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WOMEN IN THE PLUMBING & WATER SECTOR



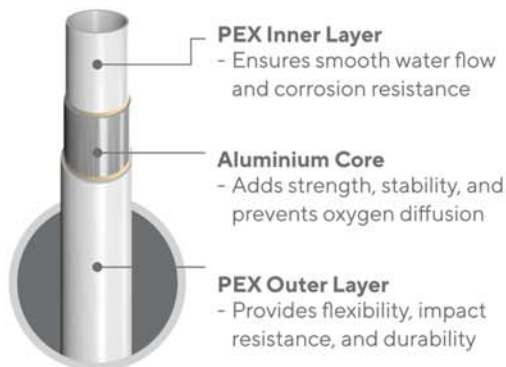
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Editor

Sharatchandra Venkat Rao

Editorial Board

Chandra Shekhar Gupta
Rahul Dhadphale
Dipen Mehta

Sub Editor

Nivedita Sharma
Mob: +919667591004

G M - Marketing & Events

Sushanta Sinha
Mob: +919599001282

Design

Naveen Jaiswal
Studio Detail

Share your feedback at:

acep@indianplumbing.org /
hq@indianplumbing.org

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Dear Readers

The goal of transforming India into a developed nation by 2047, or Viksit Bharat, stands as a beacon guiding our nation's progress. This ambitious objective is also the central theme of our upcoming IPA Summit in Delhi on March 7th. At the core of this vision is 'water,' which plays a pivotal role in our journey toward development. History has shown that nations that prioritize water management not only safeguard their natural resources but also ensure the well-being of their people, setting the stage for progress and prosperity.

The theme for this year's **IPA Summit** is **"Viksit Bharat @2047: Design, Technology, and Climate Resilience for Human Habitat."** The 2025 Summit will delve into innovative approaches in design, technology, and infrastructure resilience to elevate India into a developed nation. This exclusive event will gather visionary professionals, industry leaders, and experts from various sectors, including real estate, construction, architecture, interior design, government, policymaking, and academia.

The IPA Summit serves as a dynamic confluence of CXOs, business leaders, change-makers, influencers, mentors, and trendsetters in the built environment and physical infrastructure industries. It provides a platform for thought leaders to engage in meaningful discussions, shaping the future of sustainable urban development. Previous IPA Summits were held in Bengaluru and Mumbai in 2023 and 2024, respectively, and the 2025 edition will mark the third such conclave.

Every initiative by IPA is driven by the principles of the famous 5R's (Reduce, Reuse, Recycle, Recharge, Respect), and we remain committed to spreading this message. As you read this issue, IPA Chapters across the country will have celebrated **World Plumbing Day** through a series of events, including technical webinars in local languages, seminars, and painting and drawing competitions for school and college students. These initiatives aim to raise awareness about the crucial role plumbing plays in human health and hygiene.

In parallel, preparations are in full swing for **PlumbexIndia 2025**, India's largest exhibition of water, sanitation, and plumbing products, to be held on April 24th, 25th, and 26th, 2025, at Bharat Mandapam, New Delhi. We invite you to join us, connect with industry experts, and explore opportunities to network and generate leads for your business.

This March issue of IPT is dedicated to "Women in Plumbing, Water, and Construction Sectors", in honor of International Women's Day on March 8th. We feature insightful articles from women leaders in these industries who have made significant strides in their respective fields. We hope you enjoy this special edition and encourage you to share your thoughts with us. Your feedback will help us bring more content that resonates with your interests.

We look forward to engaging with you as we continue to work toward a **Viksit Bharat**.

Sharat V Rao

Managing Editor, Indian Plumbing Today
National Joint Secretary, IPA



A Precious resource in a thirsty world

T. Manjula



Women in Plumbing engineering- breaking barriers of gender stereotypes

Ranjini Venugopal

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WATER

A Precious Resource in a Thirsty World

- T. Manjula

Water is the lifeblood of our planet. It sustains ecosystems, fuels agriculture, powers industries, and quenches the thirst of billions. Yet, despite its undeniable importance, water is often taken for granted. As the global population surges and climate change exacerbates water scarcity, the need to manage this finite resource responsibly has never been more urgent. This article delves into the critical importance of water, the challenges of freshwater availability in India, the concept of water use efficiency, and the transformative role of water audits in achieving sustainable water management. We'll also explore how water efficiency ties into the broader goal of achieving net-zero emissions and introduce the concept of a Water Efficiency Index.

The Availability of Freshwater in India: A Looming Crisis

India is home to nearly 18% of the world's population but possesses only 4% of its freshwater resources. This stark imbalance underscores the gravity of the water crisis facing the nation. While India receives abundant rainfall during the monsoon season, much of this water is lost to runoff, evaporation, and inefficient storage systems. Groundwater, which accounts for nearly 40% of India's water supply, is being extracted at an unsustainable rate, leading to plummeting water tables and deteriorating water quality.

Rapid urbanization, industrialization, and agricultural demands have further strained water resources. Agriculture alone consumes over 80% of India's



freshwater, often through inefficient irrigation practices. Meanwhile, cities grapple with leaky pipelines, inadequate wastewater treatment, and inequitable water distribution. The result is a nation where water scarcity is no longer confined to arid regions but has become a pervasive issue affecting urban and rural areas alike.

Water Use Efficiency: The Key to Sustainable Water Management

Water use efficiency refers to the optimal utilization of water resources to achieve maximum productivity with minimal waste. It is a cornerstone of sustainable water management and a critical response to the growing water crisis. Inefficient water use not only depletes resources but also exacerbates energy consumption and carbon emissions, as pumping, treating, and distributing water require significant energy inputs.

Improving water use efficiency involves adopting advanced technologies, implementing best practices, and fostering a culture of conservation. For instance, precision irrigation systems like drip and sprinkler irrigation can drastically reduce water wastage in agriculture. In urban areas, fixing leaky infrastructure, rain water harvesting and promoting water-saving appliances can lead to substantial savings. Industries, too, can play a pivotal role by recycling and reusing water in their processes.

However, achieving water use efficiency is not just about technology; it requires a shift in mind-set. Every individual, community, and organization must recognize the value of water and take proactive steps to conserve it.

The Role of Water Audits in Driving Efficiency

A water audit is a systematic process of measuring, analysing, and optimizing water use within a system, be it a household, a business, or an entire city. Think of it as a health check-up for your water infrastructure. By identifying leaks, inefficiencies, and areas of high consumption, water audits provide actionable insights that can lead to significant water and cost savings.

Water audits typically involve the following steps:

1. **Data Collection:** Gathering information on water sources, usage patterns, and infrastructure.
2. **Analysis:** Identifying inefficiencies, leaks, and areas of high consumption.
3. **Recommendations:** Proposing measures to improve water use efficiency, such as repairing leaks, upgrading equipment, or adopting water-saving

technologies and most importantly harvesting rain water to the maximum extent.

4. **Implementation:** Putting the recommendations into practice.
5. **Monitoring:** Continuously tracking water use to ensure sustained efficiency.

Water audits are particularly valuable in industries and municipalities, where water use is often complex and large-scale. For example, a textile factory might use a water audit to identify opportunities to recycle wastewater, while a city might use one to detect and fix leaks in its distribution network.

In recent years, water audits have gained traction in India as a tool for promoting water efficiency. According to a report by the Central Water Commission, over 500 industries and 50 municipalities have conducted water audits in the past decade. These audits have collectively identified potential water savings of over 1,000 million liters per day (MLD), equivalent to the daily water needs of a city like Pune.

The Indian government has also taken steps to institutionalize water audits. The Bureau of Water Use Efficiency (BWUE), established under the Ministry of Jal Shakti, has developed guidelines for conducting water audits in various sectors. Additionally, several states have made water audits mandatory for industries and urban local bodies.

Despite these positive developments, the adoption of water audits remains uneven. Many small and medium-sized enterprises (SMEs) lack the resources or awareness to conduct audits, while rural areas often fall outside the scope of such initiatives. Bridging these gaps will require concerted efforts from policymakers, industry leaders, and civil society.

Net Zero and Water Efficiency: Two Sides of the Same Coin

The concept of net zero—achieving a balance between greenhouse gas emissions produced and emissions removed from the atmosphere—has become a global rallying cry in the fight against climate change. While much of the focus has been on reducing carbon emissions, water efficiency is an equally critical component of the net-zero equation.

Water and energy are deeply interconnected. Treating and transporting water requires energy, while generating energy often requires water. By improving water efficiency, we can reduce the energy needed for water management, thereby lowering carbon



emissions. Conversely, adopting renewable energy sources can reduce the water footprint of energy production.

For example, a study by the World Resources Institute found that improving water use efficiency in India's power sector could reduce water consumption by 30% and cut carbon emissions by 10%. Similarly, water-efficient agriculture can reduce the energy needed for pumping groundwater, while also conserving water for other uses.

Introducing the Water Efficiency Index: A Metric for Progress

To track and incentivize water efficiency, experts have proposed the development of a Water Efficiency Index (WEI) for the built environment. Similar to a carbon footprint, the WEI would quantify the water use efficiency of a product, process, or organization. It could be used to compare the performance of different entities, set benchmarks, and drive continuous improvement.

For instance, a company with a low WEI might invest in water-saving technologies or adopt best practices to improve its score. Governments could use the WEI to design policies and allocate resources more effectively. Consumers, too, could benefit by choosing products with a favourable WEI, thereby supporting sustainable practices.

While the concept of a WEI is still in its infancy, it holds immense potential for promoting water efficiency on a global scale. By creating a standardized metric, we can foster transparency, accountability, and innovation in water management.

Conclusion: The Imperative of Water Audits in India

Water is a finite resource, and its prudent management is essential for the survival and prosperity of future generations. In India, where water scarcity is a pressing challenge, water audits offer a practical and effective solution. By identifying inefficiencies and promoting best practices, water audits can help conserve water, reduce costs, and contribute to the broader goals of net zero and sustainable development.

The statistics on water audits in India are encouraging, but much remains to be done. To truly harness the potential of water audits, we need greater awareness, stronger policies, and widespread adoption across all sectors. Only then can we ensure that every drop of water is used wisely and that no one is left thirsty in a world of plenty.

As we navigate the complexities of the 21st century, let us remember that water is not just a resource; it is a responsibility. By embracing water audits and championing water efficiency, we can secure a sustainable future for ourselves and for generations to come.



Manjula Thavarekere

Founder & Principal Consultant, Adithi MEP Consultants

Manjula Thavarekere is a graduate in Civil Engineering with a management program for women entrepreneurs from IIMB, that equips her with the perfect blend of technical and management competency to provide innovative engineering solutions in the field of Plumbing and Firefighting systems.

With 30 years of industry experience and connoisseur in the art of water, she is passionately working across various projects but not limited to Residential, Commercial IT parks, hospitality, institutional campuses, R&D centres and Industrial projects. She is serving as an honorary technical committee member of IPA and was instrumental in developing the IPA and IAPMO Plumbing codes and standards. She can be reached on manjula@adithiconsultants.com.



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WOMEN IN



PLUMBING ENGINEERING

BREAKING BARRIERS OF GENDER STEREOTYPES

- Ranjini Venugopal

"यत्र नार्यस्तु पूज्यन्ते रमन्ते तत्र देवताः"

"Where women are worshipped, there the gods reside,"

- signifying the importance of respecting and honoring women as the foundation of a prosperous society.

Women breaking barriers and shattering stereotypes is a powerful force for change, highlighting the resilience, strength, and capabilities of women in fields and roles that society has historically reserved for men. This movement spans

across many sectors—business, politics, sports, science, and more—challenging ingrained ideas about gender and paving the way for future generations.

Women entering plumbing engineering is an inspiring and transformative shift, especially since it is a field



traditionally dominated by men. Plumbing engineering, like other skilled profession, has historically been considered a male-dominated industry, often because of outdated stereotypes about physical strength, technical skills, and gender roles. However, over the years, women have started breaking into this field and challenging these assumptions, proving that women can excel in plumbing engineering just as much as in any other area of engineering.

Women in plumbing are still relatively underrepresented, but the presence of women in the occupation is growing.

Women entering plumbing defy outdated gender roles, proving that physical skill and technical expertise aren't confined to one gender. This challenges societal expectations and shows young women that they can pursue any career they're interested in.

While women in plumbing face challenges, the presence of more women in the field is slowly but surely helping to change the industry's landscape. As feminism advocates for equality across all sectors, women in plumbing are proving that this profession is not just for men — it's for anyone with the skill and drive to succeed.

Plumbing engineering spans many roles beyond physical installation, including designing plumbing systems, troubleshooting, project management, and consulting. These diverse roles create pathways for

Planning

System analysis

Compliance of building codes

women to get involved in areas that might be more appealing or accessible, such as planning, system analysis, and compliance with building codes.

The growing presence of women in plumbing engineering is a testament to their determination and the breaking down of gender stereotypes in a field that was once almost exclusively male. As more women enter and excel in plumbing engineering, they are not only opening doors for others but also reshaping how the industry is viewed and its potential for innovation, sustainability, and community development. By continuing to support women in this field through education, mentorship, and greater representation, we can look forward to a future where plumbing engineering is more diverse and inclusive.

Ranjini Venugopal
Associate, AECOM



Ranjini Venugopal is a graduate in Environmental Engineering, Environmental Law and Environmental Management Systems from National Law School of India University (NLSIU) and Indian Institute of Science (IISc). She has technical and management proficiency in providing sustainable and innovative engineering solutions in the field of Public Health and Fire Protection Engineering Services.

She has a strong experience of 20 years in this industry, and is passionately working on various projects like residential, commercial, IT parks, data centers and hospitality. She is a certified trainer who is dedicated towards Plumbing Education Programs and empowering the industry with certified Plumbers and Engineers.

She can be reached on Ranjini.Venugopal@aecom.com.



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SKILLED TRADESPERSONS IN CONSTRUCTION

A look at the evolution of skill, current status, emerging trends and the path forward

- Shobha Regunathan

Introduction

India, a rapidly developing nation with booming infrastructure needs, is at a pivotal moment in its construction industry. The demand for skilled labour is greater than ever before, and yet, there is a significant gap in the availability of qualified tradesmen, particularly in plumbing, electrical, and mechanical roles. The skilled trades—often overlooked and undervalued—are essential to the success and safety of construction projects, from residential buildings to

large-scale infrastructure like highways, bridges, and smart cities.

