARDS 2023

***CEAI National Awards for Excellence in Engineering Consultancy Services*** were distributed during the inaugural session of the Seminar on "Quality of DPR and Construction of Highway Projects" on 9th January 2024 at Hotel Le-Meridien, New Delhi.

The awards were conferred on the following individuals and organisations:

| A | INDIVIDUALS | |
|---|---|---|
| i) |  | **CATEGORY A: PROJECT ENGINEERING**<br>**SURENDRA KUMAR GUPTA**<br>Project: Engineering services for a cement grinding unit and building of a river water canal inside the cement plant area, off a river, and installation of a mechanised system for loading of cement bags into the barges. |
| ii) |  | **CATEGORY B: ENGINEERING INNOVATION**<br>**ASHISH RAKHEJA**<br>Project: AEON Corporate Office, Noida<br>*Mr. Dushyant Rana received the award on behalf of Mr. Ashish Rakheja* |
| iii) |  | **CATEGORY B: ENGINEERING INNOVATION - CERTIFICATE OF MERIT**<br>**CHANDRACHUDHA BHATTACHARYYA**<br>Project: Civil and Structural Health Audit of the Four Towers and other associated Structures of Diamond City South |

| B | ORGANISATIONS | |
|---|---|---|
| i) |  | **CATEGORY A: GROUP 1 UPTO RS. 50 CRORE: PROJECT ENGINEERING**<br>**SPECTRUM Techno Consultants Pvt. Ltd.**<br>Project: Design of Multi-span Cable Stayed Bridge at Ambhora, near Nagpur, Maharashtra |

ii)


**CATEGORY A: GROUP 2 ABOVE RS 50 CRORE: PROJECT ENGINEERING**

**SMEC (India) Pvt Ltd**

Project: Detailed Design & Engineering Consultancy Services pertaining to Kameng Hydro Electric project (4x150 MW) Arunachal Pradesh

iii)


**CATEGORY B: GROUP 1 UPTO RS 50 CRORE: ENGINEERING INNOVATION**

**B&S Engineering Consultants Pvt Ltd**

Project: Consultancy Services for 4 Laning of NH-37A from Km. 0.00 (Kaliabor Tiniali Road Junction) to Km. 17.300 (Dolabari Road Junction) including Construction of new Brahamputra Bridge on the EPC basis in the State of Assam Under Phase-A of SARDP-NE

iv)


**CATEGORY B: GROUP 2 ABOVE RS 50 CRORE: ENGINEERING INNOVATION**

**RITES LTD**

Project: Project Management Consultancy for Bogibeel Bridge

**TATA Consulting Engineers Ltd**

Project: Riverfront Development of Tunga in Shivamogga City

## LIFETIME ACHIEVEMENT AWARD 2023

The Awards Committee decided to confer the Lifetime Achievement Award to the following considering their extensive contribution towards the upliftment of the consultancy profession.

1. **Mr. Sudhir Dhawan, Past President CEAI**
2. **Dr. Samarjit Chatterjee, Past President CEAI**


*Mr. Sudhir Dhawan receiving the Lifetime Achievement award*

*Dr Ajay Pradhan receiving the Award on behalf of Dr. Samarjit Chatterjee*

## WORKSHOP ON "AI, VR & AR FOR ENGINEERING PROJECTS"

CEAI Academy and CEAI-Western Region Centre in their efforts dedicated to keeping professionals up-to-date and helping them incorporate new techniques, methods, and technologies into their work, organised a workshop on the three game-changing technologies AI (Artificial Intelligence) and the immersive wonders of VR (Virtual Reality) and AR (Augmented Reality) which are revolutionising the lifestyle, especially of those dealing with Engineering Projects.

It was different from the usual workshops since the participants were provided opportunities to also experience the technologies themselves by donning VR/AR headset and experimenting with the AI system.

Dr. Harshavardhan Subbarao, Member Governing Council CEAI and Chairman, CEAI-Western Region Centre, welcomed everyone, gave a brief about CEAI and then dealt at length on the current hot developments in technology – AI and the immersive technologies VR & AR; how there are daily reports of new developments and as to how they are set to change how one works. He added that AI, in particular, would transform everyone's lives. He also cautioned on the need for its governance to minimise misuse.

Mr. Alok Bhowmick, Chairperson CEAI Academy elaborated on the CEAI Academy and that the workshop of this type would be replicated in other regions also.

Mr. P R Shahu, Head – Digital and CIO, TATA Consulting Engineers Limited gave a good exposition on the theme of the workshop, explaining each one and how they can be and are being used by consulting engineers. He highlighted the phenomenal practical difference they have made in the projects.

