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TCExpression

House Magazine of TCE

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Editor's Note

Global Blueprints

Dear TCEites

Pythagoras and Aristotle convinced mankind that the earth is spherical, way back in 6th century BC. A good 2000+ years later Thomas Friedman has deemed the world flat! And that it is getting flatter!!

Yes, the world today is a flat & level playing field. With technology shrinking distances and growing knowledge, the world is rolling out its flat persona like a red carpet, for globalisation.

All that it is demanding from mankind is collaborative thought and action.

This issue of TCExpression explores the flat world within TCE.

How does TCE spread its engineering blueprints across the world?
How do TCEites manage their globe trotting aspirations?
How does TCE harness its collective intelligences?
What does the world have to offer and how is TCE grabbing it?
What strategies are working towards earning TCE its rightful place in the global arena?

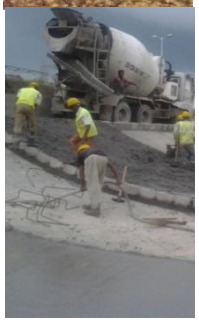
Read on and find out.

Globally yours

Sowmya Raghu Raman

Editor-In-Chief

In this Issue



TCE has made its mark across the globe over the last 50 years of its operations and is continuing to strengthen its international ties with offices and alliances in the global arena.

The globe ensconced in a nest of blueprints that is symbolic of engineering represents this issue's theme " global blueprints".

The nest of blueprints signifies how engineering and technology provide an incubation pad for the future of this world. The globe is portrayed as an egg that would sprout wings and fly into its technologically secure future.

The image insert on this page shows the TCE-CDRL team that supported the making of the blueprints nest.

Global Blueprints

TCE's Global Blueprints have covered 50 countries over the last 30 years. The organisation is now gearing up its global presence with a strategy that leverages on its core strengths in Infrastructure, Power, Chemicals, Mining and Steel sectors.

Today, with a clear focus on emerging markets of developing & under-developed countries, TCE is aptly aligned to the *smiling* side of the world economy. With a dynamic onshore-offshore model for resource management, TCE delivers engineering solutions to overseas clientele, through its multi-location teams.

This issue of TCExpression takes you through a journey of TCE's blueprints across the globe.

Get insights on TCE's strategy for international marketing in the Corporate Communique section; Catch the TCEites share their international experiences and aspirations in the Truly Global section; Take a peek into the lives of engineers posted abroad in the Global Glimpses section;
Enjoy a visual treat of international project teams in the candid camera section;

Managing diversity further picks up steam at TCE as it trains its focus to markets dispersed across the two hemispheres; its role of managing diversity taking centre stage.

While TCE is culturally ready to handle divergent markets, it is now seriously investing in employee orientation to effectively engage in divergent cultures as it enhances its presence in different continents.

TCE's Diversity Management encapsulates the following.

- Cultural Diversity
- Biodiversity
- Socio-economic diversity
- Behavioural diversity
- Diversity of thoughts, opinions , opportunities, beliefs & capabilities

We have always leveraged on diversity, managing to unify the varied engineering perspectives that come from civil, mechanical, electrical, instrumentation, mining and many more technical fields. We have nurtured an environment that offers freedom to retain the uniqueness that stems from cultural and social diversity.

In the global arena we also understand the socio-economic, political and cultural differences amongst various client countries and hence work from a position of mutual respect.

As a responsible organisation we strive to give back to the society, to iron out disparities. With engineering, education, community and environment as means for corporate sustainability, we have been continuously aligned to the Tata Group Values.

Corporate sustainability now brings with it a responsibility to not just profess tolerance but to truly respect diversity. We need to do our bit to leverage on diversity for the opportunities that it offers. And yet, reach out to bridge the gaps that diversity brings to the table.

We are focusing our sights on Affirmative Action(AA) that will further reinforce respect for diversity. AA makes it possible for everyone to have a fair chance to compete as we grow from strength to strength though success will still depend upon the individual's efforts and attitudes.

So, let us work together through this promising kaleidoscope of diversity.

Rakesh Gupta
Senior Executive Vice President – Corporate Affairs

"Diversity is the one true thing we all have in common. Celebrate it every day."

"I believe employees are the most pivotal part of TCE and I would like to ensure that we are on the same page as we pursue our organisational goals.

TCEites can now dialogue with the Managing Director with the click of a button. A new communication initiative ***Words on Wings*** *(WoW)* was launched from the MD's desk on 12th June 2012.

The maiden mailer had **Mr. J P Haran** lending a strategic direction for the fiscal year 2012-13. He unveiled a 3-pronged strategic mantra for becoming strong players in the consulting business and moving towards enhanced profitability of operations.

Mr. Haran emphasised that TCE is well poised to enhance its presence in the world's most promising locations viz., India, Africa, Middle East, USA & UK. He went on to add that with an agenda to expand its suite of businesses and a continued focus on corporate sustainability, TCE is all set to pursue a three-fold growth in revenues by 2015-16

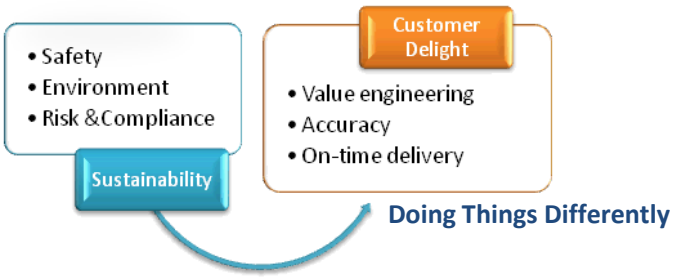
In order to combat today's tough market situation, Mr. Haran urged TCEites to do things differently and change the way we work. With Customer Delight and Sustainability forming the foci of TCE's operations, he encouraged TCEites to weave in innovation and environment friendly solutions into their work and ensure error-free deliverables.

Strategy Mantra

Building Skills by enhancing technological capabilities through training and by collaborating with partners in profitable domains

Increasing Scale by increasing market share, diversifying into new verticals and in international markets

Expanding Scope by moving up the value chain to provide high-end services



WoW@tce.co.in is all set to achieve its objective of aligning employees to the organisation goals and solicits their thoughts and ideas to achieve these.

"We have high goals to achieve and I am absolutely sure that with such a great team, TCE will scale new heights of success.

Globe Trotting

What does it take to be global? How does TCE align its business, people and resources to the needs, opportunities and challenges of a global market?

Dhananjay Dave, Head of TCE's International Marketing Group, speaks to TCExpression…

TCEx: Can you throw some light on TCE's Business Environment in the International Market?

During the past 30 years, TCE has completed projects in 50 overseas countries. Today, we are aggressively focusing on specific geographies, industries and clientele. Our attention is now rightly focussed on to emerging markets of developing and under-developed countries. In addition, we are building a clientele relevant to our kind of integrated engineering solutions and targeting projects that are aligned to our key competencies.

TCEx: What are the emerging markets on which TCE is focussing and why? What are the associated entry strategies?

The African region which is today an investment destination offers myriad opportunities for TCE in infrastructure, mining & metals, energy, chemical and construction sectors. While leveraging on the Tata Group brand equity in the region, we have been able to venture in, on the strength of our capabilities. We have therefore set up a base in South Africa with a long term strategy for strengthening our business prospects.

The Middle East is a well developed and mature market that offers opportunities in productivity enhancements, resource optimisation and building up local capabilities.

TCE hopes to partner with global firms in these markets and has set up a subsidiary company (TCE QSTP-LLC) at Qatar to front end the Middle Eastern opportunities

The Rest of Asia is also on our list. While TCE has set up projects in Nepal and is capitalising on opportunities in Myanmar, the plan is to forge alliances and partnerships with Korean, Japanese, North American and other western firms to provide technology solutions.

TCEx: Do USA and Europe figure in your target list?

Yes, very much! Post the economic downturn, these regions are focussing on cost competitiveness. TCE envisages opportunities in enhancements and refurbishment of existing facilities. We plan to bring in the cost advantage by on-site/off-shore work models. Joint representation with alliance partners to participate in local projects is also a strategic plan that TCE is considering. Establishing dedicated global delivery centres to facilitate its business interests in the region is on the anvil.

TCEx: In order to align with the international markets, does TCE plan to add on to its service portfolio in any way?

Working from a position of strength and leveraging on our established key competencies in Infrastructure, Power, Mining& Metals and Chemicals is definitely giving us the edge in the emerging markets.

In the mature markets, TCE is considering diversifying into new segments by aligning with home-grown niche players confined to their regions and delivering consulting solutions to end-customers, in other regions. Hospital and Education sectors are areas where TCE is seeking knowledge partners.

TCEx: Does TCE have any plans to enhance its existing service offerings to the international clientele?

Yes! We plan to leverage on our current competencies and offer value engineering as a key entry point to long-lasting relationships with customers. We are extending our services to customers who are on the look out for rehabilitation and optimisation of under-utilised facilities. This, we believe, will lead to instilling trust & confidence and hence usher in new business connects.

TCEx: What do you think are the parameters contributing to customer delight in the global arena?

State-of-the art and project-appropriate technology, value engineering, environment-friendly solutions, transparency in all dealings, dedicated & qualified resources are a few of our definite strengths.

TCEx: What are the top priorities earmarked for improvement in ensuring customer delight?

A few top priorities are cutting-edge delivery models, accuracy & efficiency, enhancing our global delivery logistics and an improved focus on safety and health.

TCEx: Is it all smooth sailing? What are the challenges associated with TCE's global aspirations?

We have undertaken several international projects in the past. What we need today is a sustained approach. We are facing challenges that are typical of scaling up international operations. The competition from international players is something that we are countering by taking several measures to be globally competitive both in terms of service offerings as well as pricing. Flexibility of project execution approach and defined value additions will also be an integral part of TCE's USP.

In addition, we are also managing people and resistance to relocate by addressing the softer aspects of culture-management on a priority basis. In the days to come, TCE will also be considering local hires in varied geographies and infusing diversity in its workforce.

TCEx: What has been TCE's performance record till date, in the global arena? What does the future hold?

TCE's international Business Unit has seen a five-fold increase in business acquisition in 2011-12, when compared to the previous year. The international business is estimated to clock a 50% annual growth in acquisitions and a revenue share of 20% (of overall TCE revenues) in the next five years.

"Project assignments at TCE have helped me acquire a global outlook for gaining expertise" says **Mr. J L Thakker**, General Manager, Infrastucture Business Unit. In conversation with Poorva Narsapur from TCExpression, Mr. JLT shares his experiences on some of the international projects in his career.

TCEx: How did you enter the global arena in TCE?

JLT: My agility in quickly aligning with the customer needs and a keen sense of learning set the context for international exposure in the initial stages of my career. Keeping pace with the customer demanded a thorough understanding of international regulatory systems as well as the specific requirements of global financial institutions. I began with designing industrial waste treatment plants and used the know-how to develop *"Zero Waste"* treatment plant designs for sustainable development. My understanding of global issues related to environmental sustainability and climate change paved a way towards international assignments.

TCEx: How does TCE improve its offerings based on knowledge captured through international assignments?