Historical Importance

Historically, tradesmen have played a critical role in the construction sector. India's rich history of architectural marvels have been shaped by master architects, engineers and craftsmen, their contributions, recognized and lauded. Skilled artisans and craftsmen were responsible for constructing some of India's most iconic structures, monolithic temples carved out of hills,



or temple structures that were built to astronomical calculations, or the intricately carved palaces of Rajasthan, and the detailed water management systems of the Indus Valley Civilization and many more. These structures not only highlight the advanced technical skills of the professionals but also their ability to integrate functionality with aesthetics.

In the past, skilled labor was passed down through generations in the form of apprenticeships. For instance, ancient Indian temples not only showcased magnificent craftsmanship but also boasted impressive engineering feats. The copper and bronze casting techniques, used in the creation of idols, are an early testament to the importance of specialized trades. Likewise, the expertise of local plumbers in old towns ensured the survival of functioning water systems that even modern-day cities struggle to match.

Traditional apprenticeship models have played a crucial role in skill transfer and preserving local knowledge in the construction sector. These models involve on-the-job training under the guidance of experienced masters, allowing apprentices to learn the trade through practical experience and hands-on learning. This

approach ensures that skills are passed down from one generation to the next, preserving traditional techniques and knowledge that are specific to local contexts and building practices.

Evolution and Current Status

Over time many of the skills started to get concentrated in certain geographies because of the apprenticeship model that revolved around existing skilled tradesmen. The skills were passed on one-on-one and the need for new apprentices spread word of mouth. It was but logical that tradesmen found it easier to pass on the skills to friends and family thereby resulting in communities specializing in specific skills.

Everyone who has been in the construction industry recognizes that some of the best carpenters, furniture makers and stone workers come from Rajasthan, the carpenters for shuttering from Bihar, the plumbers from Orissa and welders from Kerala. Within states there are pockets of excellence where a certain group may be adept at working in say terracotta roof tiles or mud earth bricks or glazed indigenous clay tiles or bamboo construction or marble polishing, electrical wiring, etc.





The construction sector in India has evolved significantly over time, with advancements in technology, materials, and construction methods. This evolution has also impacted the nature of tradesmen's skills, requiring them to adapt and acquire new knowledge to keep pace with industry demands. For instance, plumbers now need to be familiar with modern plumbing systems, electricians need to understand advanced electrical installations, and mechanical workers need to be proficient in operating and maintaining complex machinery.

The present-day status of skilled tradesmen in India's construction sector is marked by both opportunities and challenges. While there is a growing demand for skilled workers due to the expanding construction industry, there is also a shortage of qualified tradesmen, especially in specialized areas like plumbing, electrical, and mechanical work. This shortage can be attributed to factors such as lack of formal training, limited awareness of career opportunities in the trades, and social stigma associated with blue-collar jobs.

Skill Shortage

The construction industry in India is valued at over \$200 billion and accounts for a significant portion of the country's GDP. Despite this, the sector faces a severe shortage of skilled workers, particularly in plumbing, electrical, and mechanical trades. The National Skill Development Corporation (NSDC) has estimated that in



the next decade over 40.5m additional skilled workers will be needed and that the construction industry will employ nearly 100 m workers by 2030. *

One example of this shortage is the struggle to find qualified plumbers in urban areas. Cities like Delhi and Mumbai face an ever-growing demand for skilled plumbing professionals to handle the infrastructure growth, yet the workforce is primarily informal, with workers lacking formal training or certification. This results in inconsistent quality of work and a significant number of repair jobs to fix poor plumbing work. It also hampers the industry's ability to adopt new technologies and sustainable practices, as skilled tradesmen are needed to implement and maintain these innovations.

Similarly, in the electrical and mechanical trades, there is an increasing need for workers with knowledge of smart electrical systems, renewable energy solutions, and advanced HVAC systems. However, many existing workers are trained in outdated methods and are not prepared for the modern, technology-driven construction environment.

Implications for the Industry and Challenges

The shortage of skilled workers in plumbing, electrical, and mechanical trades is a major economic concern for the Indian construction industry as it can lead to project delays, increased costs, and compromised quality thereby implying decreased productivity, higher labour costs and reduced competitiveness.

There is a significant rural-urban divide in the availability of skilled labour in the construction sector. Urban areas tend to have better access to training and employment opportunities, while rural areas often lack adequate infrastructure and resources for skill development. This divide can lead to a concentration of skilled workers in urban areas and migration of qualified tradesmen from the rural areas.

Added to these complications is the fact that in India, skilled construction tradesmen and within that especially those in plumbing, electrical, and mechanical fields, often suffer from low social status. Many view such jobs as "manual labour," rather than skilled professions. This stigma deters many young people from pursuing careers in these fields, opting instead for white-collar jobs.

This perception is reflected in the low wages and poor working conditions that tradesmen often face. Plumbers, electricians, and mechanical technicians typically work in hazardous environments without adequate protective gear or social security benefits. Contract labour being employed for less than stipulated minimum daily wages is not uncommon. Neither is fatality or injury due to unsafe working conditions.

Emerging Trends

The rapid urbanization, development of smart cities, and increased investment in infrastructure projects in India have led to a growing demand for qualified tradesmen who can install, maintain, and repair the essential systems that support these developments.

Technological advancements in the construction industry, such as the use of automation, robotics, and smart materials, are transforming the way construction projects are executed, necessitating an upskilled workforce that can operate and maintain new



technologies, adapt to changing construction methods, and leverage digital tools to improve efficiency and productivity.

The emergence of green building technologies and sustainable construction practices has created a demand for specialized trade skills such as energy-efficient construction, renewable energy systems, water conservation, and waste management.

There is an increasing focus on safety, quality control, and sustainable practices in the construction industry. This trend requires tradesmen to be knowledgeable about safety regulations, quality standards, and environmental sustainability principles.

The Need for Focused Education and Training

One of the most significant challenges facing the construction industry in India is the lack of formal education and training opportunities for tradesmen. Many tradesmen acquire their skills through informal apprenticeships or on-the-job training, which may not provide them with the comprehensive knowledge and skills required by the industry. Moreover, education system tends to prioritize academic degrees, leaving vocational training at the margins. However, there is a growing recognition of the need to provide young people with the skills they need to succeed in the trades.

Government initiatives like **Pradhan Mantri Kaushal Vikas Yojana (PMKVY)** and **Skill India Mission** aim to



Skill India
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bridge this gap by offering vocational training and certification in various sectors, including construction. These programs focus on practical, hands-on training and aim to align the skills of workers with the demands of the industry.

For example, **National Skill Development Corporation (NSDC)** collaborates with private training providers to equip workers with the latest skills in electrical and plumbing technologies. More recently the **MSDE (Ministry of Skill Development and Entrepreneurship)** have trained over 10 lakh workers through several skill development programs in the sector. The NIPUN scheme jointly developed with Ministry of Urban Development and Housing has been set up, with a view to training 1 lakh workers in construction skills. Further initiatives in 57 identified job roles are being planned.

However, the gap remains wide. The current system lacks a clear pathway from school to the workforce for skilled trades. More investments in vocational training centers, apprenticeship models, and partnerships with industry players can help bridge this gap. Some of the practices that need adoption would be:

- Increasing participation of schools, colleges, and trade institutes in imparting structured vocational development courses.



- Offering courses and programs that align with industry needs, incorporate the latest technologies and construction methods
- Collaborating to provide students with hands-on experience through apprenticeships and internships.
- Ensure that training programs are relevant, practical, and meet the evolving demands of the construction sector by running joint programs with suppliers and construction companies.
- Incorporate Sustainable Construction practices and skills related to sustainability or Green Buildings.
- Incorporate safety and health related construction methodologies and techniques.

Improving Working Conditions & Inculcating Pride

Improving the working conditions of tradesmen is essential for elevating their status in society. Ensuring safe working environments, providing health insurance, and offering better wages are key factors in making these trades attractive to young people. By bringing dignity and respect to the trade and profession, the tradesmen feel more inclined to stay back near their places of work, thus reducing attrition and reverse migration, and contribute to economic growth of the country.

The Indian Plumbing Association (IPA) is one of the organizations actively working to change this perception. Through various programs, they promote the value of professional plumbing as a skilled trade and work to improve the wages, working conditions, and safety standards for plumbers.

Many of the Construction and Development companies are focusing on safety and health for their workers. They are implementing strict safety protocols, offering workers health and wellness programs, and providing



them respectable living environments, proper protective gear to mitigate the risks associated with construction work and improved working conditions. Such efforts help improve worker morale and raise the prestige of the trades. When workers feel valued, they take greater pride in their craft, which leads to better quality work and a higher standard of construction.

Empowering Women in the Trades

I have referred to workers as Tradesmen throughout this article and finally it is time to de-gender the trades. Traditionally, trades like plumbing and electrical work have been male-dominated fields. However, there is growing recognition of the need for diversity and inclusion within the construction workforce. If the nation has to progress it needs to tap the potential of the entire 100% of the population and not restrict to the male 50%. Programs aimed at training women in trades like electrical work and plumbing have seen success in many countries, and India is beginning to follow suit.

We need to work towards a truly inclusive and diverse workforce in construction where all genders can participate with dignity and pride. Tradespersons of all genders need to be trained. Women from both rural and urban backgrounds who are often breadwinners of the family and play a crucial role in the growth of the family and the community can be trained to become skilled tradespersons especially in the more technical trades such as plumbing, electrical, mechanical and green building works. These are non-traditional trades however they are the skills of the future and can inspire women for generations in the future.





Case for Focused Effort on Developing Trade Skills

In conclusion, the construction industry cannot continue to grow and thrive without a focused effort on developing and retaining skilled tradespersons. With technological advancements, growing infrastructure projects, and an evolving workforce, there is an urgent need for a concerted effort to close the skills gap.

Efforts to enhance social status, improve living and working conditions, and increase wages for

tradespersons are essential to attracting young talent. Additionally, promoting diversity and inclusion, especially for women, can provide long-term benefits for both the trades and the wider society.

Finally, consistent upskilling efforts—backed by government programs, industry collaboration, and community-based training initiatives—will ensure that India's construction workforce is ready to convert all opportunities and challenges into driving growth for the nation.

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Shobha Regunathan

Founder, Build ED

Founder Advisory Board Member, WiREnet World

Shobha Regunathan has nearly 3 decades of experience in the Built Environment Industry and was previously the National Head of Project Management at Colliers International India and the Co Head of Occupier Services at Cushman & Wakefield India. Through Build ED she provides consulting services for small and medium companies in the Built Environment sector in streamlining workflows, decision making, building organisation structures. She is an Alumnus of School of Planning and Architecture, New Delhi and Indian Institute of Management, Bangalore. She mentors young startup founders and delivers customised workshops for mid and senior managers.

Shobha is a passionate advocate of Sustainable Development practices in the Built Environment and is open to opportunities to create large scale impact through Construction Skill Development especially by training women in the fields of plumbing, electrical and specialised trades. She can be reached at shobha@thebuildded.com

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Ancient Water Conservation Systems

- Dr. Smita Pataskar and Aradhana Chavan



Preamble:

India, with its diverse geography and climate, has a long history of innovative water conservation methods. These systems were developed to address the challenges posed by varying rainfall, frequent droughts, and growing agricultural needs. Ancient Indian civilizations recognized the importance of water management, and their strategies reflect deep environmental awareness. To name a few, in Indus Valley Civilization, Dholavira had reservoirs to collect rainwater, while Lothal and Inamgaon had small bunds built to store water for irrigation and drinking. At the time of Mauryan Empire, The Arthashastra of Kautilya records extensive irrigation systems, including dams and bunds, managed under strict regulations. These water supply and water conservation systems are still seen at various locations and many of them are still functional. Lessons are to be learnt from our wise ancestors who built these large systems fulfilling the thirst of millions of population. Otherwise, the day is not far when world war III for "Water" will take place. Population of the earth is increasing with increasing demand of water in every sector and hence there is a need of using water sparingly along with its conservation.

With the advancement of technology, man has learnt to store water using dams. But our ancestors were practicing it way ahead of us although the demand was

less as compared today. We have to learn many lessons from them in practicing the rule of 'not a single drop of water should be wasted.' This article highlights the ways and techniques from ancient India that were followed by our ancestors. Two case studies which explain the rainwater harvesting techniques that were adopted by renowned dynasties are discussed here.

1. Kanheri Caves, Mumbai, Maharashtra:

In the very heart of Sanjay Gandhi National Park, Kanheri caves carved in basalt are situated. The name Kanheri is derived from sanskrit word 'Krishnagiri' i.e. black mountain which was the home of more than 2000 Buddhist monks. So, the need of water was tremendous and the only source of water was rain. Due to the presence of impervious basalt rock, water need to be stored in monsoon season using cisterns excavated near the residences. These cisterns or water tanks at different levels provided water for various purposes to different category of people at the same time.

The water cistern at the highest level is meant for the monks or the teachers. Lower to them are reserved for the disciples of the monks. Then those lower to them are for the business class or traders. The lowest are for the animals to drink from during summer months. All these water cisterns used to be covered with wooden lids, which are no longer present. In fig. 1, we can see the water channels inside and outside the caves which lead the fresh rain water to the water cisterns even now.



Fig. 1: Water channels outside caves



Fig. 2: Water pathway inside caves

Fig 3 depicts the system of outflow channels at each level, which lead the excess water into the next water tank and not a drop was wasted. The water from upper level was used for washing purpose where even the rocks were cut in a spherical shape to properly wash the clothes.



Fig 3: System for Reuse of water

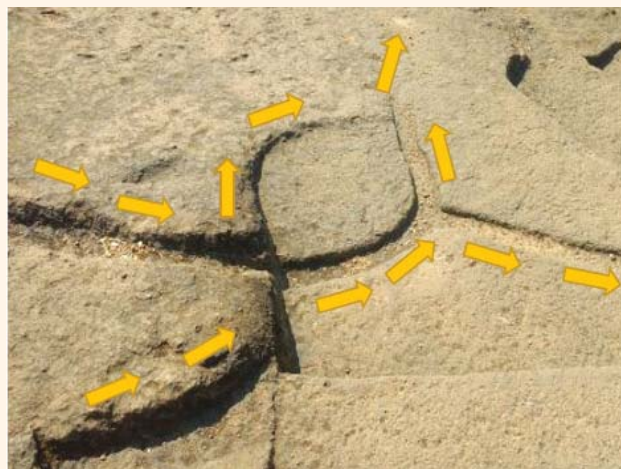


Fig. 4: Channelised water around steps

The channels carved in the floor, drain the water away from the steps, helping them to keep dry as far as possible as represented in fig 4.