Mr. Suhas Bhagwat, CEAI-WRC Committee Member lucidly covered VR and AR and their use in the various stages of engineering projects.

Mr. Amit Shrivastava, Director Solution Engineering, Bentley Systems traced the development of computer graphics which has resulted in the current use of Digital Twins for Engineering Projects and enhanced through use of ML, AR and VR.

Mr. Ashish Mehta, Co-Founder, KGraph AI Solutions Pvt. Ltd. (BI42) traced the development of AI and how it has, along with VR & AR, become a game changer. He stressed that AI is very useful for consulting engineers.

In the practical sessions the participants donned the headset, provided courtesy Bentley and experienced VR/AR for themselves. For AI the proof of the pudding was in seeking answers to queries raised by participants which were provided by the AI package developed by bi42.

**In their feedback the participants wrote that the workshop was very useful to them and that what they learnt and experienced would help their organisation.**

Mr. Jeffrey Nambiar expressed CEAI's gratitude to Bentley who was a Sponsor and to others who supported the event.

*Dr. Harshavardhan Subbarao welcoming the speakers and the participants*

*Mr. Alok Bhowmick explaining the role of CEAI Academy*

*View of the participants*

*View of the participants*

*View of the participants*

*A partcipant experienceing the VR/AR*

*A participant experienceing the VR/AR*

*Speakers, Participants and Organisers*

## WEBINAR ON "RESPONSIBILITIES OF CONSULTANTS (AE/IE) IN SERVICES FOR EPC/HAM PROJECTS"

CEAI organised a webinar on ***"Responsibilities of Consultants (AE/IE) in Services for EPC/HAM Projects"*** on 9th February 2024.

Mr. D.C. Katara, President, and Head (Technical) and Mr. V.V.S. Ramakrishna, Senior General Manager, Theme Engineering Services Pvt. Ltd., presented the difference in responsibilities of the Authority Engineer (AE) and Independent Engineer (IE) consultants in relation to the Engineering Procurement and Construction (EPC) and Hybrid Annuity Model (HAM) type of project contracts, as well as their roles in completing the projects on schedule with minimal deviations in design and construction approach.

Several effective monitoring methods were proposed, including improved management reporting dashboards, progress reviews, brainstorming sessions, training of key personnel in various fields of construction monitoring vis-à-vis EPC and HAM, design-construction interfaces, daily quality audits, quality diligence, and team delivery sessions. The mechanisms for monitoring payment milestones in EPC contracts, as well as proposed work weightages for measuring physical progress in HAM projects, were also discussed. They also talked of some of the issues such as:

- Failure to evaluate quality control records for RFIs closed by the contractor/concessionaire.
- Team Leaders (TLs) failed to review Contractor/ Concessionaire's Drone Videography submissions.
- Delays in communicating feedback on the Contractor/ Concessionaire's Monthly Progress Report (MPR) within defined timescales.

One of the primary problems raised by the speakers, which is very relevant to current contracts, was the possibility of improper and inadequate contract administration when recommending certifications for contractors by the AEs/ IEs, as well as dealing with instances of overpayment.

The speakers concluded by underlining the importance of good AE/IE with definite roles and responsibilities to avoid cost and time overruns in projects.

**Youtube Link** https://www.youtube.com/watch?v=DbVop6hHMeg

## FORTH COMING EVENTS

Registration Link is https://docs.google.com/forms/d/e/1FAIpQLSeqpnGirePYOStA_x0oyf5Xf5DXwiNGbMLR_wZMliawwMAt7g/viewform?usp=pp_url

## TRAINING COURSES ON FIDIC CONDITIONS OF CONTRACT

CEAI is organising a series of Training courses on ***"FIDIC Conditions of Contract"*** at Delhi, Hyderabad and Bengaluru on the following dates:

**Training dates**

- 6th & 7th May 2024 at New Delhi
- 8th & 9th May 2024 at Hyderabad
- 10th & 11th May 2024 at Bengaluru

Registration link for New Delhi:
- https://docs.google.com/forms/d/e/1FAIpQLSd8B4u-X0Ua82yg-WhScGmOe_EOtKkgvdOYYoPmo5gS5WrSgg/viewform?usp=pp_url

**Registration link for Hyderabad/ Bengaluru:**

- https://docs.google.com/forms/d/e/1FAIpQLSd8B4u-X0Ua82yg-WhScGmOe_EOtKkgvdOYYoPmo5gS5WrSgg/viewform?usp=pp_ur

**Fee for New Delhi:**

Member - Rs. 27,140/- | Non Member - Rs. 29,500/- *(including GST)*

**Fee for Hyderabad and Bengaluru:**

Member - Rs. 35,400/- | Non Member - Rs. 37,760/- *(including GST)*

CEAI is pleased to offer a **5% discount** on the basic registration fee if there are 4 or more participants from one organization.