JLT: At TCE, we continuously upgrade our standard practices based on live project experiences. International project exposure often provides us the opportunity to rapidly upgrade our offerings in the local market with world class services.

For example, I was deputed to Qatar to work with URS for preparing an EIA study of industrial units located in Maseed Industrial City. The projects gave exposure of working in an international regulatory regime. The methodology had to confirm to BS or American standards. The experience gained in understanding best practises particularly for Air Pollution Modelling and of air quality impact prediction was later implemented as a standard practice in all TCE Projects in India.

Treading the Global Path

TCEx: What are the projects that offered experiences to cherish?

JLT: While working on a first of its kind Flue Gas Desulphurization Project, I was responsible for evaluation of some of the leading European and Japanese technology companies. The project was completed with the largest Sea Water Scrubbing System in India with disposal of scrubbed water into the sea.

This experience was later useful to lead with the partner team of URS, USA for technology evaluation of a Dust Separation and Flue Gas Desulphurization system (for power plant of MARAFIQ in Saudi Arabia). This also gave me insights into relationship building with associates / technology partners.

TCEx: What do you think are the make-or-break imperatives of handling an international assignment?

JLT: My experiences as Project Manager for developing Power Plant Environmental Impact Assessment Study for Cogentrix of USA and later China Light and Power gave an early exposure to working in teams with multi-cultural background.
While technical knowledge is a *given*, communication, quality, and timeliness are the prime requirements for project success.

TCEx: What is your message to TCEites who are *treading the global path*?

JLT: It is very important to build your network by associating with reputed associations / forums in your chosen field of expertise.

Keep abreast of the latest product applications and practices around the world by subscribing to knowledge magazines & mailers or participating in webinars / seminars.

Participate and deliver lectures/talks at conferences to test your depth of knowledge as well as to keep abreast of latest applications and practices.

Update your knowledge by way of journals and other publications.

Develop a keen sense of receptivity and an aptitude to piece together various bits of information that come along your way to deliver innovative solutions.

J L Thakker joined TCE as an Assistant Engineer in 1978 and today he lends his expertise in Environmental Engineering, Climate Change and Sustainability as General Manager for TCE's Infrastructure Business Unit . He has a Bachelors Degree from Indian Institute of Technology, Kharagpur and has more than 34 years of work experience. Mr. JLT has represented the Tata Group in the "Asia – Pacific Partnership Conference on Clean Development and Climate" at Sydney, Australia.

The above pictures are from Mr. JLT's recent visit to Qatar

"Multi-national , Multi-disciplinary, Multi-industry Exposure" is how **Rupam Bandhopadhyay**, Dy. GM from TCE-Jamshedpur, sums up his experiences with international projects.

Global Multipliers

I am currently stationed at the OML58 Block site near Port Harcourt in Nigeria and am coordinating the detailed engineering and procurement activities for the client Darycet International Limited. The most exciting part is the multi-national team composition which brings with it a mix of cultures.

My earlier stint at Abu Dhabi for another EPC client got me working on a district cooling chilled water plant as the MEP design coordinator. This assignment helped me understand the importance of being conversant with international codes (British, American & European) and their applications in design and material specifications.

Another important aspect is the constant need for team building initiatives which help integrate the TCE engineering team. Very often, we hail from different offices, business units and disciplines and meet each other for the first time at the overseas location. So, we make every effort to get to know each other and work as a cohesive unit.

As an HVAC engineer in TCE, I have gained exposure in a variety of areas including building projects, fire-fighting systems, utility piping, water & waste water systems and other utility systems. Also, I have had opportunities to work in different business areas of TCE which include infrastructure, industrial, steel as well as oil & gas. These have shaped me into a well rounded engineer.

TCE is aggressively grabbing global opportunities to achieve its targeted growth and I am glad to be a part of it.

"Unleash your mind, learn the state of the art and unlearn a few things as well" says **Aslam Basha**, Dy. GM from TCE-Bangalore as he shares a few tips for handling international assignments

Unleash & Unlearn

My work in an assignment with GE Energy, USA presented me an opportunity to focus and apply basic engineering principles in an analysis and gave me immense satisfaction. An on-going project in Nigeria urges me to foster a relationship with the client and familiarise with client needs on plant design. I could achieve this by simultaneously aligning my team with the client's work approach and driving the project towards its deadlines. This dual focus has resulted in winning the client's confidence.

I would like to share a few tips to be lead player in the global arena:

- Be clear about your fundamentals of engineering and have an open, systematic and logical approach
- Never lose sight of the big picture
- Unleash your mind, learn the state of the art and unlearn a few things as well, with an adaptive and passionate approach
- Be uncompromising when it comes to quality of deliverables and project schedules
- Align yourself to the emotional and cultural service differentiators with the international customer

Gaining technical depth in the early years of my career and widening my interests to cover a range of technical areas have provided me a stronghold and confidence to handle and execute international projects.

"Today, the global theme is to do *collaborative engineering*" says **Mohan R Joshi**, Chief Manager from TCE-Mumbai, while sharing his penchant for working with international teams.

International projects are not new to TCE. Today the global theme is to do collaborative engineering for providing cost effective solutions utilizing the expertise across the globe. The companies which adapt to collaborative engineering will survive.

Collaborative Engineering

Since my early days in TCE I got the opportunity to be associated with International teams. I have enjoyed working on these assignments and there was always something to learn.

Working on international projects gives opportunity to understand different cultures and geographies. It also helps us to approach issues with a different perspective and resolve them effectively.

TCEites have a passion for engineering and also a flexible approach with an attitude to accept new challenges. This stems from the opportunities available for working on all the areas of the project lifecycle rather than slot oneself into a single project phase. This gives TCE the niche to go global and be successful.

There are plenty of opportunities in TCE for working on International projects and I would encourage all the engineers to grab these opportunities.

Right from my early days in TCE, I have had the privilege of being involved in projects which had International clients / EPC Contractors from US, Europe and Gulf countries. I've realised that timely delivery and quick response to client communication goes a long way in building relationships.

My deputations to UAE, Qatar & USA for TCE assignments as Project Manager, have taught me the art to say "No" when I want to say "No" and hence be respected for my time. Understanding cultural differences and hence working effectively with multi-national team members is a vital skill.

I am at present involved in a project in India for a US client and a project in Egypt for a Swedish client! This has helped shape my skills to be flexible and hence adapt to demanding situations.

Approaching International projects is similar to playing cricket. We have to have different approach in different geographies however the rules of the game remain the same.

My ongoing project assignments in MALI-West Africa & Uganda have not only added competencies to my technical portfolio but also inculcated in me the confidence to handle more overseas tasks. They have also given me an opportunity to understand how the people in other countries work. The direct interaction with International clients and exposure to their culture has immensely benefited me.

With TCE's wings soaring globally it is important to have a systematic, innovative & logical approach in accomplishing assigned tasks. These become all the more important when people look up to you as expert in the field and expect more from you.

I fully endorse Albert Einstein**'s** words ***"The only source of knowledge is experience."***

I have learnt that experiences gained in different projects can be utilized in newer projects that come our way. These in turn will contribute to TCE's growth and also add to the individual's skill and capability to take up higher responsibilities.

Einstein & Experience

Quoting Albert Einstein and attributing his technical prowess to international experiences **Amit Bansal,** Asst. Manager from TCE-Delhi, takes pride in contributing to TCE's growth.

Team at substation site - Mali

I had a first hand experience of working on an international project when deputed to CCWP- II site at Qatar. My significant achievements for this project involved the most critical item i.e. synchronising panel. Preparing the control philosophy, carrying out the vendor drawing review, developing the commissioning procedure and successfully commissioning the system helped me learn that understanding mind set of an overseas client a well as the required standards & technology help in overcoming issues during execution of international projects.

I am now working as project engineer for 2x 600 TPD PET chips Ain Sokhna Egypt with Oerlikon Barmag (EPC contractor). TCE's Sound Document & Knowledge Management systems help in speedy preparation & approval of deliverables required for proceeding with onsite activities.

Matters that Matter

Working at site in close co-ordination with client has helped me develop customer relationship skills, and speedy problem analysis & resolution skills. Frequent interactions with Vendors have kept me abreast with the latest technological developments in my field.

Above all, what matters is a positive attitude of learning and constant interactions with experts.

Subodh Pawar, Asst Manager**,** TCE-Mumbai, tells us what matters most in building relationships with international clients.

M S Ramakrishna, Senior Design Engineer, TCE-Bangalore, shares his cherished moments and immense respect for zero-defect methodologies gathered from his involvement with Japanese Clientele.

Virtual & Real Moments

TCE has been associated with MHI since 2003. We have completed around 7 projects till date and one more project is underway. I have been associated with MHI projects right from the first project. Every project with MHI has offered me a new learning experience in my profession. There have been numerous challenges / problems which are totally different in all respects.

When we were working on the Nuon project, we faced tough situation while working on the fire fighting system piping. As the layout of the TG building was very compact, we could not route / accommodate the piping with the numerous restrictions imposed by our client. We gave our proposals after consultation with the concerned department of MHI. The proposals regarding the routing were finally accepted and I feel it was one of the rewarding moments in my career..

Another great experience came while working for the Alinta Project. Our piping system design did not pose a single interference during erection. The client informed us that the project was executed without a single problem at site. We were very thrilled when we got an appreciation from our client.

My best personal moment was when the site photographs arrived for the Alinta project. I had created a 3D model plant snapshot with our review software and it proved to be an exact match to the actual onsite image. The two photographs were so similar that I felt a surge of pride in the engineering that converted virtual imagery into onsite reality.

Team work with peers, guiding people with regard to modeling, guidance from seniors with regard to work are all good moments to cherish.

A few of the things which every one of us should learn from the Japanese are their dedication, hard work and commitment. They emphasize a lot on the finer details at the design stage of the project and leave nothing to chance. They will strive to achieve zero defect deliverable even if it calls for major changes to be done on the deliverables. The quality management methodology followed by them, though very difficult to follow is one of the best methods to ensure zero defect deliverables.

Alinta

Nuon

Prashant Wani, Asst. Manager, TCE-Chennai, narrates how he gained the knowledge and confidence to be associated with a *one of its kind* project executed by a consortium of Seven Countries.

I am currently working on an International Project, viz. ITER (International Thermo Nuclear Experimental Reactor) which involves the engineering for a Fusion Experimental Reactor and is *one of its kind* in the world. This project is a result of the consortium between seven countries - China, Korea, Japan, India, USA, Russia and European Union (Host Country). For the first time in TCE, the project entailed a combined analysis on *Reliability, Availability, Maintainability and Inspectability* as per international standards.

Where did I gather the confidence and competence required to add-value to a landmark project like ITER? The answer is simply TCE!