2. Hampi, Karnataka

Hampi (Kishkinda), Karnataka is situated on the banks of river Tungabhadra 340 km north of Bengaluru. Once the most prosperous and considered to be the largest city in the World is now in ruined state, exhibiting the large water management system spread over almost 40 sq. km of area. A series of tanks, canals and aqueducts built in stones during 1336 – 1565 CE constitute the

amazing ancient water management network of Hampi.

The network of waterways reached each and every corner of Hampi bringing water from river Tungabhadra on one side and lake at Kamalapura (which is at a higher elevation) on the other. The properly sloping stone aqueducts carried the water to the Pushkarani or other tanks throughout the year. (Fig 5)



Fig. 5: Stone aqueducts supplying water to Pushkarini

The aqueducts built over and under the ground were used to supply water to a series of tanks, temples, royal enclosure areas and residential quarters.

In other areas, channel system was provided to collect water in smaller tank by providing adequate slopes (Fig. 6). Later on the water collected is fed to the bigger tanks for drinking, bathing and other purposes.



Fig. 6: Water collection system

Conclusion

These case studies illustrate the ingenuity of ancient water conservation systems in India and their enduring relevance in modern times. While technological advancements have changed the way water is managed today, these traditional systems provide valuable insights into sustainable practices that balance human needs with ecological preservation. The revival of such systems across the country demonstrates a growing awareness of the importance of water conservation, offering hope for a future where these ancient methods coexist with modern techniques to ensure water security.



Dr. Smita Pataskar

Associate Professor, Deptt. of civil engineering,
D Y Patil College of engineering, Akurdi

Dr Smita is an Associate Professor and Dean Students affairs. She has a academic experience of 30 years with specialization in Construction Management. She is passionate about teaching students and ensuring they are well-versed in the best practices followed by the construction industry. She is instrumental in forming IPA Students Chapter in the department and now working as mentor for the students. She can be reached on svpataskar@dypcoeakurdi.ac.in.



Aradhana Chavan

Assistant Professor, Department of Civil Engineering,
D Y Patil College of Engineering, Akurdi

Aradhana is an Assistant Professor with specialisation in Construction and Management. She is pursuing her PhD from MIT WPU and has got total teaching experience of 11 years in the institute.

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BENGALURU

Once a City of Lakes- from Junior Citizen's Lens



Jakkur Lake

Connecting with our city and feeling a sense of belonging can stir the urge to take meaningful action for its well-being. That is exactly what we, the students of Sparkling Mindz, have been doing. By learning and connecting with the story of Bengaluru's water condition, we are taking steps to make a difference.

Seeing our city beyond the facade

We are walking a journey of being changemakers and in this journey it is important to feel belonged to know about the problems of our city and to start doing something about it. We started building this sense of belonging, our facilitators asked us what we see when we think of our city. When we first thought about our city, Bengaluru, we saw traffic jams, endless honking, pollution, and piles of garbage. Some of us even called it a "Shitty city". Bengaluru was not different from any other city, it was just building, traffic and potholes. It wasn't a pleasant picture and most importantly children didn't see it as their city. But this perception changed when we went on "Child in the City Walks". Where we saw beyond the chaos to explore and connect with the heart of our city.

We visited the airport, railway station, markets, and quiet parks. Staying with the space, observing, wondering and listening to the untold stories we

started to see the wonders and stories of our city hidden in plain sight—hills, ancient temples, serene lakes, and vibrant markets that make Bengaluru unique. These experiences gave us a fresh perspective and a sense of belonging to this city that we had never felt before.

Phase 1: Child in the city Walk at Jakkur Lake

One day, we visited Jakkur Lake as part of our Child in the City walks. There, we learned something incredible: the lake had been rejuvenated through the collaboration of stakeholders, citizens, and local authorities. Hearing the story of how the lake was revived inspired us. We dived deeper into learning about the story of Bengaluru and its lakes.

Did you know Bengaluru was built by Kempegowda over 400 years ago as a city of interconnected lakes? Our city is built on granite hills, hence the system of lakes was designed to manage water overflow and recharge groundwater.

Through this process, we saw the importance of a community being built to save and protect the lakes of Bengaluru. To build communities and to belong to the Jakkuru community, we started holding workshops and stalls at Jakkur Lake. Every Saturday morning, we bring the community together through read-aloud and traditional games on the lake shore. We greet walkers



and runners in the morning with interesting nuggets about junk food, raising awareness about healthier choices. To address the garbage issue, we hold waste segregation games, helping them understand how proper disposal can prevent our lakes from facing further damage.

Phase 2: Facing the Water Crisis

During this time, Bengaluru faced a water crisis, which made it even more urgent to take action. We dove deep into the city's water history and wanted to make a difference. We curated our learnings into a play called **"Bengaluru: Once A City of Lakes."** We performed this for our Annual day. It was more than a play—it was a call to action. We invited citizens to sign a petition urging civic leaders to rejuvenate our lakes. This petition was supported by an organization called Jhatka. To reach more people we also performed this at the **Bengaluru International Centre**.

Phase 3: Understanding Floods and Infrastructure

Then came the floods. Rains wreaked havoc across Bengaluru. When this adversity hit our city, we wondered: Why? What can we do? How did we get here? Through this process of questioning and learning, our younger classes explored the water cycle, natural versus man-made disasters, and the difference between linear and cyclical systems. We also delved into

measurement, probability, and the materials that make up our city's infrastructure.

We learned about measurement, probability, and the materials that make up our city's infrastructure.

For 9th grade and above, this process helped us learn to research deeper on our own. We reached out to experts like hydrologists, urban planners, and organizations working on water conservation. We interviewed experts like Ashish Kumar, Annapoorna Kamath, Vishwanath (Zenrainman), Sanjana and Varun and Theertha from an organisation called Annanas. We culminated our learnings from the research through articles about Bengaluru's water history, and we wrote our own pieces about what we learned. One such article, titled "Yesterday I Missed My Trinity Exam Due to Bangalore Traffic," written by Mihika Jain, caught the attention of The Better India. They reached out to us and interviewed our team and our Founder to understand the Problems to Projects process that we follow to create possibilities when adversities hit.

Following this, *The Better India* published an article highlighting our work and journey. You can read the article here:

<https://www.sparklingmindz.in/blog/bengaluru-floods-when-it-rains>

Phase 4: Reaching More Citizens

But we weren't done yet. We wanted to reach more





people. Two students, Archita Anish and Lakshita Jain, took up the initiative of visiting the government office, engaging with officials, and successfully securing permission to perform a powerful dance at four metro stations—Baiyappanahalli, Majestic, Dassarahalli, and Kengeri.

For the past three weekends, our team has been committed to performing and inviting citizens to sign the petition by Jhatka to urge civic leaders to take immediate action. In just three weeks, our efforts have inspired 250+ signatures! We believe that Bengaluru's lakes and its future depend on us—its citizens. And together, we can create a city we're proud to call home and we continue to take action for this.

Phase 5: Inspiring Others Through Heritage Walks

Through this journey, we realized that the city isn't just a backdrop for our lives—it's alive, and we are a part of its story. Every lake, park, and monument is a documentation that narrates the story of our city. That's why we continue to take citizens through Child in the City Heritage Walks, sharing what we have learned and encouraging others to explore and connect with Bengaluru. We hope to inspire more children and adults to see beyond the traffic and pollution, to the beauty, history, and potential that lies beneath.

This journey is a testament to the fact that when children belong to the city and can see the city beyond the common facades, it builds a sense of purpose to take action. Then learning becomes purposeful, meaningful and joyful.

A Call to Action: What You Can Do

We believe that change is possible when we work together. Here's how you can help us continue our efforts to protect Bengaluru and its lakes:

1. **Sign the Petition:** Join us in urging civic leaders to take immediate action on rejuvenating Bengaluru's lakes. [Sign the petition here.](#)
2. **Join Our Heritage Walks:** Participate in the *Child in the City Heritage Walks* and explore Bengaluru's hidden gems while learning more about its history. [Register now here.](#)
3. **Spread Awareness:** Share our story with friends and family. The more people know the more we can accomplish together.
4. **Join Us at Jakkur Lake Every Saturday:** Attend our stalls, games, and workshops and be part of building a strong community dedicated to protecting Bengaluru's lakes.
5. **Start These Community-Building Initiatives:** Begin similar initiatives in your own communities and **invite us to be a perform** at these initiatives—together, we can amplify the impact.
6. **Share the Story of Our City's Water Condition:** Join us in sharing our journey and raising awareness about Bengaluru's water condition at the metro stations and lakes. Reach out to us at +91 88677 03055 or at school.sparklingmindz.in to be part of this movement.
7. Read more about the work that we young changemakers are doing at our school blog: [Sparkling Mindz Global School](#)

Let's work together to rediscover Bengaluru and make it the city we've always dreamed of. Together, we can create a cleaner, greener, and more sustainable future!

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Accessible and Inclusive Spaces:



A Pathway to Equity, Sustainability, and Water Efficiency

- Dr. Veena Shenoy

Introduction

Creating accessible and inclusive spaces is not just about compliance with legal mandates—it is a commitment to equity, sustainability, and universal participation. Inclusive spaces cater to individuals of all abilities, ensuring that physical, digital, and social environments are welcoming and barrier-free. As governments, businesses, and communities recognize the value of universal design, accessibility is becoming a crucial consideration in real estate development, corporate governance, and urban planning.

An often-overlooked yet critical component of accessibility is water and plumbing infrastructure. Reliable and inclusive water systems ensure that people of all abilities can access clean drinking water, use hygienic sanitation facilities, and navigate plumbing systems designed for universal ease of use. From sensor-based faucets that promote hygiene and water conservation to accessible restrooms with ergonomic fixtures, integrating thoughtful plumbing solutions is essential for creating truly inclusive environments.

The Business Case for Accessibility in Real Estate and Design

Enhancing Property Value and Market Appeal

From a real estate perspective, accessibility is no longer an optional feature—it is a necessity. Commercial and residential spaces designed with universal accessibility principles offer a competitive edge by catering to a broader range of users, including senior citizens, persons with disabilities, and families with young children.

Key Benefits:

- Increased property valuation and higher occupancy rates.
- Compliance with global standards and national regulations.

- Improved customer satisfaction and brand reputation.

Universal Design Principles in Architecture and Plumbing

Universal design focuses on creating environments that are usable by all people without the need for adaptation. Key elements include:

- **Step-free access:** Ramps, wide doorways, and elevators for easy mobility.
- **Wayfinding solutions:** Braille signage, tactile paths, and digital navigation tools.
- **Smart technology integration:** Automated doors, voice-activated controls, and sensor-based lighting.
- **Ergonomic plumbing solutions:** Sensor-based faucets, touch-free flushing, and accessible



restrooms with grab bars and appropriate sink heights.

Accessible Toilets: A Crucial Aspect of Inclusive Design

Sanitation plays a pivotal role in accessibility. The design of accessible toilets must prioritize:

- **Adequate space for manoeuvrability** to accommodate wheelchairs.
- **Lever-style or touchless faucets** to aid individuals with limited dexterity.
- **Height-adjustable or universally designed sinks** ensuring usability for all.
- **Well-placed grab bars and non-slip flooring** to enhance safety.
- **Efficient water management systems** such as low-flow fixtures and rainwater harvesting integration to promote sustainability while ensuring accessibility.

Countries like India, under the RPWD Act, 2016, emphasize the need for accessible sanitation facilities in all public buildings. Additionally, initiatives like the Swachh Bharat Mission have highlighted the importance of inclusive toilets in ensuring dignity and hygiene for all.

Challenges in Real Estate and Urban Planning

Despite the clear advantages of accessibility, there are significant challenges in real estate and urban development:

- **High Costs of Retrofitting:** Older buildings and public spaces require substantial investment to meet accessibility standards.
- **Lack of Awareness and Expertise:** Many developers and architects are not well-versed in inclusive design principles.

- **Regulatory Gaps and Enforcement Issues:** While laws like the RPWD Act exist, enforcement remains inconsistent, leading to non-compliance.
- **Resistance from Developers:** Some real estate stakeholders prioritize aesthetics or cost-cutting over accessibility features.
- **Water Scarcity and Plumbing Limitations:** Many urban areas struggle with water shortages, making it critical to integrate water-efficient plumbing solutions that do not compromise accessibility.

The Role of Smart Cities and Sustainable Development

Smart cities embrace accessibility as a key component of urban planning, ensuring that public transportation, parks, workplaces, and commercial hubs cater to diverse populations. Aligning with Sustainable Development Goals (SDGs), particularly **SDG 6 (Clean Water and Sanitation)**, **SDG 10 (Reduced Inequalities)**, and **SDG 11 (Sustainable Cities and Communities)**, cities worldwide are investing in barrier-free infrastructure, digital accessibility, and age-friendly designs.

Water-sensitive urban design plays a crucial role in this vision. Rainwater harvesting, greywater recycling, and smart water meters contribute to both accessibility and sustainability, ensuring uninterrupted water access while conserving resources.

Innovative Architectural Solutions

Showcasing architectural projects that prioritize inclusivity highlights innovative approaches to design:

1. **The Lighthouse for the Blind and Visually Impaired, Seattle:** This facility employs tactile maps, auditory cues, and seamless navigation paths, providing a model for inclusive design for the visually impaired.



Picture representing the design of the Lighthouse for the Blind incorporated



2. **Maggie's Centre, UK:** Known for its holistic approach to cancer care, this center offers serene, accessible spaces with wide corridors, ramps, and natural lighting, ensuring a welcoming environment for all.



Picture presenting the Maggie's Centre, UK

3. **National Centre for Biological Sciences, Bangalore:** Notable for its universal design principles, the campus integrates accessible pathways, Braille signage, and inclusive restrooms, promoting a barrier-free environment.



Picture showing the building and entrance of the National Centre for Biological Sciences, Bangalore

4. **Singapore Sports Hub:** This architectural marvel incorporates inclusive design in its seating arrangements, ramps, and sensory-friendly spaces, ensuring accessibility and comfort for diverse audiences.



Picture showing the stadium of Singapore Sports Hub

5. **Vitra Campus, Germany:** Renowned for its universal design, it showcases varied seating options, adaptable workspaces, and ergonomic designs, setting benchmarks for inclusivity in office environments.