## REVISION IN MEMBERSHIP SUBSCRIPTIONS

The Membership Subscriptions for CEAI, which had been prevailing since 2012 were reviewed by the Governing Council in its meeting held on 22nd January 2024 and it was decided to revise them with effect from FY 2024-25. The revised subscription shall be as below:

| Membership Category | Revised Annual Subscription (Rs) |
|---|---|
| **INDIVIDUALS** | |
| a) Member (Individual) | **4,000** |
| b) Affiliate Member (Individual) | **4,000** |
| c) Young Professional Member | **2,400** |
| d) Student Member | **1,000** |
| **MEMBER ORGANISATION & AFFILIATE MEMBER ORGANISATION** | |
| a) 5-25 employees | **10,000** |
| b) 26-50 employees | **20,000** |
| c) 51-300 employees | **30,000** |
| d) 301 and above employees | **40,000** |
| **MEMBER (EPC ORGANISATION)** | **1,00,000** |

# MEMBER NEWS

## IEI Industry Excellence Award

Holtec Consulting Pvt. Ltd. received the IEI Industry Excellence (Platinum) Award 2023 in the category, Engineering Services and Consultancy (for Organisations having turnover of Rs. 50 Cr and above but below Rs 200 Cr.).

The award was presented on 27th December 2023 by Shri Rajendra Shukla, Hon. Dy Chief Minister of Madhya Pradesh at the 38th Indian Engineering Congress at Jabalpur, Madhya Pradesh.


# IEI AND CII AWARDS

TATA Consulting Engineers Ltd. received Awards from the Confederation of Indian Industry (CII) and the Institution of Engineers (India) {IEI}.

1. CII Industrial Innovation Awards 2023 - as one of Top 50 Innovative Companies
2. CII Industrial Innovation Awards 2023 - as the TOP Innovative Company – Category: Services (Large)
3. IEI Industry Excellence Award 2023: Platinum - in Engineering Services and Consultancy



# VIEWPOINT

The theme for the June 2024 issue of CEAI's quarterly magazine ***"ViewPoint"*** is **"Affordable Housing"**. The Guest Editor for the issue is Mr. R K Bhola, Director, Civtech Consultants Pvt Ltd

Housing for the masses has been on the agenda for quite some time and many schemes have been put in place by the Central as well as the State Governments which cater to the under privileged. The number of buildings being built is phenomenal yet there is a dearth of affordable housing. Using local sustainable materials would be a good way to achieve both goals of numbers at low cost.

Articles could also be on expressing one's thoughts on new ways of doing design, construction, repairs, maintenance, etc. or even on adoption or development of new technology.

A number of consulting engineers and smaller organisations are engaged in these works which do not receive the recognition they deserve since their works do not get publicized. CEAI's ViewPoint provides an opportunity to all those engaged in such activities to share case studies of their achievements, how they addressed the challenges faced, practical issues experienced and the solutions to those, etc. in the various disciplines of engineering. Photographs, charts, diagrams, drawings, etc. would benefit readers for a better appreciation of the issues encountered and the manner in which they were addressed.

The articles for an issue need to reach CEAI at least 3 weeks prior to the end of the month of the ViewPoint issue. Articles need to be in Times New Roman 12 with single line spacing with before and after 6 pt and normal margin, on A4 size. A recent clear and bright passport size photograph of the author(s) is to be sent along with the article. For details of formatting please refer to *"Format for Articles for CEAI Viewpoint"* on CEAI's website, under *'Publications'*.

**We urge all Professionals to use CEAI's ViewPoint to showcase the capabilities and achievements of the Engineers in India plus educate and guide new engineers.**

The theme for the remaining issues for the year 2024 are:

| | |
|---|---|
| 1 | **September 2024 – Energy Transition** |
| 2 | **December 2024 – Recycling & Reuse of Building Materials in Construction Industry** |

The articles for an issue need to reach CEAI at least 3 weeks prior to the end of the month of the ViewPoint issue. Articles need to be in Times New Roman 12 with single line spacing with before and after 6 pt and normal margin, on A4 size. A recent clear and bright passport size photograph of the author(s) is to be sent along with the article. For details of formatting please refer to *"Format for Articles for CEAI Viewpoint"* on CEAI's website, under *'Publications'*.

## Advertisement in ViewPoint

ViewPoint is circulated to all CEAI Members, FIDIC, Ministries of the Government of India, Ministries of the State Governments, Administrations of Union Territories, Public & Private Sector Undertakings, Construction Firms, Contractors, Consultants, Foreign Missions and Funding Institutions in India and other organisations related to or dealing with the engineering profession. Thus, all stakeholders partnering development and progress are its readers.