Global Grounding

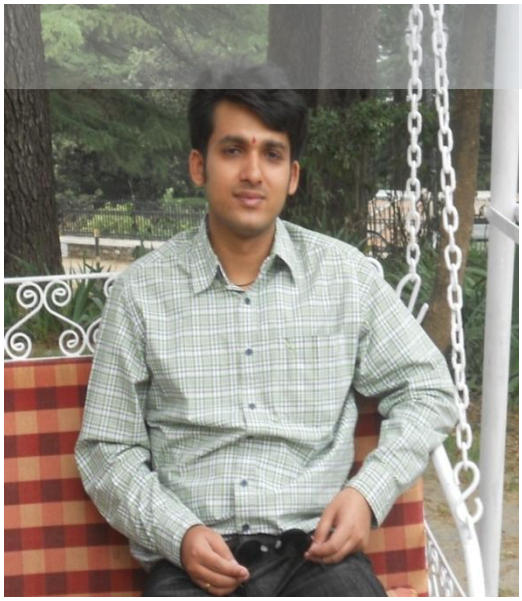
The exposure that I had gained from my previous project experiences in TCE have moulded me into a sound System Engineer with a thorough technical grounding in the field of Nuclear Power generation.

My first project in TCE , for which I had prepared all the design documents from concept to Design note was Kakrapar Atomic Power Project (KAPP-3&4), where I handled 4 systems, viz. Fuel Oil Storage and Transfer System, Plant Water System, Active Drainage System and Non-Active Drainage System. This project gave a great boost to my career as a System Engineer in the Nuclear Field.

The Second Major project was with BARC on the Thermal Hydraulic Test Facility which led to Research & Development(R & D) being given a new direction.

This time I handled 5 major systems, viz. Natural Circulation System, Heat Transfer through Helical Coils, Flow Visualization in Helical Coils, Blow down Behavior and Depressurization Studies and High Enthalpy Water and Steam Supply System. All these systems were very new and helped me acquire an in-depth technical knowledge.

I aspire to be associated with TCE which provides an opportunity to grow both personally and professionally, by acquiring/learning new skills and thus contributing towards the development of self as well as the Company.



"I believe that, in order to be a successful *global* consultant, one must first become a good *local* consultant" **says Jatin Talwar,** Sr. Engineer, TCE-Delhi

Glocal Focus

Working in Projects across different states of India, i.e. Himachal Pradesh, Arunachal Pradesh, Chhattisgarh, Mizoram, Odisha, Karnataka, and Haryana, gave me an understanding of site-specific issues together with the applicability of various Indian practices and guidelines.

Working in international projects located in Uganda, Zambia and Nepal, I got to learn about various international standards and codes, their suitability, construction material-availability and usage, rules and regulations of other countries, etc. besides knowing about site-specific issues and practices.

My engineering knowledge has flourished as a consequence of applying technical skills to site-specific engineering challenges. These challenges have not only helped me learn advanced techniques for hydraulic modeling, water hammer analysis, and power potential assessment but also got me exposed to situations that helped me develop my managerial skills.

These local and global experiences have led to an overall understanding of the criticalities involved at various stages of a project. In addition, the uniqueness of each project has helped me develop the urge to provide customized locale-specific solutions.

I can now say with confidence that my domestic and international experiences have made me both globally local and locally global! To say it simply, thanks to TCE, *I am now Glocal*.

For the last two years, I have been working as Resident Engineer and Deputy Project Manager for 360 MW Kariba North Bank Extension Project wholly owned by Zambian Electricity Supply Corporation of Zambia and being built by Chinese construction giant Sinohydro Corporation. My work here includes Inspection of the works, Planning and monitoring of the project, Quality and Safety management.

The project offers a very good opportunity to share my technical knowledge and experience as well as learn new techniques and construction methods from one of the biggest Infrastructure groups in China.

My stints in India have exposed me to rough terrains and tough challenges. Having handled hydro-power assignments with capacities ranging from 5 MW to 1500 MW and gaining a foothold in the most difficult terrains of the Himalayas have given me the confidence to apply my learning in international projects.

Stationed in Zambia **A Satya Srinivas,** Chief Manager, Contruction Business Unit reveals his passion for Mega Hydro Projects and says ***"I love to work with rivers and harness them to build big Hydro electric projects for the benefit of mankind"***

River Power

I take pride in having been associated with the prestigious *Nathpa Jhakri Hydro Electric Project* of 1500 MW capacity from concept to commissioning. Challenging projects like these have exposed me to all aspects of a hydro power project and helped me hone my skills in Tunnelling and Dam construction.

Working in Mega Projects specially Hydro Projects is not only my career but my passion. I love to work with rivers and harness them to build big Hydro electric projects for the benefit of mankind.

TCE provides a very good platform for aspiring Engineers and Managers to showcase their technical skills and knowledge in large international projects with their best systems and technical expertise. I have great confidence and belief that I can achieve my technical aspirations working with TCE.

Unbelievable Experiences

M Karthikeyan, Manager, TCE-Chennai shares some amazing anecdotes from his recent sojourn at Kuwait.

Unbelievable Pace

Working with L&T in Kuwait for the design of 132kV GIS substation, has taught me the value of schedule based activity. The project pace was set by the client who would call us for discussions across the table and communicate their feed back on deliverables within a week.

Aligning with the client pace led to submission of Civil construction layouts, Electrical layouts & Control schemes within a record time of three months.

Unbelievable Sights

The Fatimah Al-Zahara Fund organizers have built a mosque to symbolize their devotion to the daughter of Prophet Mohammad (PBUH). The fund organizers say that the Tahir Center for Architectural Consultation executed the design, as a replica of the famous Taj Mahal.

The size of the new mosque is 3,200 sq. m. It consists of the basement (280 sq.m), ground floor (1,340 sq.m), first floor (500 sq.m) and car park (5000 sq.m), with a massive main prayer area on the ground floor equipped with a library which presents an impressive facade. The women's prayer area on the first floor can house more than 300 women….

…Still, there is no comparison with the original world wonder back home!

Unbelievable, but true

In some places in Kuwait, oil is available at a depth of 60m, whereas in some places of India, its hard to get water at a depth of 60m!

Currently stationed at the project location for a 380kV Transmission Line at Ras Al Khair area for Royal Commission, Saudi Arabia, **Amol Kulkarni, Manager** talks about his experiences.

Paving a Way

TCE's scope is to prepare Project Technical Specifications and Scope of Work for the construction of a 380 kV Over Head Transmission Line along with modifications for road crossings. TCE is also scheduled to prepare the base design and review the survey work done by a local surveyor.

The overall experience has been very good. There is a lot of attention given to each detail of design drawings/documents. The project schedule once agreed is strictly followed.

During a recent visit to a site in Saudi Arabia, we visited an ex-client of TCE. They were happy to meet us and also gave positive feedback on the work performed by TCE on the existing substation. They also expressed their desire to work with TCE for future projects.

It is heartening to receive an appreciation from previous and current clients and hence pave the way for future clientele.

Naval Sant (Manager) & Vinay Kumar SR (Sr. Engineer), TCE-Bangalore reminisce about their stint in Singapore for the Coal based power plant project for EVN-Vietnam, executed by Alstom Singapore.

Personally Professional

Naval Sant

My best professional moment at Singapore was when, within 2 months of deputation, the Project Manager and the Operations Director at Alstom-Singapore, appreciated the TCE team's effort in achieving considerable engineering progress.

I also had some exciting moments during visits to the Singapore Bird Park, Zoo and Marina Bay Sands with my TCE team mates

Vinay Kumar

My best professional moment at Alstom, Singapore was when the Project Manager reposed faith in me and chose me as the training co-ordinator from amongst many senior engineers who were working on the same project for a long period of time to impart technical training to a group of Vietnamese engineers from the client side".

The most memorable personal moment was when my Project Manager spent a couple of hours late in the night with me over dinner on my last working day in Alstom office in spite of his project commitments on that day and I was emotionally touched to see him come to the airport early in the morning to bid me adieu.

Ravikumar A L, Manager TCE-QSTP LLC, shares his most memorable professional and personal moments in Qatar.

Heart & Mind

Professional Moments at Qatar

In the second week of my stay(January 8th to 13th 2012) in Qatar I had to work for a contractor *(Al-Balagh Trading & Contracting Co.).* They appreciated my work and felt very happy when I agreed to come to their office even on a Friday (a total holiday in Qatar).

Another unforgettable instance is when I helped bring down the expenses incurred on Geotechnical Investigation by more than 50%. This is for an on going project for the Waste Management facility at Raslaffan. I could achieve this by studying the available Geotechnical reports on Qatar.

My crowing moment was when I registered as a Practicing Civil Engineer in MMUP *(Ministry of Municipality & Urban Planning),* Govt. of Qatar. This, I believe is a step to support my global aspirations as well as add value to TCE's international businesses.

Personal Moments at Qatar

One moment I shall always treasure is participating in a mini-marathon(3KM) conducted by QNB and completing the full stretch under hot sun, running along with people from Africa, Europe and Asia. It was a totally different experience.

When I helped an aged person from Pakistan in a health centre to pay his bill, he was so moved that he blessed me and called me *Beta*. The best part was that he was speaking in Urdu and I was responding in broken Hindi, you can imagine our conversation!

During March 2012 , the Indian cricket veteran Gunadappa Vishwanth (Vishi) was felicitated by the Kannada Sangha at Qatar. Seeing him at close distance and walking with him *(during the procession)* is a memory I shall cherish for a long time.

While I am awaiting bigger tasks and challenges in TCE's international front, I owe it to TCE & my TCE QSTP LLC colleagues for giving me opportunities to test my *heart and mind*…

Ravikumar is standing 2nd from right in the above image

P Vishnu Prasad, Chief Manager from the TCE project location at Zambia, takes time off to give us a peek into his cherished moments in Zambia.

Blasting the Odds

My best professional moment at Zambia

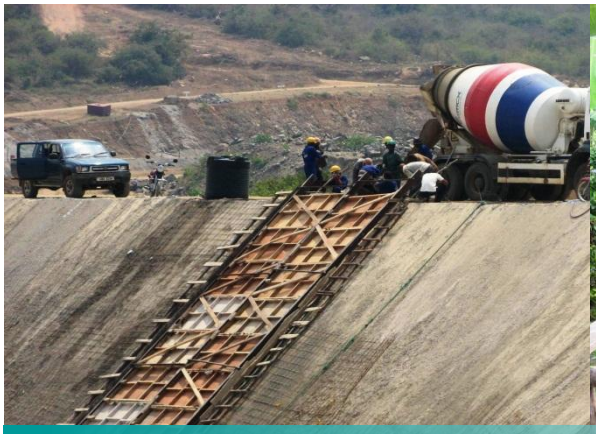
Working with a team of experts in geology, blasting & electrical engineering and convincing the EPC contractor to agree to our views. It was a big moment for me and I derived a lot of satisfaction in contributing to the inputs on blasting methodology. More so because I had a role in selecting and taking the blasting expert along (against all odds). The blasting expert's inputs were very crucial for safety of the project.

My best personal moment at Zambia

Watching wild elephants and other wild animals from close range at the Kafue National Park.

Vishnuprasad is seated at the centre in adjacent image

P Vijaykumar Reddy, Asst. Manager, shares how his *engineering* and *gardening* experiences have given him his moments of pride at Uganda



Professional & Personal Pride

During my tenure at Buseruka Hydro Power Project (BHPP), Uganda, I have faced a lot of challenges.. I was required by the circumstances at BHPP, to design a formwork model for RCC slope lining of the power channel. The design challenge was that in Uganda, concrete pavers are not available and it is much too expensive to import the pavers. As there is plenty of wood timber available in Uganda, I designed the shuttering using a conventional method with combination of steel I-sections and lifting jack arrangement.