Picture showing the structure of Vitra Campus, Germany

Architects today are surpassing regulatory compliance, embracing best practices that intricately weave accessibility into design. Many modern workplaces prioritize inclusivity, employing features like adjustable desks, sensory rooms, and universally designed spaces. Corporate offices are integrating ramps, wide corridors, and inclusive restrooms, fostering an inclusive work environment. New architectural designs are seamlessly incorporating accessibility aids like Braille signage and adjustable-height workstations. These initiatives champion a shift from standard compliance to holistic inclusivity, setting precedents by prioritizing user experience, diversity, and innovation in architectural design, creating spaces that seamlessly accommodate diverse needs.

Regulatory Mandates: RPWD Act, BRSR Framework, and Accessibility Audits

Rights of Persons with Disabilities (RPWD) Act, 2016

India's RPWD Act, 2016, mandates the development of inclusive environments across educational institutions, workplaces, transportation systems, and public buildings.

Key provisions include:

- Ensuring all public and private buildings comply with harmonized accessibility standards.
- Making reasonable accommodations for persons with disabilities in workplaces.
- Establishing accessibility audits to monitor compliance and improvements.



Business Responsibility and Sustainability Reporting (BRSR) Framework

The BRSR framework, introduced by SEBI, encourages companies to disclose their environmental, social, and governance (ESG) performance, including accessibility initiatives. Under BRSR, businesses must:

- Report on policies related to diversity, equity, and inclusion (DEI).
- Conduct accessibility audits and obtain certifications.
- Invest in infrastructure that supports universal access, including water-efficient and accessible plumbing solutions.

Conclusion

Designing accessible and inclusive spaces is no longer just about compliance—it is a strategic investment in sustainability, equity, and business growth. By aligning with RPWD mandates, BRSR reporting frameworks, and SDG targets, organizations can contribute to a world where every individual, regardless of ability, can participate fully and independently. Water and plumbing considerations play a critical role in this effort, ensuring dignity, hygiene, and sustainability in accessible spaces. Moving forward, accessibility audits and certifications will be key differentiators, driving corporate and real estate sectors toward a truly inclusive future.

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Dr. Veena Shenoy
Founder and CEO, Inclusiv



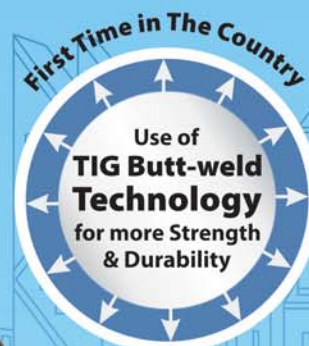
Inclusiv is a social impact start-up with a global mission of creating a barrier-free sustainable inclusive environment for persons with disabilities and senior citizens. Dr. Shenoy's passion for inclusion goes beyond her entrepreneurial endeavours. Dr. Veena Shenoy is Head SDG's Impact ISBR Business School Bangalore. She represents the Women Indian Chamber of Commerce and Industry (WICCI) as the State President for the Karnataka Sustainable Development Goals Council. She also serves as the State Chair for the Diversity and Inclusion Wing of G100. Her academic credentials include a Ph.D. from the National Institute of Technology Karnataka (NITK) Surathkal Mangalore, and she remains an active member of the International Association of Accessibility Professionals (IAAP).

She can be reached on Veena.s@isbr.in Veena.shenoy@inclusiv.in.

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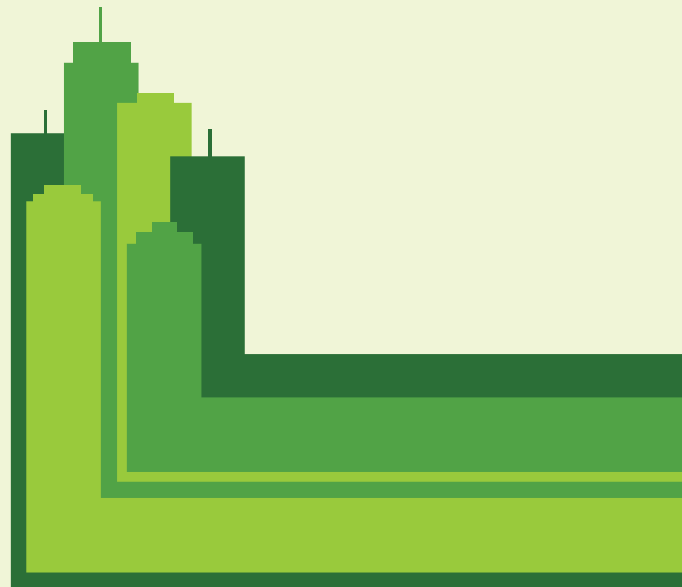
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SCAN FOR MORE DETAILS

High Rise Plumbing in Green Category Buildings

- Sharat V. Rao



'Going Green' has been the buzzword in all spheres of life and plumbing engineering is no exception. Accelerated depletion of water resources, global warming, scanty and irregular pattern of rainfall are all global issues and we must find a way to address this. In plumbing 'water' happens to be the focus area although drainage and its recycle also holds equal contribution. There cannot be two doubts that 'Green Plumbing' should be mandatory. Whether you call it 'Smart Plumbing' or 'Green Plumbing' they are essentially the same. The basic concept is reduction of water use through resourceful landscaping, waste water technology and high efficiency plumbing design. The future is to go for 'Net Zero' buildings which will be self-reliant, sustainable and will not borrow 'Water and Power' from the public supply grid.

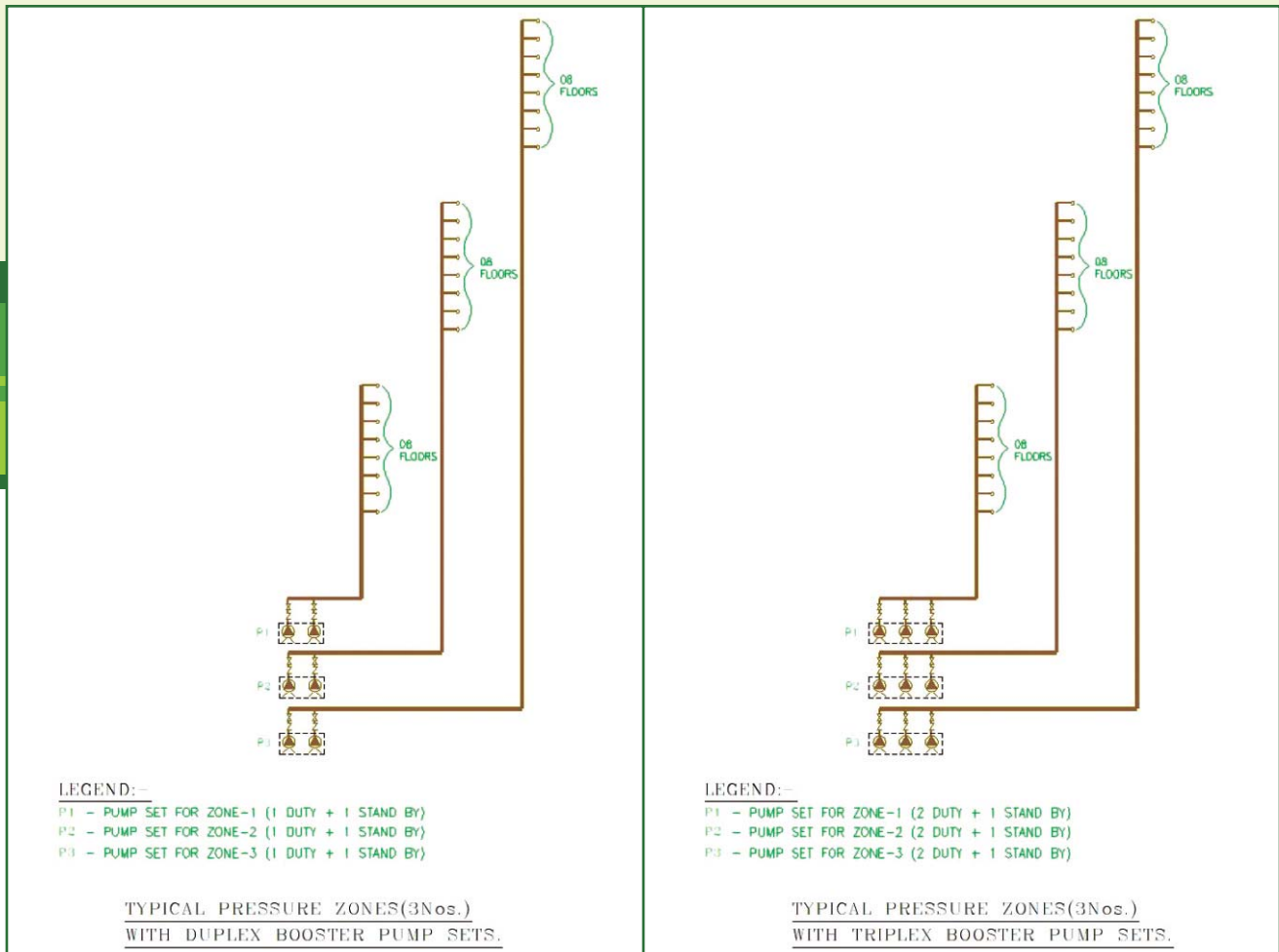
The major concern in High Rise Plumbing is the pumping requirement especially with booster pumps commonly known as Hydropneumatic systems. Besides providing variable frequency drive (VFD) which is a pre-requisite, if these system are not properly designed in terms of pressure zones and pressure reducing valve (PRV) it could become major source for loss of water and energy, thus defeating the very purpose of 'Green Plumbing'.

The simplest way of designing a pressure booster system is to have a set of pumps with a single water riser and controlled on the lower floors with pressure reducing valves. This system is very cost effective but at the same time it is very high on maintenance and power consumption. Pressure reducing valves in a domestic water booster system is like driving a car with your feet on the accelerator and brakes simultaneously. This would wear out the components very fast and consume unnecessary fuel.

Good and efficient high rise plumbing design with pressurized booster system is to design the building with pressure zones for the domestic water systems such that each pressure zone is served by an independent booster pump system with individual risers. This type of design keeps the building free from pressure reducing valves which is a huge energy saver and also less maintenance hurdles. Good and efficient sustainable design should encourage pressure zones for domestic water systems that are each served by an independent booster pump system and risers.

The pressure zones could be established in a way that each zone shall restrict its height such that the pressure in the system at any delivery outlet is not above 4.2 bar (60 psi). This type of design will keep the building free from pressure reducing valves which is a huge energy saver and less maintenance intensive. Accounting for all friction losses and residual head, on an average each pressure zone could cater to approximately 8 floors considering an average floor height of 3.0m and the residual pressure at the remotest outlet to be 1.2-1.5 bar depending on the flow conditions. True that this system will be high on capital cost due to the multiple pump sets but will be tremendously energy efficient and the estimated payback time would be around 3-5 years.

Besides this, the system will not be subjected to excessive pressures with reduction in water wastage. Over and above, if each pressure zone is served by a triplex booster set i.e. (3 Nos. pumps) instead of a duplex (2 Nos Pumps) then it should qualify for additional bonus points as there is an additional energy saving. Triplex will mean (2 working + 1 standby) and Duplex will mean (1 Working + 1 standby). It is recommended to design each pressure zone with its own standby pumps. Refer to the sketch below.



It would be appropriate to mention over here that good engineering practices are sometimes compromised in the name of 'Value Engineering' with the sole objective of cost cutting without any due consideration of life cycle costs. Green Building norms must address this issue and incorporate this aspect in their rating system.

Sharat V. Rao

National Joint Secretary, Indian Plumbing Association
Managing Editor, Indian Plumbing Today magazine
Convener, IPA Technical Committee

Sharat V. Rao is the Managing Director, Engineering Creations Public Health Consultancy Pvt. Ltd. Sharat V. Rao graduated from V.J.T.I, Mumbai, in 1977 and obtained his Master's Degree in Civil Engineering with Environmental Engineering subjects in 1979 from the same institute.

He is IPA National Joint Secretary and Convener, IPA Technical Committee. Prior to becoming the National Joint Secretary, he has been the Chapter Chair for IPA Mumbai Chapter for two terms. He is also fellow of the Institute of Engineers, Member of Indian Water Works Association (IWWA). He is Managing Editor, Indian Plumbing Today, the official journal of Indian Plumbing Association. He can be reached on jtsecretary@indianplumbing.org



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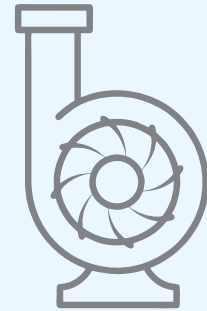
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Pump Installations



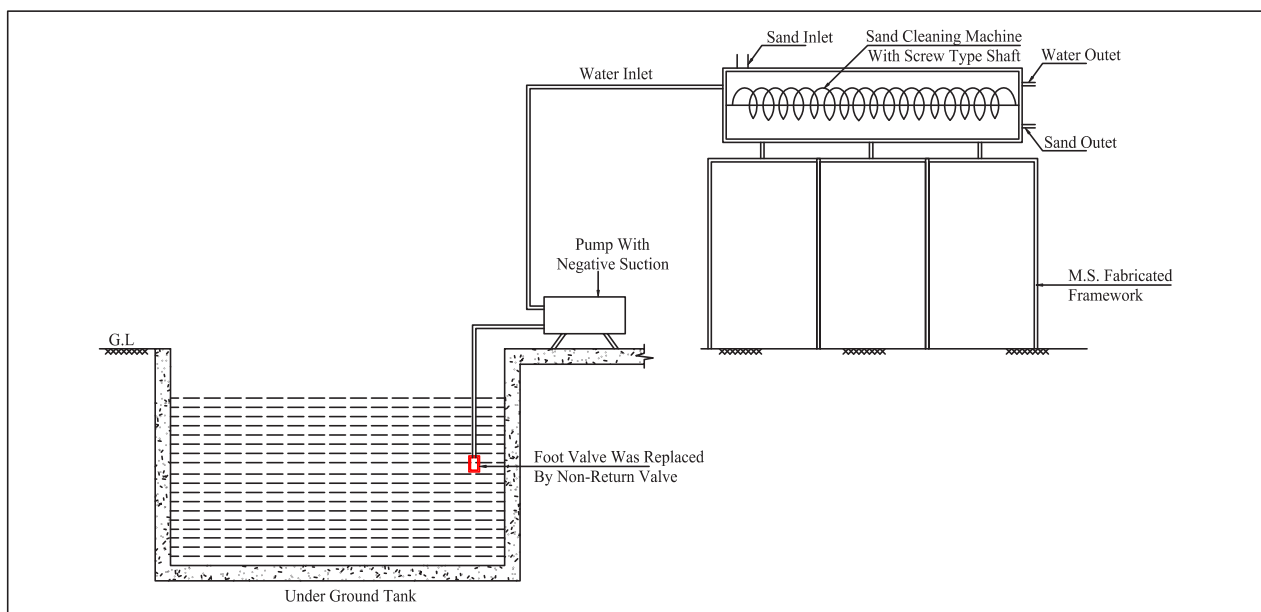
- Kiran Vinayak Joshi

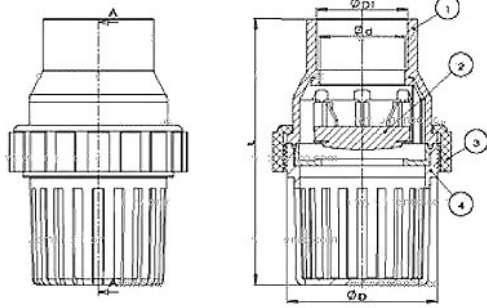
Silica stones are extracted from quarries and crushed to produce Silica sand in Amba Ghat, located in the Sahyadri region near Kolhapur. Since there are various grades of sand, and stone dust is also mixed in, proper grading of sand and removal of dust is essential. To achieve this, the sand must undergo a washing process, which requires water. The process is referred to as "single wash sand" or "double wash sand." Washing enhances the grade of the sand, which is then used in foundries for moulding machine parts. As a result, the price of the sand depends on its grade.