Support from CEAI members and stakeholders are sought for increasing the number of advertisements, so that ViewPoint gains in its stature as a unique Technical Publication for the fraternity and the public at large to spread information of how Consulting Engineers are helping society for improving the quality of life and doing so sustainably.

The rates for advertisements in ***VIEWPOINT*** are given below:

| Item | Rate Per issue* (Rs) | Discounted rate at 10% for 2 consecutive issues* (Rs) | Discounted rate at 20% for 4 consecutive issues* (Rs) |
|---|---|---|---|
| **Back Cover** | **25,000.00** | **45,000.00** | **80,000.00** |
| **Inside Front Cover**** | **18,000.00** | **32,400.00** | **57,600.00** |
| **Inside Back Cover**** | **18,000.00** | **32,400.00** | **57,600.00** |
| **Full Page (Colour)** | **12,000.00** | **21,600.00** | **38,400.00** |
| **Full Page (Colour), if a specific page position is required.** | **14,000.00** | **25,200.00** | **44,800.00** |
| **Full Page (B&W)** **(such advertisements will be taken up for printing only when there are 4 or multiple of 4 advertisements for an issue)** | **8,000.00** | **14,400.00** | **25,600.00** |

*Notes:* ****GST @ 5% or as prescribed will be added to the above rates.***
***Inside Front Cover inside back covers booked till June 2024*

## *Gen & Tech Quiz*

1. **When was the predecessor ministry of the MSME formed in India?**
   a. 2001
   b. 2007
   c. 1961
   d. 1999
   e. 2006
2. **When did the new classification criteria for MSMEs come into effect?**
   a. 1st July 2020
   b. 10th August 2021
   c. 1st June 2021
   d. 14th December 2019
   e. 1st July 2019
3. **Which activity has the largest number of MSMEs?**
   a. Non captive Electricity generation, transmission, distribution
   b. Manufacturing
   c. Trade
   d. Other Services
   e. None of the above
4. **Which State has the largest number of MSMEs in India?**
   a. Uttar Pradesh
   b. Karnataka
   c. Gujarat
   d. Tamil Nadu
   e. West Bengal
5. **Which State has the largest number of Udyam Registrations?**
   a. Rajasthan
   b. Uttar Pradesh
   c. Tamil Nadu
   d. Gujarat
   e. Maharashtra
6. **Which is the major cause of Accidental Death?**
   a. Accidental Fire
   b. Drowning
   c. Falls
   d. Traffic Accidents
   e. Sudden Deaths
7. **Which is the oldest bridge in India?**
   a. Old Yamuna Bridge 1867
   b. Old Naini Bridge 1865/1866
   c. Pamban Bridge 1914
   d. Koilwar Bridge 1862
   e. Shahi Bridge 1568-69
8. **Which sector in PPP has maximum number of projects?**
   a. Electricity generation (grid)
   b. Irrigation (dams, channels, embankments, etc.)
   c. Roads and bridges
   d. Electricity transmission
   e. Renewable energy (grid)
9. **Which is the tallest self-standing structure in India**
   a. Fazilka TV Tower
   b. Palais Royale
   c. Refinery Products
   d. Rameshwaram TV Tower
   e. Lokhandwala Minerva
10. **When did the highest magnitude earthquake occur in 2023 in India?**
    a. November
    b. January
    c. October
    d. June
    e. December

The first person who mails the correct answers to CEAI *info@ceai.org.in* will get a congratulatory mail and will be acknowledged by publishing the persons photograph in the next issue.

**Contributed by A P Mull**

**Answers to Tech Quiz December 2023 issue**

1. (d), 2. (e), 3. (b), 4. (a), 5. (c), 6. (e), 7. (b), 8. (e), 9. (d), 10. (b)

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- *promotes the interest and works to enhance the status of the Consulting Engineering profession in India*
- *advocates global networking and co-operation*
- *helps to keep in touch with the latest professional updates – technical, regulatory, legal, financial, health & safety, environmental, etc.*
- *provides excellent opportunity to present papers in seminars and technical lectures organised from time to time*
- *aids in skill development through regular training programmes including training on FIDIC Conditions of Contract and sharing of the legal issues based on the Indian context*
- *takes-up various issues confronting the profession with government and other authorities from time to time with the objective of making the conditions of engagement on a fair and equitable basis so that Consulting Engineers can function in the best interest of the country*
- *promotes the cause of Women Engineers with a view to ensure rightful places for them in the engineering consultancy arena*
- *helps to develop Young Engineers to be the Future Leaders*

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