The shuttering Model and methodology was presented to the client, Mr. Maheswar Reddy, MD of Hydromax Limited and the Engineers of the African Development Bank, during their site visit. Their outright approval is one of my Best Professional moments in Uganda. 1300 metres of the shuttering has now been completed on site and it is a matter of professional pride for me.

As we are living in a remote forest area only few edible vegetables were available for us. We planted some Indian vegetables and flower plants around our quarters. Very soon the garden became green and attractive. Our garden impressed the EHS officer, Nursery Bed attendant and workers surrounding our site camp so much, that they also started a Nursery Bed and a plantation of trees as a part of the Environmental Development (National Environment Management Authority (NEMA-Uganda).

All visitors to the BHPP site, now visit our garden and their appreciation is a matter of pride.

Chemical Challenges

Balaji

Rui

V Balaji, (Asst. Manager) & **Rui Colaco,** (Sr. Design Engineer), narrate their high points in working on the P&G chemical plant at Sacramento & Cincinnati, USA.

In Procter and Gamble I played the role of process engineer & energy sustainability leader for the P&G Cincinnati Plant. Since I was in the plant engineering team, I was closely involved in all recommendations for operations and trouble-shooting at the plant. I was also in-charge of the sustainability tracker for the Cincinnati plant, where by 2013, energy consumption of all the plant utilities is being planned to be reduced by 10%.

My best professional moment at P&G Cincinnati was the design of odor scrubber water reuse project at glycerin refinery which saves 6.48 million gallons/year of water usage and 4000lbs/hr of steam usage. My best professional moment was when my work was featured in the internal publication of P&G.

All the P&G Assignments that I've handled till date posed challenges pertinent to execution of work on a running plant with time constraints posed by minimal shut down periods. The fact that I have donned a variety of roles as Project Manager, Project Mechanical Engineer & Piping Specialist for the P&G projects, has given me my moments of pride.

Working at Procter & Gamble (P&G) Sacramento Plant, USA was challenging & stimulating. Striving for successful completion of the packages with zero-defect Engineering Designs, made me proud especially when it was highly appreciated by the client.

To quote Mother Teresa, it is not how much you do, but how much love you put in the doing…

Just Do It

K Y Dalal, Dy. GM, TCE-Mumbai tells us *What to Do* while handling global projects

I have been part of TATA Consulting Engineers Ltd. for the last two decades. Every project in TCE has offered an indelible experience. I have had the opportunity to work on a number of international projects for TCE's Chemical business unit. I had the privilege of working along with Technology Experts in TCE and receiving on-job structured training. Added to this, my work has been enriched by experiences on projects from USA, Middle East, Africa and Sri Lanka. These generally included process, mechanical, electrical, civil, structural, instrumentation and control engineering. Typical to TCE's repertoire, the projects' coverage also included a wide range of industries (refinery, petrochemical, chemical, food processing and fibers sectors,) and disciplines (process, mechanical, electrical, civil, structural and instrumentation & control).

Each international project adds up to the agility, duty towards on-time performance and knowledge on country specific requirements.

Some *Dos* to handle international projects:

- Meet customer specific needs on priority
- Do use the vast knowledge base of domestic projects to work on International projects.
- Do make use of the time zone difference between India and western countries to aid in continuous roll-out of deliverables

K Y Dalal is standing 3rd from left in the above image

Business Confidence

Vinita Rath, Sr. Engineer, International Business Development Group, TCE weaves in the elements of culture, language and know-how, in her narrative on business confidence.

My big moment as a TCEite was when I attended the CII-Exim Bank Conclave on India-Africa project partnership. Meeting delegates from 41 African countries and participating in discussions covering more than 200 projects was an insightful experience.

With TCE's focus riveted on the most promising continent of today's economy, my learning and networking takeaways from the CII conclave help me source and develop business opportunities for TCE.

Working 2 years in UK was probably one of the best decisions I've ever made. During my tenure in UK I came across multinational clients from different parts of the world who even became friends and are still in contact. What I will treasure most, however, is the knowledge of the English culture and English people. I can honestly say that my UK work experience was a fantastic, worthwhile experience. Not only did I meet lots of lovely people, both in my studies and at my workplace, but I came home with a real confidence in my English speaking ability and a fantastic sense of English culture.

Last but not the least, the English are said to be reserved in manners, dress and speech. They are famous for their politeness, self-discipline and especially for their sense of humour.

Delhi:

Architectural and Detailed Engineering Services for Landside Development at Angre Port, Maharashtra.

Perkins Eastman has engaged TCE for providing architectural and detailed engineering services for setting up Ship Repair Facility and Cargo Terminal at Jaigad in Ratnagiri district of Maharashtra for Angre Ports Infrastructure Private Limited. The services provided by TCE include design of all utilities and buildings, development of necessary technical specifications, drawings, bill of materials, assistance in obtaining statutory approvals and providing construction - administration services.

The ship repair facility will have a ship lift arrangement and six dry repair berths to carry out maintenance. In addition to the dry repair berths, three wet repair berths are also planned. The maximum size of ship that can be repaired at the facility is 10,000 dead weight tonnage (DWT) with the maximum dimensions of LOA (length overall) 125m, beam 20m and draft 6.5m.

View of cargo jetty

3D view of ship repair facility

Main berth work in progress

The berthing structure will be accommodating bulk vessels up to 60,000 DWT, the maximum dimensions of which are LOA 220m, beam 20m, draft 13m. The container yard has been planned to store 2,76, 571 TEUs (twenty-foot equivalent units) of containers with stack height of three, by 2025-26.

38 MW Tuirini and 42 MW Tuivawl Hydro-Electric Projects, Mizoram.

M/s Subhash Projects and Marketing Limited (SPML), Kolkata has awarded TCE the work of consultancy services for preparation of feasibility study report & specifications, monitoring & detailed project report for survey and investigation (S & I), for two projects viz., **38 MW Tuirini** Hydro-Electric Project (HEP) and **42 MW Tuivawl** Hydro-Electric project in the state of Mizoram.

38 MW Tuirini HEP is located near Sesawng village in Aizawl district. The project involves construction of a 111m high zoned Earth-fill dam, 2.42 km long Head Race Tunnel, 8.0 m diameter surge shaft, 290 m long pressure shaft and a power house with an installed capacity of 2 x 19 MW on the left bank of river Tuirini located 3.50 km downstream of the dam axis. Land acquisition clearances are currently being pursued by the Client.

42 MW Tuivawl HEP is located near East Phaileng village in Aizawl District. The project involves the construction of a 98 m high zoned earth-fill dam, 3.145 km long Head Race Tunnel, 5.30 m diameter surge shaft, 255.5 m long pressure shaft and a power house with an installed capacity of 3 x 14 MW on the left bank of river Tuivawl.

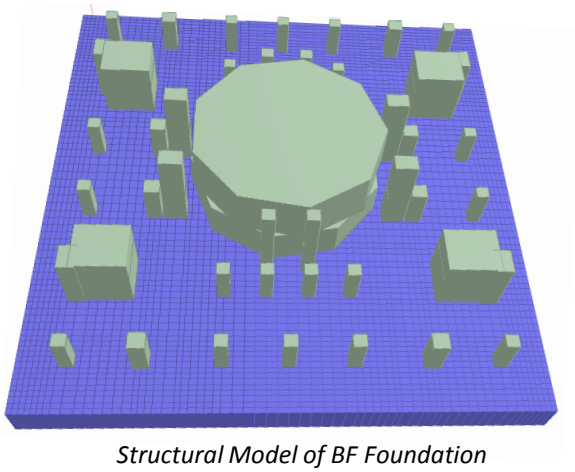
Tuirini Geological assessment by geologist

A view of the Tuivawl HEP project area

Kolkata:

Optimization in blast furnace foundation design considering rigid foundation.

A blast furnace (BF) with 4500 cu.m hearth capacity will be installed at NMDC Limited, for their 3.0 MTPA Integrated Steel Plant, Nagarnar, Chhattisgarh, India. The blast furnace proper, weighs about 17653 MT, with a surrounding four- poster structure and cast house columns.



Structural Model of BF Foundation

The plan dimension of the foundation is 47m x 45m. Design of foundation for such a massive superstructure is a challenge due to various constraints, including intense heat in the top portions of the foundation. The analysis was carried out considering the foundation as both rigid & flexible.

It was found that if the foundation raft of size 47m x 45m x 4.5m thick is designed as a rigid foundation for worst load combination, 1500 cu.m of concrete can be saved. The design had been approved by NMDC & their Consultant MECON.

Value Engineering Applications for New MRSS at Tata Steel- Noamundi.

Tata Steel engaged TCE for consultancy services for their new facilities at their Noamundi & Joda Mines. The work includes design engineering, procurement assistance & construction management services for installation of main receiving substation (MRSS) with 132 kV GIS, along with overhead transmission lines from Jharkhand State Electricity Board to the MRSS site & from MRSS site to destination points.

The above works are required to be executed considering the constraint of cost, time & space availability. The planning & finalization of the MRSS layout adjoining a forest land was a challenge. Based on preliminary inputs on new facilities, a 2 storied building of size 48 m long x 28 m wide was planned & submitted to Tata Steel. The building was planned to have 3 bays – a GIS bay with overhead crane facility to accommodate 132 kV GIS & 33 kV GIS, a second bay for accommodating Control & Relay Panels and a third bay for accommodating electrical switch gears. In addition, there shall be a cable vault & space for air conditioning, ventilation & other equipment.

MRSS-Building

A Comparative analysis of civil quantities pre & post value engineering summarized below indicate the extent of space savings:

Sl No	Stage	Unit	% savings for value Engg
1	Floor area of Building	m2	28% saving
2	Building External Cladding	m2	17% saving
3	Building Internal Cladding	m2	16% saving
4	RCC in super structure	m3	28% saving

Jamshedpur:

Coke oven plant for 6MTPA Integrated Steel Plant for Tata Steel, Kalinganagar.

TCE Jamshedpur has been working on the design, project management & construction management services the ISP of Tata Steel. 90% of piling work has been completed. Civil works for the coke oven batteries, Chimneys, Coal tower and quenching tower are in progress. Photographs depicting the civil works are given below.

Nozzle Pipe Fixing in progress for Battery 2

Reinforcement Fixing in progress for Chimney

Power distribution system for 6 MTPA Integrated steel project at Kalinganagar, Odisha.

TCE Jamshedpur has been working on the design and erection of the power distribution system consisting of 400/220kV outdoor switchyard and overhead transmission line from OPTCL Grid Substation II to the Plant MRSS. The elements of the projects include 9 Nos. large substations comprising 220/132/33 KV Gas Insulated Switchgear System; Transformers; Control and Protection; SAS & SCADA; 6.6 kV Switchgears; LV Auxiliary Power System; Cabling; Earthing & Lightning Protection System; 8.5 KM long cable tunnel network connecting all substations , captive power plants and an Energy Management Centre.