One day, I received a call from a project manager at my

client's site, asking if I could select a pump for a sand washing plant. I agreed, but I needed technical data for the washing machine, including flow and pressure requirements, as I wasn't familiar with the full process. The project manager sent me the details of the machine, as provided by the manufacturer. Based on this, I selected an appropriate pump model, which was then installed at the site. For over a year and a half, the pump functioned smoothly.

However, one day the project manager called again and requested a site visit. They were experiencing a reduced water flow, which was affecting both the quality and





Foot Valve Section



Non-Return Valve Section

quantity of the output. I visited the plant and observed the setup, which appeared to be unchanged since its initial installation. The issue seemed to stem from a reduced flow of water, which had resulted in decreased quality.

We proceeded to inspect the underground water storage tank, which was about 3 meters deep. The pump was installed on the tank with negative suction. The installation appeared to be fine, and the system had worked properly for more than a year and a half. No changes had been made since the first installation. I continued to search for the source of the issue, but couldn't identify anything unusual. The water was not clean, so I asked the operator why this was the case. He informed me that fine sand dust had collected in the tank, which was interfering with the foot valve's operation. Due to the frequent nature of this issue, the team had been removing the suction pipe, cleaning the foot valve, or replacing it, and restarting the process. As repairs became more frequent, they replaced the foot valve with a non-return valve. While this resolved the issue of air entering the suction pipe, it led to a new

problem: low discharge. That's when they reached out to me for assistance.

I recommended that they switch back to using the foot valve and suggested keeping one or two extra foot valves on site, as the location was far from the city. It turned out that the non-return valve was the culprit. While the functions of the foot valve and the non-return valve are similar—both prevent water from flowing backward—their mechanisms differ. The foot valve allows water to flow freely, with its flap opening when the pump starts, allowing water to enter the pipeline. The flap is made of plastic, rubber, or leather, and works efficiently under low pressure, with minimal energy loss during suction. In contrast, the non-return valve uses a spring to close the valve and prevent water from flowing back. This creates a back-pressure in the pipeline when the valve is closed. To open the valve, the pump needs to exert more power, resulting in lower discharge and pressure.

The root cause of the issue was a lack of understanding regarding the function of foot valves and non-return valves.

Kiran Joshi

Chapter Chair, IPA Kolhapur Chapter

Kiran Vinayak Joshi is the Proprietor of the firm Kiran Joshi & Associates, a firm engaged in Public Health and Fire Fighting consultancy at Kolhapur. He has a specialization in institutional buildings, medical colleges, hospitals, hotels, villas etc and in finding water leakages & remedies.

He is a GPI Accredited Trainer and Chapter Chairman, IPA Kolhapur Chapter. He can be reached on kolhapur@indianplumbing.org



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Groundwater Tribunal Acts Quietly without Media Spotlight

- Hari Haran Chandra

It is like some sort of a ritual. Every onset of summer will see the media reporting on the water crisis, and a dozen 'experts' will be interviewed for features and reports on the 'grim crisis' the city, any city, faces. As an American journalist, Ron Feemster, touring India the last couple of months said on a national water platform called the [WOW Action Forum](#), "Journalists are good at fast-moving stories and not with 'slow journalism' that covers such stories and reveal patterns we have long ignored. Environmental reporting needs a different reporting timeline, not just fast journalism with 'breaking news' sort of thinking."

Take, for example, the approach the GWT has taken in the last 3 months in anticipation of the summer and of the long-term water challenge. A very well thought-out

set of actions has been packed into a directive that is going out to every company that is a bulk water-user. Without much fanfare, the Tribunal has sent out individual directives to hundreds of companies on do's and don't's on water management. Middle and Senior managers are scurrying to find consulting professionals and solution providers who can help these companies and facilities comply with this directive.

Consider the set of actions the GWT is 'demanding' of every company that gets this NOC for prudent water management, and you will see how this can constitute a good strategy for managing water effectively and getting companies to go closer toward securing self-dependence on their water needs. IT parks commercial buildings, and industrial facilities typically are required

by this mandate to comply on an everyday basis, and to report such compliance periodically through the state Groundwater Directorates.

For starters, there is a cap that is fixed on how much water can be drawn from inhouse borewells of any such facility. In one case, for example, over nearly 40 borewells that the facility has been exploiting, it has been 'told' to extract no more than about 500,000 litres a day against about twice as much that the facility was drawing from these borewells. Of course, they have been banned from plunging more borewells, and precluded from using other borewells at the facility that have been dysfunctional. The GWT has been, sensibly, deciding on the cap for groundwater extraction on the basis of the geomorphology of the entire micro-region where such a facility is located. For example, where the region falls under 'Over Exploited' category the cap on extraction is much lower. Besides, there is a new Groundwater Abstraction/Restoration Charge ranging from 15 to 30 lac to be paid annually by any such facility which takes recourse to borewells use—it is reckoned at a very nominal 0.01 paise per litre for such a facility or building.

This is not all. Every such facility has to prove that it is remaining under the extraction limit by installing piezometers, a device used to measure water pressure, particularly the pressure of groundwater within soil or rock. This is better known as pore water pressure—essentially a tube installed underground that allows the measurement of the water level within the soil by observing the height to which water rises within the tube, providing information about the groundwater conditions at a specific point. So, the facility is obliged by mandate to install these at suitable locations and to comply with the groundwater regime monitoring programme in and around the project area on regular basis. Reports have to be provided periodically to the Groundwater Directorate at the state level.

This new dictate from the GWT also requires the facility to conduct and offer details of a 'water audit report'. These audits are to be done by certified auditors. Every water-user company with more than 100,000 litres used per day, or about 36 million litres a year, has to comply.

Part of the set of directives also is a set of managing principles: the withdrawal of water should be better managed to avoid wastage of water; the used water should be treated, recycled and reused; rain water harvesting structures should be erected around the borewells and must meet approval of the officers of the GWT or the state agency; use of water will be subject to

regulation from time to time based on the extraction of water from the borewells; necessary steps should be taken to avoid pollution of groundwater resources across the facility's land expanse. The GWT also recognises the importance of measuring and monitoring is the key to managing water better. So digital meters have to be installed and data on groundwater withdrawal have to be maintained and submitted every month to the Authority. The groundwater quality has to be monitored twice a year during pre- and post-monsoon periods—a stipulation that can only come from officers within the GWT who understand the dynamics of water, of turbidity, of the 'relate' to soil and local ecology.

This writer, just as any other water professional among readers here will be, is amazed at the sensitivity that the GWT has shown. Every aspect of good and sound water management practice has been covered with care and diligence. Of course, there are punitive penalties for violating any of these provisions. Well, much of these are practices that any responsible company should be putting into practice voluntarily and conscientiously. The fact that the NOCs have to be devised in these ways shows that companies continue not to pay attention and abuse such natural resources without much thought. And there is therefore the need for the stick that the GWT is now wielding across industry and commercial segments.

There have been provisions for long years but compliance has been an exception, rather than the rule. The State Groundwater (Regulation for Protection of Sources of Drinking Water) Act, 1999, for example, has now been asked by the GWT to be 'scrupulously' adhered to by every bulk water-user. Every prevailing Central/State Government rule or law or Court order relating to construction of borewells, withdrawal of groundwater or even of construction of recharge or conservation structures [a 'rule' that has been flouted by nearly every water-user] has to be complied with. All laws and provisions relating to waste water discharge and their treatment to permissible limits is also part of this mandate now.

Furthermore, an NOC that is issued for a window of two years, can be reviewed by the Authorities mid-term, if the hydrogeological condition in the microregion demands a change. Which means, the quantity of groundwater allowed to be drafted can be changed at short notice. If the groundwater drawn within these permissible limits is not adequate to meet daily demand, the GWT suggests that the company should

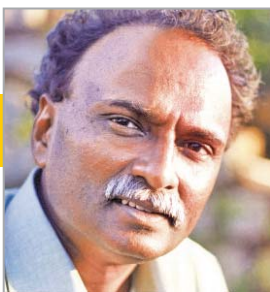
make 'alternate arrangements' for reducing quantity with demand-side measures. A company or facility is of course permitted to sustain its activity by securing water through local bodies or using waste water fully after necessary treatment. In effect, the Tribunal is saying a water-user can treat the water to drinking grade and create a Net Zero Water loop with little or no dependence on borewells, or external purchase, or recourse to the municipal water grid.

In another case of a hospital in the heart of a city, the requirement of water is at 330 KLD—or an annual demand of 120 million litres. No more than 16 million litres a year is secured from borewells, with the yield per borewell per day being no more than 10,000 litres. All the rest is provided by the municipal water grid... Now the new directive from GWT is demanding that they align to better water management practices. A cursory examination of the data showed that the Hospital could harvest or treat-and-reuse or conserve with demand-side options as much as 90 million litres—or 75-80% of their water need of 120 m litres! This will well mean that the Hospital does not have to rely at all on the external grid. And with a bit of work to renew and strengthen the shallow aquifer by 'depositing' water into newly created dug wells [like those in our grandfather's homes] their need for water from the municipal grid will drop to zero. In the case of this hospital, the current

tCO₂e is about 2000 tons. This can drop to zero and make the hospital a low-carbon facility if only they did all these voluntary or under the stick of the GWT.

The GWT has been generous to a fault when it comes to the cap they are allowing water-users. In the case of one IT Park where the annual demand is 400 m litres, the NOC has permitted them to use as much as 200 m litres from existing inhouse borewells, of course within the confines of the regulatory norms that we have listed in this column—the levy of a 'Restoration Charge' at a very nominal 0.01 paise per litre of water-use; the installing of piezometers for groundwater regime monitoring and of a digital meter with real-time dashboards; the filing of a water audit report every year, the recharge of shallow aquifers and of the borewells with depositing of water in the rain months, the responsible use of treated water. All of these are best practices that any company or facility should adopt, whether or not they come under a mandate. Claiming green certification and burnishing brands of companies as 'sustainable' is not enough. They have to walk the claim.

As a water professional yourself, what do you think the companies you advise should be doing, or the company that you lead should implement as policy and practice? Write in. It will help us to know what we can do as practitioners.



Hari Haran Chandra

The writer is founder-trustee at the economic-ecologic AltTech Foundation, a Senior Fellow at CII IGBC, founder-trustee at Prem Jain Memorial Trust. He is a green building pioneer and a Net Zero Water/Energy exponent currently guiding over a billion litres of low-carbon water for a variety of projects as he mentors Ecophoria. Reach him at hariharan@alttech.foundation

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IPA Leaders meet Sh. Manohar Lal Khattar, Union Minister of MoHUA to invite him to PlumbexIndia 2025 as a Chief Guest



Left to right: Sh. Rohit Srivastava – Manager, Outreach, Sh. Gurmit Singh Arora- National President, IPA, Sh. Manohar Lal Khattar –Union Minister of MoHUA, Sh. Chandra Shekhar Gupta, National Vice President, IPA

IPA Leaders meet Shri Tokhan Sahu, Hon'ble MoS MoHUA Minister to invite him to PlumbexIndia 2025 as a Guest of Honour



Left to right: Sh. Rohit Srivastava – Manager, Outreach, Sh. Chandra Shekhar Gupta, National Vice President, IPA, Sh. Gurmit Singh Arora- National President, IPA, Sh. Tokhan Sahu, Hon'ble Minister of State, MOHUA

IPA leaders visit Astral Headquarters



From left to right: Sh. Chandra Shekhar Gupta - National Vice President, IPA, Sh. Sandeep Engineer - Chairman and Managing Director, Astral Limited, Sh. Gurmit Singh Arora - National President, IPA, Sh. Minesh Shah - National Secretary, IPA, Sh. Apurva Shah - Chair, IPA Ahmedabad Chapter, Sh. Kairav Engineer - Executive Director, Astral Limited, Sh. Bhaskar Katragadda - National Treasurer, IPA

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Technical Seminar

“Sustainable MEP Engineering using BIM”

IPA Trivandrum Chapter in association with Builder’s Association of India (BAI) Trivandrum Centre organized a technical seminar on “Sustainable MEP Engineering using BIM” on 11th January 2025 at Hotel Hycinth, Trivandrum. The seminar was inaugurated by Er. Suresh Kumar, Chairman, CREDAI. The program was presided by Er. K. Nandakumar, Chairman, IPA Trivandrum Chapter. The Chairman, BAI Trivandrum Centre, Er. Varghese Mathew welcomed all the delegates. The session was conducted by Er. Bijo K John, Senior MEP Consultant and Chairman, IPA Kochi Chapter.

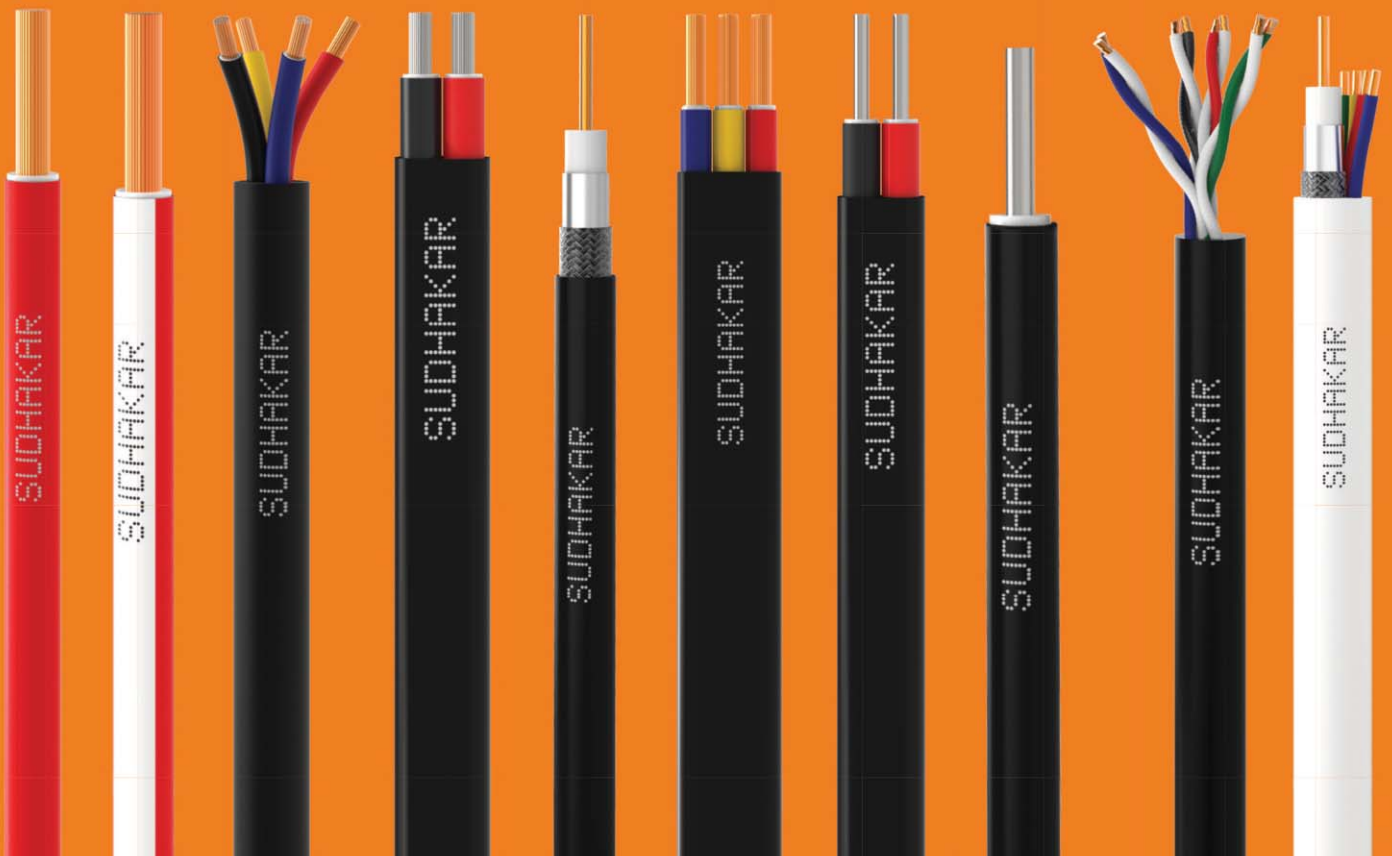
The active participation of 68 delegates from Builders, Architects, Engineers, Contractors, faculty members of Mar Baselios College of Engineering, Trivandrum, Marian Engineering College, Marian College of Architecture and Planning, College of Architecture Trivandrum, and members of the IPA Trivandrum Chapter were the highlight of the seminar.

Er. Bijo K John shared insights about sustainable MEP Engineering, which focuses on designing systems that reduce energy consumption, enhances environmental performance, and improves overall building efficiency. He explained about how Building Information Modeling (BIM) is a powerful tool used in sustainable MEP engineering; it is a digital representation of a building’s physical and functional characteristics, allowing engineers to plan, design and manage building systems in a highly efficient manner.

The delegates actively participated in the discussion with a lively and engaging Q&A session. This was followed by the presentation of the sponsor, Ms. Lakshmi Electricals, and vote of thanks by Shiva JP, Secretary, BAI Trivandrum Centre.



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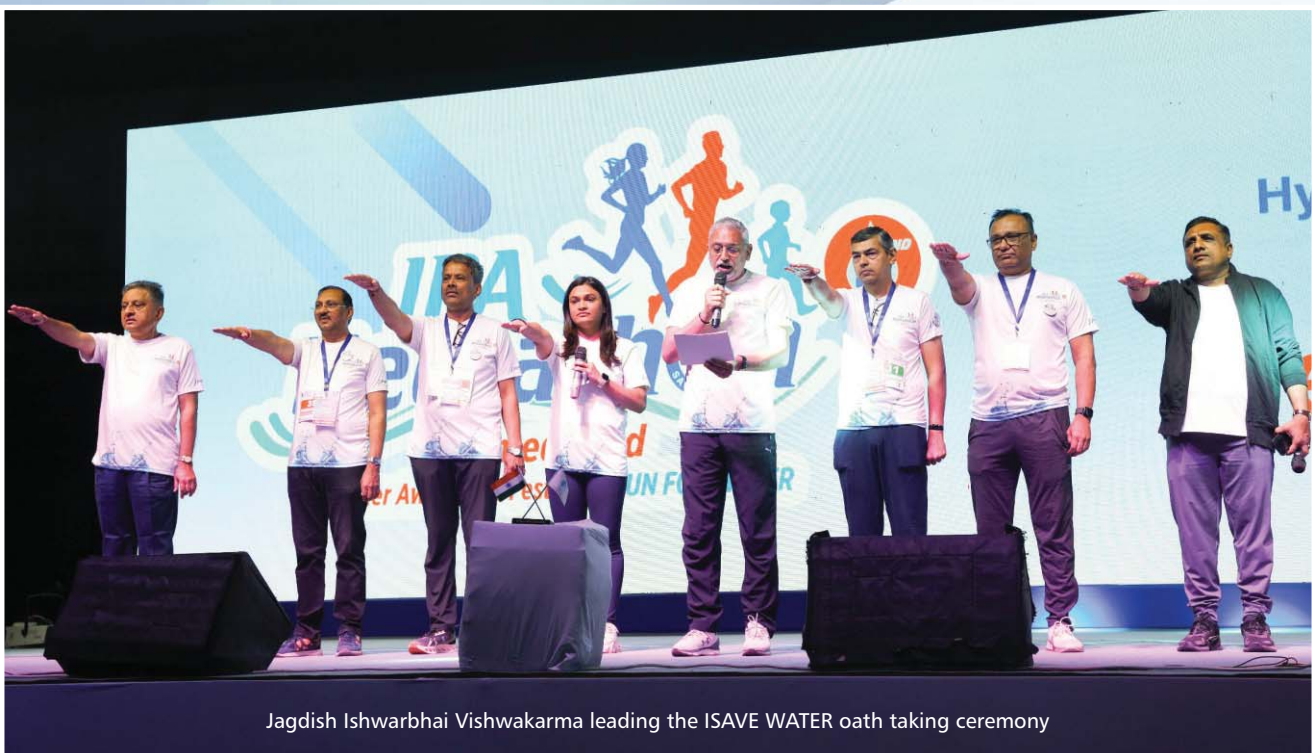
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IPA Neerathon

Festival Awareness Water - RUN FOR WATER

— AHMEDABAD —

Sabarmati Riverfront, 16th February 2025



Jagdish Ishwarbhai Vishwakarma leading the ISAVE WATER oath taking ceremony

IPA Neerathon 2025, the 2nd Edition was successfully held in Ahmedabad on 16th February 2025 to spread awareness about water conservation. Jagdish Ishwarbhai Vishwakarma (Panchal), Minister of State for Micro, Small and Medium Industries, Cottage, Khadi and Rural Industries, Civil Aviation (State Minister) presided over the event and led an oath-taking ceremony for water conservation, adding prestige and significance to the occasion. **Jagdish Vishwakarma** also flagged off the #Run4Water

With great enthusiasm, 1,300+ runners participated, making the event a remarkable success. The Neerathon featured three race categories: 3 km, 5 km, 10 km.

The event concluded with a felicitation program to honour all our esteemed sponsors, graced by the presence of Mr. Apurva Shah, Chairman of IPA Ahmedabad Chapter, and Mr. Harshal Parikh, Honourable Secretary of IPA Ahmedabad Chapter.

Renowned Gujarati artist Arvind Vegda also participated in the event and delivered an energetic performance, singing a song to motivate and inspire all the runners.



IPA Neerathoners before the Flag off



Runners after flag off



Arvind Vegda, Gujarati singer giving an enthusiastic performance



Young IPA Neerathoners

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Installation of Student Chapter – College of Architecture Trivandrum



K. Nandkumar, Chair, IPA Trivandrum Chapter (extreme left) administering the oath of office to the newly elected executive committee of Student Chapter

The IPA Trivandrum Chapter installed its fifth Student Chapter at College of Architecture Trivandrum (C.A.T), on January 15th, 2025. The function was presided over by Er. Nandakumar K., Chairman, IPA Trivandrum Chapter. Prof. Induja V., Head of Department, welcomed the participants. Ar. Jayakumar J., Director, C.A.T, Ar. Neena Thomas, Principal, C.A.T, Er. Shajeer Basheer, Secretary, IPA Trivandrum Chapter, Ar. Bijey Narayanan, Professor, C.A.T and several other faculty members were also present.

The Chairman handed over the Charter to the student chapter representatives, marking an important milestone in the establishment of the student chapter. It was followed by the administration of Oath by the Chapter Chairman to the newly elected team. The function was well attended by students from all semesters, creating a vibrant and engaging atmosphere. This initiative marks a significant step in fostering academic and professional development for engineering students in the region.

The Director mentioned the importance of plumbing in architectural designs and the need for equipping the students for the same. The Principal and other faculty members emphasised the major role the chapter could play in shaping the future generation's ability to address issues related to the effective utilization of water resources. The event concluded with a vote of thanks delivered by Er. Dinu Krishnan, Convenor, Student Chapter, expressing gratitude to all those involved in the successful launch of the chapter.

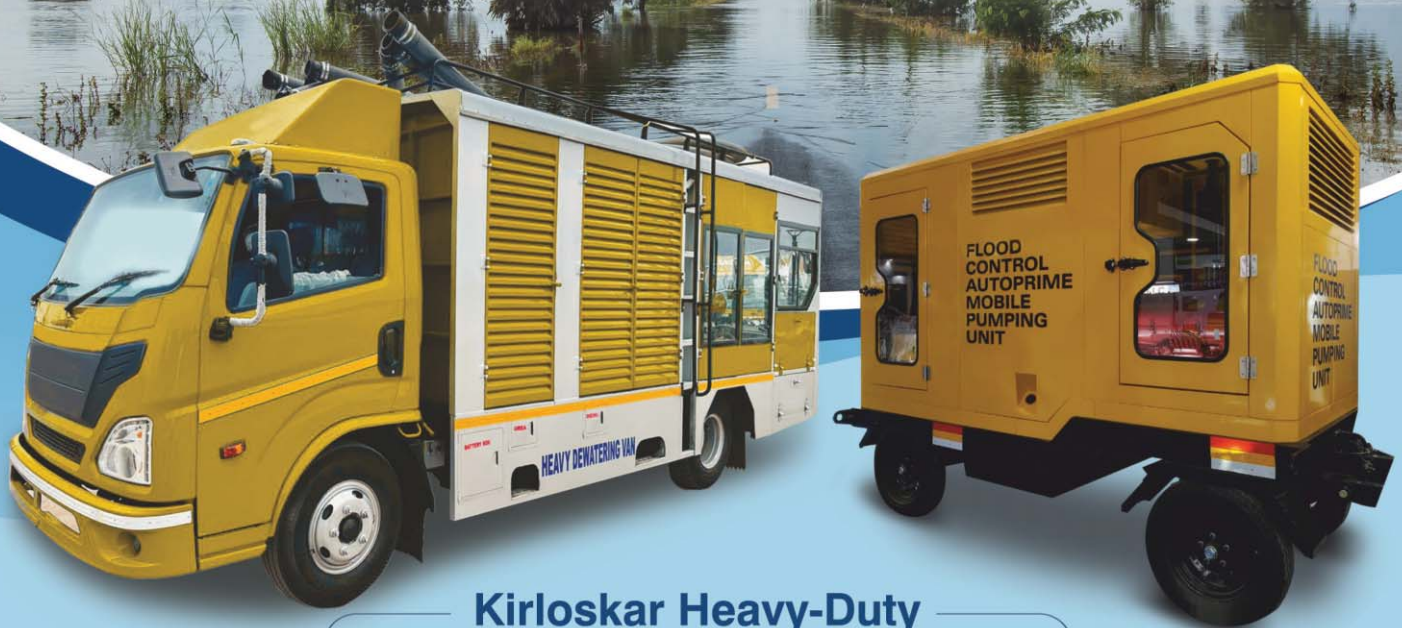
Plans for various upcoming activities were discussed. It was also discussed on how to equip the students in preparing architectural designs giving importance to sustainable plumbing practices.



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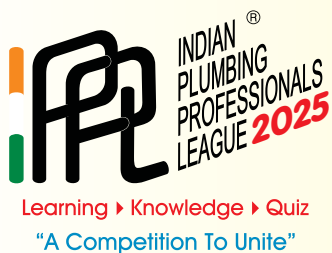
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Know Your Chapter Chair

Mr. P.V. Raghupathi

Chapter Chair,
IPA Visakhapatnam Chapter

PV Raghupathi is a project management professional with over 30 years of experience. He was the Secretary of Visakhapatnam Chapter from 2018-2021 followed by Treasurer from 2021-2024.

Q1. How long you have been associated with Plumbing industry/trade/profession. Please tell us about your specific profession in terms of the area of plumbing you work in; the type of projects you work on?

I have been associated with the Plumbing profession since 2015. I have been working into the area of Project management and Facilities management.

Q2. What are your Dreams or Wish list as Chapter Chair.

My first goal is to place the Chapter on right track so that I bring all our members together so that we carry out activities that contribute towards the betterment of Plumbing profession and Redefining plumbing standards.

Furthermore, I intend to strengthen the Chapter membership with induction of more professionals from the plumbing industry.