Concreting of 3034 m^3 of RCC was done in the month of May'12. The Foundation raft and basement RCC wall of MRSS & MSDS Substation has been completed. 85% of the civil construction drawings are released at site for Substation and Cable Tunnel.

Construction of MRSS-220 kV

Construction of MSDS

Mumbai:

Assam Petrochemicals Ltd, 500 TPD Methanol and 200 TPD Acetic Acid Project Namrup, Assam.

Assam Petrochemicals Ltd (APL) is setting up a Methanol and Acetic Acid Integrated petrochemical complex at Namrup Assam, adjacent to their existing Methanol and Formaldehyde units. The project consists of a 500 TPD Methanol Plant, 200 TPD Acetic Acid plant, a Carbon Monoxide(CO) Separation plant, a 5 MW Captive power plant, associated offsite and utilities and railway wagon loading facilities.

TCE has been appointed as the project management consultant (PMC) for the project. The project activity has been planned in two phases.
In the Phase-1, TCE has been involved in:

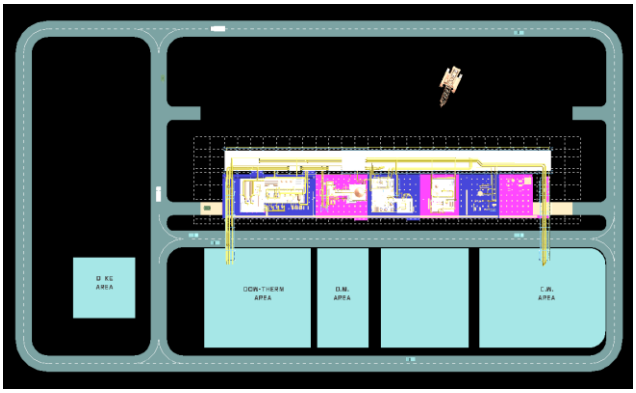
- Preparation of Techno economic feasibility report
- Selection of Licensor and EPCM Consultant for Methanol Plant
- Selection of Licensor and EPCM Consultant for Acetic Acid Plant
- Environmental Impact Assessment Study and Environmental clearance from MOEF
- Geotechnical survey
- Preparation of Detailed Project report
- Review of Methanol Plant Basic and Detailed engineering
- Review of Acetic Acid Plant Basic and Detailed engineering
- Selection of EPC Contractors for non licensed units such as railway tank farm, Water draw facilities from River, Natural gas pipeline extension, Electrical power supply extension, etc.
- Construction Supervision and monitoring for all contractors.
- Overall supervision and project management services for the entire project.

BARC, THTF, Vishakhapatnam

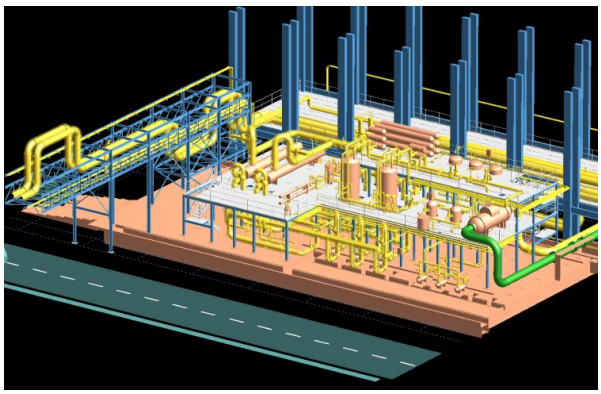
A thermal hydraulics test-facility with high enthalpy de-mineralized water as process medium is being setup in Centre for Reactor Equipment and Systems Testing building at BARC, Vishakhapatnam, Andhra Pradesh for thermal hydraulic experiments. The facility is located near the seashore at Achyutapuram about 55Km from Visakhapatnam city.

The facility building mainly consists of an Engineering Hall (150m L x 50m W x 24m H) that houses the different thermal hydraulics test loops. Ventilation & Compressed air equipment rooms , an office building, loop heating system (thermal fluid heaters), DM water plant, cooling towers, equipment storage space, transformer yard & electrical sub-station etc., are located in the adjoining structures/buildings. The total plot area allocated for the facility including provision for future expansion is about 33000 sq.m.

TCE's scope of services includes basic and detailed engineering of the experimental test loops, procurement services, construction management & commissioning services.



Plan View



3D View

Preparation of Water Management and Drainage Master Plan for Bengaluru International Airport Limited.

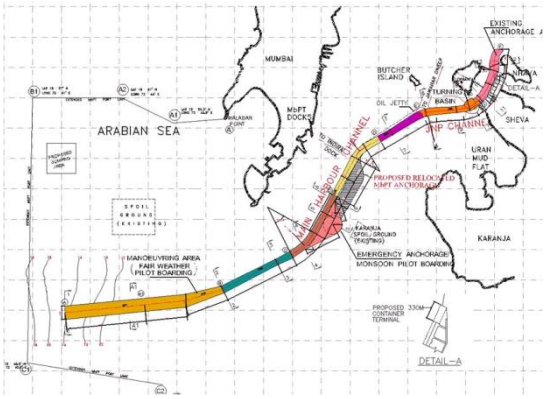
Bengaluru International Airport (BIAL) located about 35 km north of the Bengaluru city on NH-7, in the Devanahalli Taluk of Bengaluru District, started its operations in the year 2008. The current traffic of 11.4 mppa (million passengers per annum) is expected to grow further to 55 mppa by 2029-30 as per projections in the BIAL Master Plan.

TCE has successfully explored the possibilities of water management (re-charging/recycling/ harvesting), understanding the constraints associated with the same and considered options to mitigate them and prepared Water Management & Drainage Master plan at BIAL.

Water Supply Distribution Improvement Projects in nine towns of Tamil Nadu.

TCE is working on a Detailed Project Report (DPR) for water supply distribution improvement of nine towns in Tamil Nadu under three different packages namely (i) Madurai Corporation (ii) Tirunelveli Region (Virudhunagar and Sivakasi town) and (iii) Chengalpattu Region (Anagaputhur, Pammal, Madurantakam, Poonamallee, Thiruthani and Tiruvallur towns). After a gap of 10 years, TCE Infrastructure Business Unit was awarded a project for consultancy services in Tamilnadu Region and we hope this successful beginning will continue a long term relationship with the existing customers by means of procuring more assignments.

Phase I Channel deepening project- JNPT **(Jawaharlal Nehru Port Trust)**



TCE is working for JNPT **(Jawaharlal Nehru Port Trust)** for the Phase I Channel Deepening project. The project involves deepening of the approach channel from the existing (-) 11 m CD to (-) 14 m CD to cater larger vessels of 6000 TEU with 2.2 m tidal window. The project is estimated to be completed within 25 months.

APSEZ Marine outfall project

Andhra Pradesh Industrial Infrastructure Corporation Ltd (APIIC) is developing a multi product special economic zone (SEZ) in Vishakapatnam, for which a marine outfall system was required to dispose treated effluent into the sea. APIIC has appointed TCE to provide engineering consultancy services for the proposed marine outfall system.

TCE's scope included conceptualization, planning, designing and preparation of tender documents along with detailed cost estimates for the marine outfall system. The treated effluent was planned to be disposed off into the sea at a distance of 3.5 km from the land fall point. The marine outfall system comprises pumping station, an onshore pipeline, sub-sea pipeline and diffusers. An HDPE pipeline of 560 mm diameter was proposed to dispose 31 MLD of treated effluent. A circular multi-port diffuser with an anti-trawling dome has been proposed for this project. This is a *first of its kind* marine outfall project designed by TCE.

Alignment of marine outfall pipeline

Reliance Industries Limited 220 ml/d Sea Water Reverse Osmosis (SWRO), Intake and Outfall plants

Reliance Industries Limited (RIL) has planned to set up a Sea Water Reverse Osmosis (SWRO) for their manufacturing facility at Dahej.

TCE's scope includes basic engineering for the intake SWRO and outfall systems, preparation of tender document and vendor drawing review. The Intake system is designed to supply feed water to the SWRO plant continuously, taking into account large tidal variations and high suspended solid loads at the site. The location of the intake is constrained by proximity of an existing jetty, a navigational channel and a proposed jetty. The SWRO plant process was designed to take care of large variations in the Total Suspended Solids and Total Dissolved Solids in the feed water.

For the sub-sea pipeline, the design of anchoring and installation methodology was proposed taking into account the high sea currents and tidal variations. For the first time, TCE has engineered a desalination plant of this capacity.

Owner's Engineer Services to Maamba Collieries Limited for 330kV Double Circuit, 55km long Overhead Transmission line in Zambia.

Maamba Collieries Limited (MCL), Zambia has planned a 55 km long 330kV double circuit overhead transmission line between Maamba Substation and Muzuma Substation. The line is located South-East of Choma town. Currently the Project is in the bidding stage.

TCE's scope involved the reviewing of bids, LOI, contract documents & vendor drawings along with technical assistance as required by the transmission authorities at site. TCE's on time delivery was appreciated by the Client.

Saudi Electricity Company (SEC) Manifa BSP (complete 380/ 115kV substation) and Abu Hadriyah BSP (380kV GIS expansion)

TCE developed detailed designs and provided site supervision services for Civil (Structural, Architectural & Plumbing), Electrical and Mechanical disciplines for Saudi Electricity Company (SEC) Manifa BSP (380/ 115kV substation) and Abu Hadriyah BSP (380kV GIS expansion). The scope also involved remote end modifications for Manifa CPF, Manifa WSF & Abu Hadriyah Field substation at 115kV level. TCE worked for an EPC Contractor, National Contracting Company (NCC), KSA. The owner of the Project is Saudi Electricity Company (SEC). The Project was executed offshore from TCE-Mumbai and the project duration was 24 Months.

Adhering to Project Technical Specifications and in compliance with SEC standards and all International standards, four stages of deliverable submissions were adopted for the project execution viz., Base Design Stage, Detail Design Stage, Construction Stage and As-built Stage. TCE's contribution in the successful commissioning of the 380/115kV Manifa BSP was appreciated by the client.

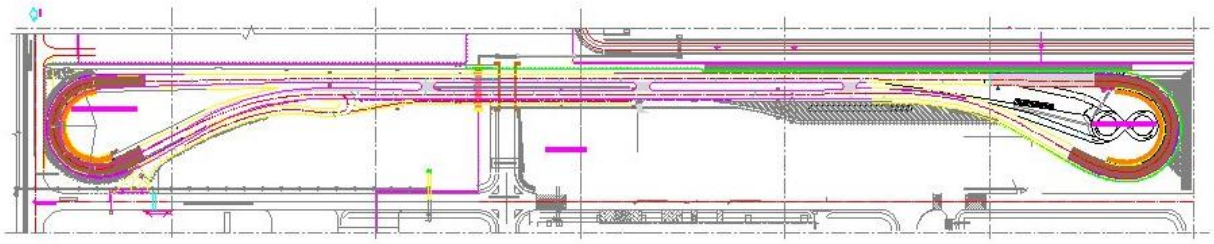
Pune:

Mahindra Vehicle Manufacturing Limited(MVML), Chakan, Pune.