Q3. What are your views on IPA activities: WPD/ IPC /IPPL and its impact on the building industry?

WPD, IPC and IPPL are all good programs providing good PR to IPA's fulcrum of activities. The participants of the said programs are benefiting the plumbing professionals in their respective trade also. This is the very reason joining these activities helps a plumbing professional to grow both personally and professionally.

Q4. Tell us your suggestions on the adoption of innovative Plumbing Technology and Plumbing Installations.

Conducting mock up sessions with real time functioning of the installations will be a good activity that IPA can take up with plumbing product manufacturers at each Chapter level.

Q5. How can IPA encourage young professionals to adopt good plumbing practices?

Providing proper training with modern techniques to young professionals in this trade will enable them to understand the importance of good plumbing practices in increasing the life of a building. In addition to this, industrial tours to good installation sites will give them hands on exposure.

Q6. Which are the new activities that IPA should explore in the near future?

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OBITUARY



Aman Kapoor

6th February 1973 – 3rd February 2025

Aman Kapoor was the Managing Director of KK Tech Eco Products Pvt Ltd, exclusive marketing associate of Kitec Industries for Punjab region along with being the distributor for multiple European and American companies like Bradford White, ACO, SFA, ILIOS etc. Aman Kapoor was associated with the plumbing and drainage industry for the last 25+ years. Before building his business and company from ground zero he worked as a sales executive in the pharma industry in Punjab & Uttar Pradesh region. After leaving his job he started his career as an entrepreneur in the trade of tiles, sanitary ware, and CP fittings later pivoting to a more specialized industry of plumbing and drainage. Since then, with his knowledge, experience, and hard work, he has been achieving great success in the industry. He became IPA Member in 2014 and later went on to become Founding Chairman of the Indian Plumbing Association Chandigarh Chapter in 2015-2018 tenure and then served as NEC member from 2018-2024.

He was a noble and compassionate soul always ready to help those in need. His hard work throughout his life transformed the life of the entire family. His sudden passing away is shocking and heartbreaking for everyone who knew him personally. He leaves behind a legacy of integrity and kindness. He is survived by his wife Mrs Pritika and son Kartik who will cherish his memory for ever.

The entire NEC mourns the sudden demise of Aman Kapoor, a pleasing personality who left a mark on everyone he interacted with.

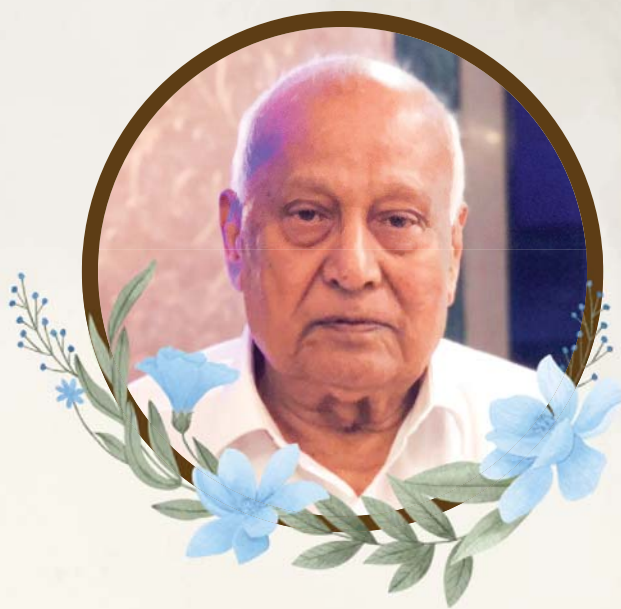
Sahil Kansal, Chair, IPA Chandigarh Chapter said, "I am deeply shocked and saddened by the sudden loss of Aman ji. His ever-helping nature, unwavering determination, and genuine kindness touched everyone around him. He leaves behind a legacy of warmth and integrity that will always be remembered."

Chandra Shekhar Gupta, IPA National Vice President expressed, "Aman Kapoor was instrumental in starting IPA Chandigarh chapter and remained committed to the Mission and Vision of IPA in totality."

"Aman was known to me much before he joined IPA. He was a soft spoken and great gentleman. I have known him to be a very ethical and honest person, always dedicated to his cause. We pray that Aman finds his very special place with the Almighty!", added Gurmit Singh Arora, National President, IPA.

ॐ शान्तिः

OBITUARY



DD Pradhan

13th December 1932 – 9th February 2025

DD Pradhan, born on 13 December 1932 in Mandapara village located in Pattamundai area of Kendrapara district of Odisha. After completing his schooling, he left his village in search of a better future. He reached Delhi in 1956 via Assam, Bhilai, Bhubaneswar where he started a new life. There was a shortage of skilled plumbers in Delhi at that time. Seeing this opportunity, in 1956 he founded DD Pradhan & Company. This company became an important source of employment for thousands of Odia youth. Pradhan ji's hard work and foresight made Odisha's plumbers famous all over the country. His business led to the economic development of many people and he was recognized as a leading entrepreneur in his field.

DD Pradhan's contribution to the Plumbing field will be remembered by many of his admirers. He was a leading renowned Plumbing contractor who with his deep knowledge in Plumbing and hard work executed lot of renowned projects throughout the country.

D. D. Pradhan was also a joint founding member of Indian Plumbing Association. He not only helped people around him to grow but also contributed a lot for the good of the society at large, with his deep devotion to the Lord Jagannath.

Gurmit Singh Arora, National President -IPA, Chandra Shekhar Gupta – National Vice President, IPA and members of the Indian Plumbing Association deeply mourn his death and pray that the almighty grant eternal peace to his departed soul in his lotus feet.

ॐ शान्तिः



INSTITUTIONAL MEMBERS

I- 095

Mr. M. Senthil Velan
Deputy Director and Principal
Government Industrial Training
Institute
MTH Road, Ambattur
Chennai – 600050. Tamil Nadu
M: 9499055664
E: ambatturiti2019@gmail.com

I- 096

Dr. Prashant Awsarmal
Head – CED
Maharashtra Institute of Technology
Gate No. 1, MIT Campus, Beed
Bypass
Aurangabad – 431010. Maharashtra
M: 8149277773
E: hodcivil.mit@mit.asia

I- 097

Prof. Amol Karbhari Thakare
Asst. Professor
Department of Civil Engineering
SNJB'S LSKBJ
College of Engineering, Neminagar
Chandwad – 423101. Maharashtra
M: 9637636495
E: thakare.akcoe@snjb.org

I- 098

Dr. V. Murugaiyan
HOD (Civil)
Dept. of Civil Engineering
Pondicherry Technological University
Pillaichavadi, Puducherry – 605014
M: 9486009466
E: vmurugaiyan@ptuniv.edu.in

I- 099

Dr. Regulwar
Professor & HOD
Dept. of Civil Engineering
Government College of Engineering
Railway Station Road, Osmanpura
Chhatrapati Sambhaji Nagar –
431005. Maharashtra
M: 9420697868
E: regulwar@gmail.com

I- 100

Dr. Nandan N Shenoy
Associate Professor
Dept. of Civil Engineering
PES Institute of Technology &
Management
NH- 206, Sagar Road
Shivamogga – 577204, Karnataka
M: 9742452370
E: nandanpes@pestrust.edu.in

I- 101

Dr. H.C. Nagaraj
Principal
Nitte Meenakshi Institute of
Technology
PB. No. 6429, Yelahanka
Bengaluru – 560064. Karnataka
M: 9845275240
E: principal@nmit.ac.in

I- 102

Mr. M. Srinivasan
HOD (Civil)
Elumalai Polytechnic College
3/249 C, E.S. Nagar, NH 45
Chennai Trunk Road, Ayyankoilpattu
Villupuram – 605601. Tamil Nadu
M: 9751797857
E: eptctp1983@gmail.com

I- 103

Mr. K.V.R. Srinivas
Managing Director
Sri Chakra Maritime College
No. 7, Nagalingam Street
Sivagami Nagar, Gowrivakkam
Chennai – 600073. Tamil Nadu
M: 9840733113
E: info@srichakramaritimecollege.com

I- 104

Ar. Chaya Chavan Tirvir
Vice Principal
Padmashree Dr. D.Y. Patil College of
Architecture
D. Y. Patil Educational Complex
Sector 29, Nigdi Pradhikaran, Akurdi
Pune – 411044. Maharashtra
M: 9822761820
E: chayatirvir@dypcoa.ac.in

I- 105

Prof. Vandana Pathak
Asst. Professor
Ambalika Institute of Management &
Technology
House No. 18/12, Sulabh Awas
Yojana, Transport Nagar
Lucknow – 226012. Uttar Pradesh
M: 9455942364
E: vp9415809167@gmail.com

LIFE MEMBERS

L-5539

Mr. Abasaheb Gopal Ghadage
Proprietor
Ramkrishna Traders
C.S. No. 65, Shirol (P)A/P-
Hatkanangale, Dist. Kolhapur,
Kolhapur – 416122.
Maharashtra
M: 8380000017
E: rkt2645817@gmail.com

L-5540

Mr. Imran Ali
Partner
Universal Hardware Mart
16, Errabalu Street
Chennai – 600001.
Tamil Nadu
M: 9841397566
E: uhm1935@mail.com

L-5541

Mr. Nicholas Baskar S
Proprietor
Matrix Hydro & Enviro Technix
Plot No. 114, VGN CH- 40Shivani
Street, Anna Nagar
Chennai – 600040.
Tamil Nadu
M: 9677203537
E: nicholasbaskar81@yahoo.co.in

L-5542

Mr. Jayvardhan U. Mane
Marketing Head
Sufal Enviro
Tikke Building, Behind Gokul Hotel,
Shahupuri, Kolhapur – 416001.
Maharashtra
M: 7387999329
E: sufalenviro@gmail.com

L-5543

Mr. Shamnad M. S.
Managing Partner
ESES Plannet Pvt. Ltd.
Plannet Hub, Peroorkada Vazhayila
Road, Peroorkada
P. O.Trivandrum – 695011. Kerala
M: 9995999332
E: ms_shamnad@yahoo.com

L-5544

Mr. Harpreet Singh Anand
Partner
Tejas Infratech LLP
Office No. 415, 4th Floor, Boulevard
Tower, Opposite Vijay Sales, Sadhu
Vaswani Chowk, Pune- 411001.
Maharashtra.
M: 9822021846
E: tejusinfratech@yahoo.com

L-5545

Mr. Santanab Mukhopadhyay
Director
Saent India Engineering Consultants
Pvt. Ltd.
Flat No. F- 425, 4 Sight Model Town
437, Madhya Balia Garia
Kolkata – 700084.
West Bengal. M: 9836677738
E: santanabm@saentindia.com

L-5546

Mr. Charandas Vitthaladasji Rath
Partner
Dwarkanish Sales LLP
Flat No. 301, Arti Residency, Taj
Nagar, Manewada Cement Road
Nagpur – 440027. Maharashtra
M: 9422804041
E: charan.rathi@yahoo.com

L-5547

Mr. Sandeep Vanvari
Director
Siddhivinayak Precast Pipes Pvt. Ltd.
Arihant Heights, Sector - 25 Plot No.
76, Pradhikaran, Nigdi,
Pune – 411044.
Maharashtra
M: 9765013888
E: shv@siddhivinayakprecast.com

L-5548

Dr. Samir Nimbark
MD & CEO
Nexgen Innotech LLP
C- 504, Siddhivinayak Towers,
Off S.G. Highway Near Kataria
House, Makarba,
Ahmedabad – 380051.
Gujarat
M: 9545994644
E: samir@nexgencorporate.in

L-5549

Mr. Mani Shankar
Afcons Infrastructure Limited
690/1, Ram Krishna Colony
Castair's Town, Deoghar – 814112.
Jharkhand.
M: 9040882242
E: er.manishankarsingh@gmail.com

L-5550

Mr. Sangram Kishore Routaray
M/s Water Odisha
Plot No. 13, Flat No. 302
Jay Durga Nagar, Bomikhal
Bhubaneswar – 751006.
Odisha
M: 9439250684
E: water.odisha@gmail.com



LIFE MEMBERS

L- 5551

Ms. Arthita Mazumdar
Business Development Officer
Janus Life Sciences
Plot No. 182, Jadavpur University
Housing Cooperative Society
Panchasayar, Kolkata – 700094.
West Bengal.
M: 8240604007
E: mazumdararthita@gmail.com

L- 5552

Mr. Shiv Agrawal
Engineer Babu Real Estate
Plot No. 38, Ashoka Palm Meadows
Old Dhamtari Road, Dunda
Raipur – 492015.
Chhattisgarh
M: 9826805300
E: shivagrawal5300@gmail.com

L- 5553

Mr. Manoj Kumar Thakkar
Milan Traders
Opposite Maharaja Plaza
Near Fruit Market, Lalpur, I
Raipur – 492001.
Chhattisgarh
M: 9329100950
E: milan.thakkar11@gmail.com

L- 5554

Mr. Pradeep Kumar Pandey
Astral Limited
Plot No. 86, KH No. 98, Village Laulai
Madhav Green City, Lane No. 4 A
Lucknow – 226028.
Uttar Pradesh
M: 7755001316
E: pradeep.pandey718@gmail.com

L- 5555

Mr. Sudheer Kumar B.
Managing Director
M/s Solve Plastic Products Ltd.
Saraswathy Bhavan
Tholicode, PO Punalur
Punalur/Kollam – 691333. Kerala
M: 6235350000
E: info@balcoppes.com

L- 5556

Mr. Anil G.
Director
Tecet Consultants LLP
D-8 A, Moolayil Lane
Sasthamangalam
Trivandrum – 695010. Kerala
M: 9447110751
E: shpcemc@gmail.com

L- 5557

Mr. Murali L.S.
Chief Consultant
KIIFCON
6 A, Mansions Gayathri
Pallimukku, Peyad
Trivandrum – 695573. Kerala
M: 9445392400
E: lsmurali66@gmail.com

L- 5558

Mr. Madhusoodanan K.
Dy. Chief Engineer (Retd.)
6 E, Nikunjann Fortune
Jawahar Nagar
Trivandrum – 695003. Kerala
M: 9447161155
E: kmadhutvm@gmail.com

L- 5559

Mr. Pradeep M.S.
Partner
Soura Smart Power
TC 2/1034-2, Sankia, PRA-26
Puthupally Lane, Medical College
(PO) Thiruvananthapuram – 695011.
Kerala
M: 9447246825
E: pradeeptvpm@gmail.com