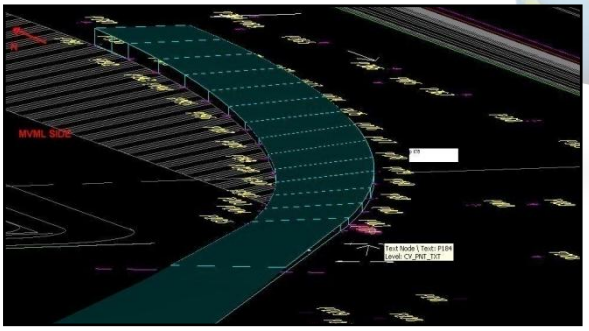
Accepting no limit has been a hallmark of MVML. Living this spirit, MVML is ready with its highly advanced state of the art *Test Road***.** A milestone marking the indigenous efforts put together by MVML team and TCE team with guidance from other functions has been a success story. The test road was inaugurated on 23 rd Dec 2011.

The approximate area for the road is 27000 m^2 with road length of 2700m. The road thickness is designed as per IRC guidelines. The road has a curvature on the south-side with a radius of around 36.5m. The geometric design covers the super elevation requirements for the various speeds at south end of the test road, extra width requirements at the curves due to psychological and mechanical reasons as per IRC recommendations. The super-elevation for the track is designed considering the production test requirements rather can confining to IRC requirements.

It was a great experience for TCE to design and supervise construction in a challenging and ambitious environment. The development of a non-standard super-elevation was a challenging task. TCE received a trophy of appreciation from MVML.



Plan Of Test Road.



View generated from micro-station

Construction of super-elevation in progress.

Construction:

3 x 400 MW Combined Cycle Mega Power Project, Dahej, Gujarat by Torrent Energy Limited

Torrent Energy Limited is setting up a 3x400 MW Combined Cycle Mega Power Project spread across 106 hectares in Dahej, Gujarat.

The Project will utilise 43.5 hectares out of the 106 hectares that is allotted for works, constituting facilities like Roads, Drains, Admin/Canteen Building, Maintenance and Workshop Buildings etc.

This Project started in November 2010 and is expected to be completed in December 2013. The EPC Contract has been awarded to Siemens (Germany). The plant will be equipped with a SGT5-4000F Class Turbine of the latest technology, generating 22kV step up to 400kV power which will be connected to the grid (transmission line) distributing to various locations. TCE has been providing Design Engineering Review & Construction Services.

View of Unit # 51 Turbine Building and HRSG

Click here to read Building Blocks

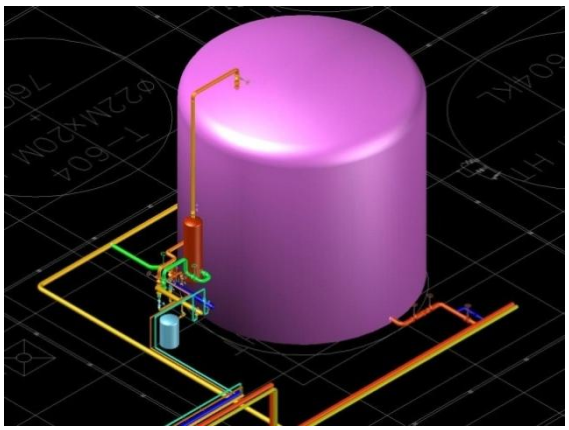
Chennai:

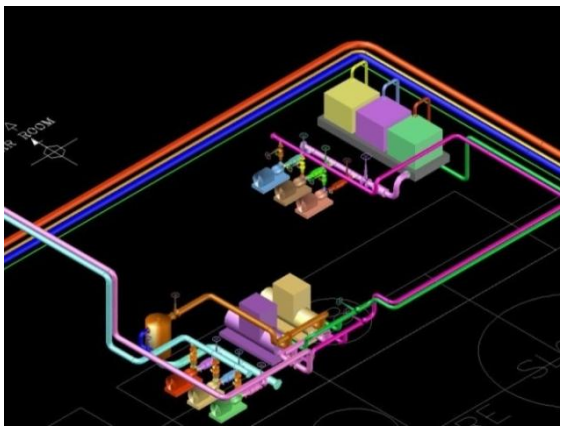
Detailed Engineering Service for Propylene Oxide Handling Facility at ETTPL Tank Farm Area, Chennai.

M/s Ennore tank terminals Pvt. Ltd. (ETTPL), Chennai is setting up a new facility for storing and handling of Propylene Oxide (PO) in their existing tank farm consisting of 42 tanks with storage capacity of 129775 m^3 for storing hydrocarbon products and Edible oils.

TCE's scope of work includes detailed engineering involving multi-disciplines of Process, Mechanical, Instrumentation, Civil and Electrical engineering. The scope of work includes the following:

- Process design of PO storage & distribution.
- Nitrogen Blanketing for PO storage tank.
- Vapour balancing/recovery system.
- Refrigeration & utility system.
- Design review of storage tank as per API 620.
- Stress analysis of Dock lines (4.5km length).
- Equipment/Piping layouts.
- Storage tank foundation design.
- Instrumentation & PLC based control system
- Cable Sizing & SLD.





Bangalore:

3x660 MW Coal based Prayagraj Super Thermal Power Project, Bara, Allahabad District, Uttar Pradesh.

3x660 MW Boiler and ESP Structure

Jaiprakash Associates Limited (JAL) has been declared successful bidder against Global Invitation of Tariff Based Bidding Process by Prayagraj Power Generation Company Limited (PPGCL) for setting up Prayagraj Super Thermal Power Project at Bara, Allahabad (U.P.) on *Build, Own, Operate & Maintain* (BOOM) basis. The proposed site is located at Bara Thehsil about 34 km from Allahabad, well connected by rail and road. With coal linkage from Northern Coalfields Ltd. & Yamuna River as source of water, PPGCL is planning to utilize 100% of fly ash in their cement plant.

Engineering services being provided by TCE include, pre-tender engineering services, pre-award activities and evaluation of bids, detailed engineering services, review engineering services for the complete project covering BTG and about 40 BOP packages including all civil works, electrical, mechanical and C&I systems. TCE is also posting engineers for construction supervision and field engineering services to the project site, taking into the consideration the requirement of PPGCL.

The major features of the project are:

- Steam Generator is being supplied by Alstom and TG is being supplied by Siemens with BHEL as lead contractor.
- Coal unloading is from both track hopper and wagon tippling. Provision is also made to unload coal supplied by trucks.
- Power evacuation is through a 765 kV switchyard which is a first time experience to TCE.
- ESP control room is common for all the three units.
- The TG building columns up to TG floor is of RCC. Auxiliary columns of TG building for unit-2 and unit-3 are pre casted.
- The CW ducts are of RCC construction.
- All major civil works are being taken up by PPGCL themselves.

TG deck columns ready for casting

JITPL: 2 X 600 MW Thermal Power Project at Angul, Odisha, India

Jindal India Thermal Power Ltd., a division of Jindal Photo Limited, is setting up their first thermal power plant consisting of 2 units of 600 MW each at Derang village, Angul district, Odisha. The site is 15 km away from its source of water viz., River Brahmani. The plant works on subcritical technology and the coal required for the operations will be sourced from Mandakini coal block. The plant will use Indian coal as fuel with 3650 kCal/kg gross calorific value and the daily requirement works out to be around 20,000T. The power generated is proposed to be evacuated into the state grid through 400 kV double circuit lines to the proposed Angul pooling station being set up by Power Grid Corporation of India Ltd. (PGCIL), about 56 km away from the project site.

TCE scope of work includes:

- Preparation of DPR ,
- Pre-EPC contract award engineering services for BOP Packages,
- Review engineering services for Main plant (BTG) package and the BOP packages covering all mechanical, electrical and C&I systems, Civil detailed engineering services for BTG & BOP area and project planning services.

The major features of the project are:

- Adoption of a GCB scheme
- Particulate emission limited to 50 mg/Nm3
- 15km long river water intake system carrying 3320 cum / hr and power supplied from the plant.
- Two chimneys of 275 m – one twin flue
- Advanced plant digital control system
- BHEL has been awarded with the EPC contract for the Main plant.
- BOP contract has been broken into 13 packages to bring down the project cost.
- TG Building layout is compact.
- The electrical building is sandwiched between the two unit TG halls / buildings with compact switchgear and control rooms.

Plant overview – chimney, boiler & turbine

Chemical

Assam Petrochemicals Limited (APL) has appointed **TCE – Raj Plaza** for detail engineering for proposed integrated Phase-II activities of 500 TPD Methanol – 200 TPD Acetic Acid plant.

Hindustan Petroleum Corporation Ltd. (HPCL) has engaged **TCE – Raj Plaza** for providing detailed engineering services for implementation of MB LAL Committee Recommendations for Package – I which is for 34 various Installations of HPCL across India(capacity more than 25000 KL).

Power

In association with KEMA – Netherlands, **TCE** has re-entered the R & M segment to provide 'Energy Efficient Renovation and Modernization' of Koradi Thermal Power Station unit – 6 (210 MW), **Maharashtra State Power Generation Company Limited (MAHAGENCO)**. This assignment will be handled by **TCE – Bangalore.**

TCE – Bangalore will provide detailed engineering services for **BGR Energy Systems Limited** for Steam Turbine Generator Island packages for 2 x 800 MW coal fired super-critical units each at Lara in Chhattisgarh and Darlapali in Orissa.

TCE – Bangalore along with **TCE – Pune** will provide Design Review of peripherals of Boiler structures & related supervision works for **TPL – TQA Quality Services South Africa (Pty) Ltd.**, for Units 1, 2, 3, 4 & 5 of ESKOM's 6 x 800 MW Medupi Power project in Limpopo, South Africa.

Mining & Minerals

TCE – Jamshedpur will provide detailed engineering services for **Tata Steel Limited** for proposed 2 MTPA Coal Washery at Jamadoba, Jharkhand.

Infrastructure

Tata Consultancy Services has appointed **TCE – 247 Park** for providing PMC services for their proposed Campus at Adibatala, Hyderabad & expansion work at Yantra Park, Thane, Mumbai.

TCE – 247 Park has been awarded a project involving detail engineering services for **Jawaharlal Nehru Port Trust (JNPT)** for deepening & widening of Mumbai harbor channel and JN port channel – Phase-II.

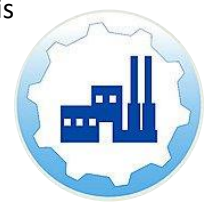
TCE – CNBU along with **TCE – Bangalore** will provide the PMC services for Office Complex at Adugodi, Bangalore for **Bosch Limited.**

Rajah Muthiah Chettiar Charitable & Educational Trust has engaged **TCE – Chennai** for Mechanical, Electrical & Plumbing (MEP) services for their corporate office at Chennai.

TCE – Chennai has been engaged to provide Mechanical, Electrical & Plumbing (MEP) services for Residential project at Kovai by **Durandel Foods Private Limited**.

Industrial

TCE – Pune has secured a job of "Engineering & Project Management Consultancy services for Cashew Nuts project at Visakhapatnam" from **Olam Agro India Limited**. Olam India is the Indian arm of Singapore based Olam International and has very recently diversified into Production plants. This project also includes a Bio-mass based Co-generation plant, to be engineered by **TCE-Bangalore**.



TCE – CNBU along with **TCE – Bangalore & Pune** will provide the PMC services for Construction of new manufacturing facility at Bidadi, Bangalore for **Bosch Limited.**

Steel & Metals

TCE – Chennai will be providing detailed engineering services to **Sterlite Industries (I) Limited** of Spray Ponds relocation.

On-going International Project Locations

- Kariba North Bank Power Station is located in the Kariba Valley of the Zambezi river, Zimbabwe.
- Mitsubishi Heavy Industries (MHI), Japan
- Posco Power, Korea
- Kraft Foods Project, Egypt
- Qatar Foundation (QF) for Education, Science and Community Development
- Zuma Energy Nigeria Limited 2 X 600 Mw Thermal Power Plant
- Darycet International Limited, Nigeria
- Nuon Magnum IGCC CCPP, Netherlands
- Buseruka Hydro power project, Uganda

Engineering Services for Disi Mudawarra to Amman Water Supply Project, Jordan.

Gama Power System Engineering & Contracting Incorporation has engaged TCE for providing engineering services for Disi Mudawarra to Amman Water Supply Project, Jordan.

Following are glimpse of major highlights:

Pump Installation initiated after clearance from Commissioning (Motor water filling, IR value, winding resistance & RTD Checks)

Pump Installation completed. Piping & Valves installation & cabling completed and ready for Commissioning

Main berth work in progress

Well Head Pump 252m3/Hr, 297MWH, 3.3KV, 290KW Ready for installation

Commissioning Team assistance during pre-installation checks and Installation of Pump

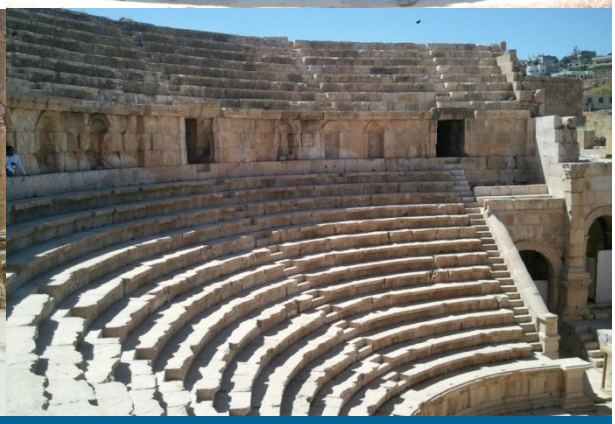
Preliminary Design Review Meeting at International Thermo-Nuclear Experimental Reactor (ITER), France.

Mr. Prashant Wani, (Asst. Manager –Chemical) and Mr. Rajesh Thakare, (Sr. Engineer-Chemical) presented the design of CCWS (Component Cooling Water System) and CHWS (Chilled Water System) in the Preliminary Design Review Meeting of ITER at Cadarache, France. The presentation was successful and was well received from attendees. The attendees were from all seven countries, viz. China, Korea, India, Japan, EU, SA, Russia, who were assessing TCE design. The design was technically accepted and the overall preliminary Design Review was successful.

Floating with History

Offering engineering services for the *Disi Mudawarra to Amman* Water Supply Project, was an opportunity to have an adventure. The overseas stint had Team-TCE tracing history and taking a dip at the lowest point on earth.

TCEites, ***Rajiv , Milind and Kundlik** share what their camera clicked.



Team-TCE in Jerash, site of the ruins of the Greco-Roman city of Gerasa

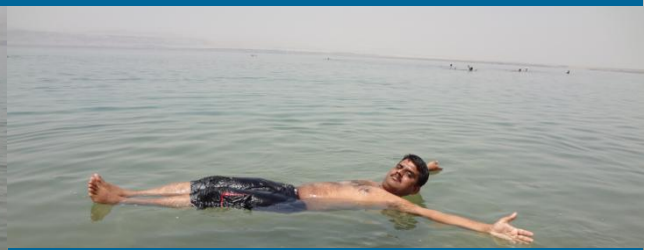
Did You Know?

The 2007 A.T. Kearney Globalization Index, ranked Jordan as the 9th most globalized nation in the world. The 2010 AOF Index of Globalization ranked Jordan as the most globalized country in the Middle East and North Africa region, including Israel and Turkey.

High technology penetration rates and its fast growing ICT industry earned Jordan high marks in the technology connectivity rankings. For example, Jordan has a 120% mobile phone penetration rate and a 50.5% internet penetration rate. 41.6% of all mobile phones in Jordan are smartphones, compared with 40% in the United States and 26% in the United Kingdom. 97% of Jordanian households own at least one television set while 90% have satellite reception which means they have access to other Arab and European programs Furthermore, 61% of Jordanian households own at least one personal computer or laptop.

Source: Wikipedia

Floating over the famous 'Dead Sea' – The lowest point on the earth with the highest salt water density.



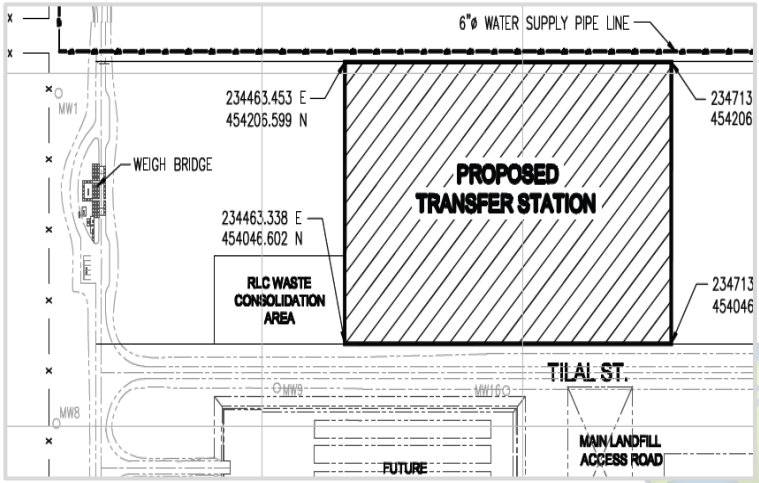
***Rajeev Vikas Joshi (Sr. Manager) Kundlik Bhanudas Jadhav (Asst. Manager) and Milind R. Korde (Sr. Construction Engineer) are currently stationed in Jordan.**

International Projects: A Package Deal

Being a trainee, getting to work on an International Project is a golden opportunity that no one would want to miss. One such opportunity was given to me. I am currently working on Qatar Petroleum-Waste Management Facility Project as a coordinator.

Qatar Petroleum is the client and TCE-QSTP-LLC has been assigned the work of Civil Infrastructure Design (CID) of a new Solid Waste Transfer Station and Front-End Engineering Design (FEED). There is a Solid Waste Transfer Station which is adjacent to the proposed site as seen in the figure below.

A great team effort from TCE is helping us achieve the required project completion within one year. Experts and leads from TCE are endowing their magnificent ideas onto this project.



The best part about coordinating is that one is aware of whatever is happening in every discipline right from the commencement of the project to the end. It is a huge experience to understand how various engineering disciplines blend in so beautifully together.

The successful completion of this project will enhance TCE's brand name in international markets. When it comes to international projects, extra care needs to be taken. We were advised by our seniors that Qatar Petroleum is a client who is very stringent with their quality norms and a stickler to time schedule. With such advice imbibed in our heads, we commenced with this project with full vigour and enthusiasm on 2nd April 2012 in Qatar.

A document Control Register was prepared along with the Project Execution Plan for the tenure of one year. The documents and drawings were supposed to be submitted as per client's specified templates. The client being particular about the deliverables and the quality of work had developed a software called "QP Checker" that checks the AutoCAD drawings as per their format. Now this was something new to me. Equipped with just eight months of experience, I said to myself, "How big a deal would it be to check the drawings in the software?" And trust me; it was very difficult because it took us one and half months to identify the problem in installing the software in our PCs! And after we identified the problem, we found that the available software was not compatible with the QP Checker. It was a completely new experience to face such technical challenges and overcome them.

"The successful completion of this project will enhance TCE's brand name in international markets"

Teasing me about Qatari culture, many of my seniors and co-trainees would say to me "Now Yugandhara definitely needs to buy a Burkha". Ms. Shilpa who is our architect for this project told that "Qatar is a tolerant country, and you can wear pretty much what you want. It has got beautiful roads, good telecommunication networks, lovely buildings, airports, ports etc." She inspired me to go to Qatar and feel its beauty while working for this project.

One of the funny incidents that I would like to share with you is about the language barrier. Mr. Nilesh who is our IT technical support and who helped us to identify the compatibility issues with QP Checker Software installation had to call the software engineer from Qatar Petroleum Office who developed the software. Nilesh found his accent very difficult to follow since they use words with "Kha" a lot and we feel as though its coming through their epiglottis. Moreover the software engineer wanted to be addressed by his full name which was "Hajibasheeruudeen K Mohamed Ibrahim"!Now can you imagine the amount of energy one has to spend on pronouncing this name?

International Projects, is truly a total package full of new experiences, challenges, people and their variant culture. It has to be perceived as an instrument to shape TCE into a vibrant constructive force capable of elevating the whole aspect of Engineering into a new realm of knowledge and enlightenment. And we being the technocrats of Modern India, have to cherish and embellish this knowledge with the zeal of an evangelist.

Yugandhara Lad, TCE-247 Park

Blueprinting Values

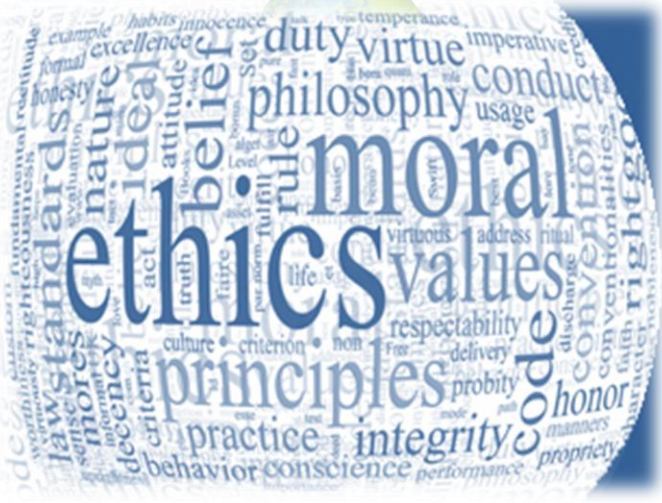
In his "*On Value and Values*", Douglas K. Smith writes: "*Values are estimations not of worth but of worth while'ness.*" There is a deep backward- and forward-looking quality to values. If value is what makes us wealthy, then values we assume and regularly assert, are what make us human. Ethical values are all about making people human." TCE - a company that breathes integrity, is a company that 'walks the talk' on ethics and integrity."

Importance of ethics in the business world is superlative and global. New trends and issues arise on a daily basis which may create an important burden to organizations and end consumers. Nowadays, the need for proper ethical behavior within organizations has become crucial to avoid possible lawsuits. The public scandals of corporate malfeasance and misleading practices, have affected the public perception of many organizations. As multinational companies expand globally and enter foreign markets, ethical conduct of the officers and employees assume added importance since the very cultural diversity associated with such expansion may undermine the much shared cultural and ethical values observable in the more homogeneous organizations.