L- 5560

Mr. Varghese Mathew
Vimson Properties
Thekkedath Baby Gardens
Ulloor Medical College (PO)
Trivandrum – 695011. Kerala
M: 9539936146
E: mailvmindia@gmail.com

L- 5561

Mr. Nakul J. Nair
Senior Engineer
MANSIONS
Jans VH- 27, Vikramapuram Hill
Kuravankonam
Thiruvananthapuram – 695003.
Kerala
M: 7736229166
E: nakul@mansionsproperties.com

L- 5562

Mr. Renjith Rajesh
MANSIONS
Raghu Bhavan, F- 2 Tagore Nagar
Vazhuthacaud
Thiruvananthapuram – 695014.
Kerala
M: 9742467172
E: renjith@mansionsproperties.com

L- 5563

Mr. Xavier D.
AEE (Retd.)
KSEB
T.C. 12/438 (1), PTR 95- A
Plammoodu Thekkumoodu Road
Pattom P.O.
Thiruvananthapuram – 695004.
Kerala
M: 9495727432
E: xavier.das@gmail.com

L- 5564

Mr. Bennychen C.E.
TC 23/25251, KNRA 38 C
Kadappathala Nagar
Lane No. 6, Golf Link Road, Kowdiar
Thiruvananthapuram – 695003.
Kerala
M: 9447587989
E: cebennychen@gmail.com

L-5565

Mr. Varun Shirish Sarwate
Joint Managing Director
Flowtech Fluid Systems Private
Limited
55-14-75, APSEB Colony,
Seethamadhara
Visakhapatnam - 530013.
Andhra Pradesh
M: 9951971777
E: varunsarwate@gmail.com

L-5566

Mr. Rajesh Nagula
Director
TRIO-S
Flat No. 401, Shree Sai Arcade,
Opposite Hill View Park,
Seethamadhara N.E. Layout
Visakhapatnam - 530013.
Andhra Pradesh
M: 9849414941
E: rajeshnagula@gmail.com

L-5567

Mr. Gorle Pardhasaradhi
Asst. General Manager
Karlan Constructions LLP
31-50-12/91, LN Gardens, STBL,
Kapu Jaggarajupeta Road
Visakhapatnam - 530049.
Andhra Pradesh
M: 7995824109
E: pardhagorle@rediffmail.com

L-5568

Mr. Arnav Sharma
Manager, BD
Taurus Industries
1st Floor, Temple Tower, Christian
Basti, G.S. Road
Guwahati - 781005.
Assam
M: 7406614717
E: tauruspurifiers@gmail.com

L-5569

Mr. Rajendra Raghunath Karmarkar
Aerocool Engineers
Shop No. 3, Akshay Apartment,
Sector N-G-F-1, CIDCO
Chhatrapati Sambhaji
Nagar - 431003. Maharashtra
M: 9372071921
E: karmarkar@aerocoolengineers.com

L-5570

Mr. Md. Yaseen Baba
Managing Partner
Air N Gas Controls
47-3-17/37, Govind Mansion,
Dwarka Nagar
Visakhapatnam - 530016.
Andhra Pradesh
M: 9849849627
E: airngas@yahoo.co.in

L-5571

Mr. Mohan Das C
Associate Professor
College of Engineering
Sudarsanam, Madavila Lane,
Sreekaryam
Trivandrum - 695017. Kerala
M: 9847319688
E: cmdcetcivil@gmail.com

L-5572

Mr. Gopakumar C.B.
Managing Partner
Chandni Agencies
Chandni, SRA- 15, Sreemoolam
Road, Kumarapuram
Trivandrum - 695011. Kerala
M: 8281679073
E: cbroy@hotmail.com

L-5573

Mr. Sudharson Raj M
Project Manager
Bala Associates Engineers &
Contractors Private Limited
Plot No. 8, 2nd Floor, Ramalinga
Nagar, Naravarikuppam, Redhills
Chennai, Tamil Nadu
M: 8637431982
E: msudharsonraj@gmail.com

L-5574

Mr. Allwin Selvan P
Project Manager
Bala Associates Engineers &
Contractors Private Limited
Plot No. 8, 2nd Floor, Ramalinga
Nagar, Naravarikuppam, Redhills
Chennai,
Tamil Nadu
M: 8675615167
E: allwinseivan28@gmail.com



LIFE MEMBERS

L-5575

Mr. AbiRam M

Engineering Manager
L & T Construction
D-106, Kochar Neetu Arjun Garden,
Tharapakkam Main Road
Gerugambakkam
Chennai - 600128.Tamil Nadu
M: 7200079487
E: abihosur@gmail.com

L-5576

Mr. Madane G

Chief. Engg
L & T Construction
Flat No. 2C, 2nd Floor, Sangam
Apartments,
Plot No:10-B, Lakshmi Nagar,
Manapakkam
Chennai - 600125.Tamil Nadu
M: 9445285391
E: gmadane@rediffmail.com

L-5577

Mr. Varma Krishnan E

Design Engineering -PHE
Udaya Engineering
No: 94, Bharathiyar Street, Sarathy
Nagar Extn, Puthagarm, Kolathur
Chennai - 600099.Tamil Nadu
M: 6374730165
E: varmaelumalai97@gmail.com

L-5578

Mr. Rajapandiyan N

Design Engineer
SR Associates
40/3 Chetty Street, Ayyanavaram,
Chennai - 600023.Tamil Nadu
M: 8220376025
E: rajapandiyan9494@gmail.com

L-5579

Mr. Padmanathan S

JGM & Head -Value Engg BIM for
Construction MEP
L & T Construction
Sree Padman, Plot No 19A, Ali
Street, Jayalakshmi Nagar,
Pulithivakkam
Chennai - 600091.Tamil Nadu
M: 9444398987
E: padmanathans68@gmail.com

L-5580

Mr. Cibi Chakravarthi N

Engineering Manager
L & T Construction
90/40, Nattu Subbarayan Street,
Mylapore
Chennai - 600004.Tamil Nadu
M: 9769788983
E: civincibi87@gmail.com

L-5581

Mr. Sri Ganesh S

Sr.Engg.Manager
L & T Construction
Plot No: 364, Phase II, Urban Rise
Eternity,
SIDCO, 5th Cross Road,
Thirumazhisai
Chennai - 600124.Tamil Nadu
M: 9841198167
E: sganesh@Intecc.com

L-5582

Mr. Shinoob M

Engg Manager - PHE
L & T Construction
621, Vaikund Srishti Apt,
Manapakkam
Chennai - 600125.Tamil Nadu
M: 7401101268
E: shinoobm@gmail.com

L-5583

Mr. Dinesh S

Construction Architect
RSD Foundations
No. 14-A, New, W Club Rd, Shenoy
Nagar, Chennai - 600030.
Tamil Nadu
E: dinesh@rsfoundations.com

L-5584

Mr. SaiRam Suresh R.C

CEO
Vector Solutions Pvt Ltd
Plot No: 2, Kamarajar 5th Street,
Tass-Industrial Estate, Ampattur
Chennai - 600098.Tamil Nadu
M: 9677256822
E: sairamsuresh@vectorsolutions.india.com

L-5585

Dr. Tamilarasan K

Associate Professor
Vel Tech Multi Tech Dr. Rangarajan
Dr. Sakunthala Engineering College
B- 226, Thendral Nagar,
Shenbagathoppu Road,
Melapatta Karisalkulam Panchayat
Rajapalayam - 626117.Tamil Nadu
M: 9486536474
E: tamilkarupiah@gmail.com

L-5586

Dr. Aswin Sidhaarth K.R

Professor
Vel Tech Multi Tech Dr. Rangarajan
Dr. Sakunthala Engineering College
Flat No : 104, R-1 Block, VGN
Stafford,
Thirumulaivasan
Nagar,Thirumulaivoyal
Chennai - 600062.Tamil Nadu
M: 7358506455
E: drsidhaarth@gmail.com

L-5587

Mr. Sakthivel Murugan M

Sr. Manager
Casagrand
1/130, Ponnamman Kovil Street,
Nanmagalam
Chennai - 600129.Tamil Nadu
M: 8838780078
E: savemu69@gmail.com

L-5588

Mr. Muthu Mani A

Plumbing Engineer
Casagrand
400, School Street, Adiyur
Village(Po), Adiyur
Thiruvannamalai - 606604.
Tamil Nadu
M: 6381387580
E: muthumep1992@gmail.com

L-5589

Mr. Arvind Raj C.K

Manager
URC Construction Private Ltd
N0 F3,1 st Flor, Pandian Enclave,
28th Street, Korattur
Chennai - 600080.Tamil Nadu
M: 9952090967
E: arvindckib@gmail.com

L-5590

Mr. Gokul Raj A

Asst. Engineer
URC Construction Private Ltd
Block No: 7(Flat no:117), Sivasakthi
Nagar, Poravacherry,sikkal(post)
Nagapattinam - 611108.Tamil Nadu
M: 9944632799
E: gokulrajanandan03@gmail.com

L-5591

Mr. Prabu G

Senior Engineer
URC Construction Private Ltd
5/394, I.V Sterling Homes, Sterling
Avenue, Gerugambakkam
Chennai - 600122.Tamil Nadu
M: 8681951503
E: prabugraj108@gmail.com

L-5593

Mr. Ranganathan R

MEP Mentor (O&M)
Chennai MEP Institute of Technology
(CMIT)
34- B/4th Street, Rajati Nagar,
Vilivakkam
Chennai - 600049.Tamil Nadu
M: 8838064496
E: cmitjobz@gmail.com

L-5594

Mr. Vetrivel M

Site Engineer
Chennai MEP Institute of Technology
(CMIT)
34- B/4th Street, Rajati Nagar,
Vilivakkam
Chennai - 600049.Tamil Nadu
E: vetrivel00200@gmail.com

L-5595

Mr. Sridhar C

Head Sales & Operations
ACE Mart
New No 100-F, Old No 187-F,
Yadaval Street,
Adambakkam
Chennai - 600088.Tamil Nadu
M: 9940588444
E: sridharppf@yahoo.co.in

L-5596

Mr. Gokulnathan P

Service Engineer
ACE Mart
242-A, 11th Street, Phase -1, Pour
Garden,Pour Vanagaram
Chennai - 600056.Tamil Nadu
M: 9514870233
E: gokulpalanivel47@gmail.com

L-5597

Mr. Sugumar R

Sr. Manager
Clar Aqua Private Limited
No. 10/81, Gayathri Nivas, Ganesh
Avenue, 4th Street,Sakthi Nagar,Pour
Chennai - 600116.Tamil Nadu
M: 9940196697
E: sugumar@cbraqua.com

L-5598

Mr. Ramasamy N

Business Development Manager
Clar Aqua Private Limited
143, Hindu Muslim Street, Siravayal,
Pillayarpathi
Sivaganga - 630207.Tamil Nadu
E: ramasamymani1997@gmail.com

L-5599

Mr. Arumugam M

AEE (Rtd)
CMWSSB Metrowater
Old No 47, New No 32, N: Block,
Phase -II,
Agathiyar Nagar 6th
Street,Vilivakkam
Chennai - 600049.Tamil Nadu
M: 8754459317
E: arumetro@gmail.com



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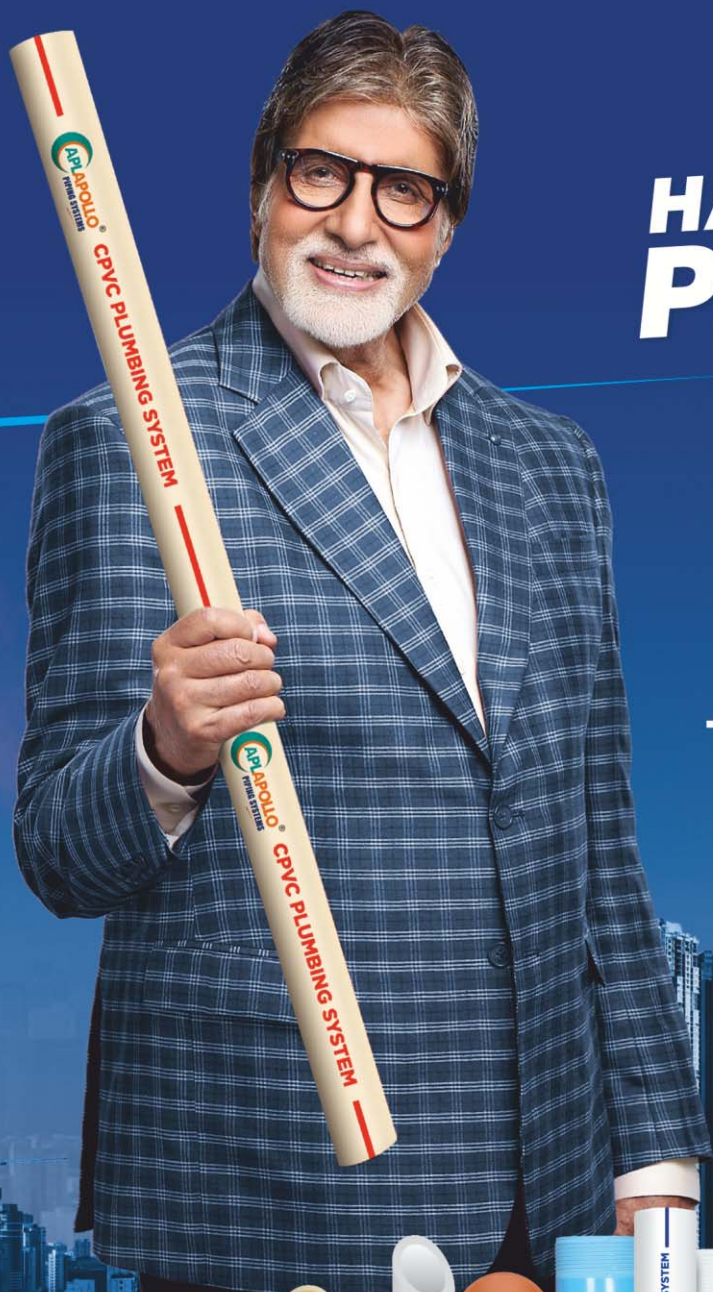
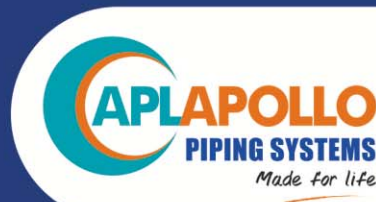
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