Globalization has brought about greater involvement with ethical considerations and most importantly achieving competitive advantage through business ethics. Globalization and business ethics are linked as they affect a company's ability to commit to its shareholders, in particular to external investors, and preserve the trust needed for further investment and growth. It is increasingly important for companies to deal with ethics as a corporate strategy that, if uniquely implemented, could achieve competitive advantage for the company rather than waiting to react to possible ethical issues of importance to the targeted stakeholders. It is the necessity of being an ethically proactive company rather than being an ethically reactive company.

As the speed of comparable tangible assets acquisition accelerates and the pace of imitation quickens, firms that want to sustain distinctive global competitive advantages need to protect, exploit and enhance their unique intangible assets, particularly integrity (building firms of integrity is the hidden logic of business ethics). "A Behavior that is trusting, trustworthy, and cooperative, not opportunistic, will give the firm a competitive advantage."

A reputation for ethical decisions builds trust in your business among business associates and suppliers. Recent scandals involving multinational corporations, impossible to name a few but from a long list, have sunk the world of big business to a new level of disgraceful recklessness and irresponsibility. Business people are now held accountable for their own actions, as more and more people are now demanding that they perform their social duty. The demand is not just giving back to the community at large but also to the customers and stakeholders. An integral approach to business can yield strengthened competitiveness: it facilitates the delivery of quality products in an honest, reliable way. This approach can enhance work life by making the workplace more fun and challenging. It can improve relationships with stakeholders and customers and can instill a more positive mind-set that fosters creativity, innovation among the stakeholders and a strong hold on the end consumers.



As the competitive environment with globalization could be characterized by the game metaphor rather than the war metaphor, it is increasingly important to include ethics in the corporation's strategy and potentially implement it in a way that achieves a competitive advantage for the company and adds value to the stakeholders and the customers. The metaphor of a game sees competition in business as an exciting game, in which each competitor strives to achieve excellence, satisfy customers, and succeed as a result. The motive in this type of game is not to drive out the competition, but to work hard, play by the rules of the game, and do one's best in order to succeed.

The bottom line is that good ethics is good business. There is a direct correlation between behaving ethically and creating long-term shareholder value. Furthermore, high integrity in external business dealings goes hand in hand with creating greater transparency and increased integrity in internal relationships.

Thus, TCE by rigidly confirming to the highest standards of ethics and integrity in the changing diversified global scenario will be able to optimally position its economic, social, and environmental sustainability efforts while addressing the company's growing global presence, the evolving definitions of sustainability, and the increasing demand from stakeholders for measurement and transparency.

Gaurav Shrivastav – TCE-247 Park

Ethiopia - A Business Travelogue

When the TCE Team landed at Addis Ababa for the Kick off meeting and site visit on 6th May 2012, they had very little knowledge on what will unfurl in the next few days.

It is worthwhile mentioning that Ethiopia's economy has grown with a GDP around 31 billion USD in 2011 and it's forecasted to grow to around 53 billion USD by 2015 at a median rate of 6 to 7% according to IMF estimates. The major contributors to the Industrial Growth are Food Processing, Beverages, Textile, Leather, Chemicals, Metal Processing and Cement. Ethiopia is the world's seventh largest coffee producer with production of over 300,000 Metric Ton in 2010. Ethiopia enjoys a good demographic advantage with 51% of population being in the working age group, while only 2.7% of population being in the dependent group.

The team left Addis Ababa next day and travelled to Mekelle situated at about 650 KM, north of the *Addis Ababa*. Our Client Ezana Mining Development's head quarters are located in Mekelle. On completion of the Kick Off meeting, the team travelled to Shire about 300 Kms from Mekelle.

As the team travelled on the newly built asphalt Shire-Mekele, Shire-Humera and Shire-Gonder highway roads crisscrossing the northern mountain terrain we could see massive ongoing development works in the infrastructure facilities. The team also witnessed herds of camel travelling across the mountains and along the highways on their way towards neighboring Somalia.

Ethiopia is a landlocked country with the nearest port located in the neighboring country Djibouti which is approximately 1000 KM from the Site. Among various minerals that Ethiopia produces minerals, rocks, and semi-manufactured goods, such as brick clay, cement, columbium (niobium), diatomite, feldspar, gold, gypsum and anhydrite, and tantalum .Gold is the main mineral export of Ethiopia. It is interesting to note that Ethiopia has an estimated reserve of iron ore amounting to 180 million tones mining sector which employs around 500 Ethiopians.

As the team travelled to the sites in semi-arid area, we noticed that there is scarcity of water. Armed guards were seen protecting water reservoirs so that the water is used only for agricultural purposes! In northern Ethiopia, in the Tigray district, mean annual rainfall is about 500 mm with maximum rainfall in the months of July & August of about 200mm/month. However Ethiopia is favored with a considerable untapped water supply from 12 main river basins as well as 12 sizeable lakes which can be tapped to mitigate the scarcity whenever required.

In the end the team was amazed and overwhelmed by the hospitality of our client and local people wherever they travelled. The abundant mineral resource complemented by its growing economy presents an opportunity and untapped market for TCE to build long strategic relationship with Ethiopia.

Dipto Bagchi , TCE- Kolkata

Lifestyle of TCEites in Nigeria

Location of Port Harcourt

*Sannu** (Hello) from Nigeria!

*Ya ya dai?** (How are you doing?) Hope you are doing well.

You must be aware by now that a team of TCE engineers are currently working in Port Harcourt, Nigeria. The team is working on the Obagi Operations & Security Camps project (OML58 and OSC block) for detailed engineering and procurement activities.

The OML58 Block is operated by TOTAL E&P Nigeria Ltd., for exploration and production of crude oil. OML58 is located about 75 km north-west from Port Harcourt close to the villages of Obite and Obagi.

Obagi Operation and Security Camps (OSC) are being developed for the accommodation of personnel of TOTAL E & P Nigeria Ltd. working on the OML 58 project. TOTAL E&P Nigeria Ltd. is a joint venture between TOTAL (France) and Nigerian Government for oil exploration and production.

Darycet International Ltd. (DIL), Nigeria was awarded the EPC Contract for the OSC project by TOTAL E&P Nigeria Ltd. TCE has been appointed by DIL to work on the detailed engineering.

Port Harcourt is the capital of Rivers State (one of the 36 states of Nigeria) located on the south coast of Nigeria. Port Harcourt is also one of the developed and important cities of Nigeria like Lagos *(the old capital and traditionally the commercial capital*), Abuja (*the administrative capital*) and Kano (*a northern Nigerian city*). The locals say that the Rivers State is one of the most economically advanced states in Nigeria due to the presence of oil fields. Many of the leading companies across the world in the oil and gas sector have their presence in Rivers. Port Harcourt is also well connected by domestic flights from Lagos and Abuja; TCEites arrive here by taking a 1 hour domestic flight from Lagos.

The city scapes - Port Harcourt

The road scapes

The environment around the city is quite green with a variety of flora. The soil colour varies from orange to yellowish. The local climate is hot and humid. Currently, the rainy season is on and will last up to September; it is understood from the locals that it rains continuously for 2 -3 days or up to a week in July and August, the peak rainy season! Winter is generally from October to February. While travelling around Port Harcourt, we are reminded of the Mumbai-Goa highway (*NH-17in India*), especially when we catch glimpses of the ongoing urbanization.

Typically, the city has a low-rise development all around with ground and two-storied structures which have pitched roof in vibrant colours such as blue, red and green. Only the government buildings and few hotels are high rise.

Accommodation – Hotel Mi Casa

Nigerian colleagues

The TCE team have been provided accommodation at Hotel Mi Casa, owned by DIL. A separate wing of Mi Casa has been converted to an office by the client.

The TCEites' daily schedule here is quite busy. The day typically starts at 7.30 am with breakfast. The office hours is from 8.00 am to 6.00 pm. TOTAL, TCE and DIL are working together under one roof. The first-half of each day is reserved for internal co-ordination within the TCE-DIL teams, in order to set the context for the work ahead. Weekly project review meetings are conducted every Wednesday by TOTAL.

TOTAL's team comprises of representatives from India, Nigeria and Europe, (*France and UK*), while DIL's team comprises of representatives from Lebanon and India. It has been interesting for TCEites to have an exposure to such varied nationalities, their background, culture and working styles. TCEites have adapted quite well to their international counterparts. Similarly, the TCE team also represents a cultural blend coming from different parts of India. The team has bonded well through a lot of interactions and the common factor of being away from home.

TCEites at Nigeria

Office Wing in Mi Casa

**Greetings from local language, Hausa.*

After the office hours, the team members get connected to their family through the internet. This dialogue with their family helps reduce the pain of staying so far away from home and also alleviates the work pressure.

After dinner, the evening is generally spent in playing table tennis, pool and badminton. Few of us prefer watching the football matches (*English Premier League or Euro 2012*), while others prefer sitting in the garden and simply chatting.

After a week of busy work schedules, the team obviously looks forward to the weekend. Come weekend, and the team gears up for a movie session. So far, it has been fun watching *The Gods Must Be Crazy, Sholay, Housefull 2, Pan Singh Tomar* and more.

Sunday in general is quite a laid-back and relaxing day. The Team enjoys playing cricket till lunch time. A few of us visit the ISKCON Temple which is about 15 km away from Mi Casa.

A few enthusiasts also give tips on Indian cooking to the Nigerian chef!

Sometimes, a few of us end up at the supermarket to shop or simply hang around.

Dinner time

At ISKCON temple

Play time

Let's cook the Indian way

Lord Krishna - ISKCON temple

Supermarket at Harcourt

In spite of staying away from the family, missing the festivals back home, staying in a restrictive environment with limited options, facing work challenges and pressures, the TCE team is focused on work and geared up to make the project a success.

It is certain that the OML58 project would add another feather in TCE's cap, and has sown the seeds of its business in Africa. It has paved TCE's way for its international business aspirations to become a leading engineering consultancy firm on a global platform.

Best wishes to you from Nigeria! We look forward to seeing you soon!!

Contributors:
Written by: ***Chaitanya N. Bondre***
Content: ***Chaitanya N. Bondre & Aakash Bajpai***
Pictures: ***Anil Kumar, Chaitanya N. Bondre, Pratik Kulkarni and Ganesha Kadar***

A Linguistic World

English	Arabic	Japanese	Chinese	Afrikaans	French	Spanish	German
hello	*marḥaban*	*kon-nee-chee-wah*	*knee how*	*Hallo*	*bonjour*	*hola*	*goo-ten tahk*
sorry	*āsif*	*suh-me-mah-sen.*	*'dui bu qi'*	*skuus*	*désolé*	*triste*	*es toot meer lied*
thank you	*shukran*	*arigato/ doumo*	*xiexie*	*dankie*	*merci*	*muchas gracias*	*dan-keh*
good bye	*ma'a as-salāmah*	*dewa mata*	*zàijiàn*	*totsiens*	*au revoir*	*adios*	*tschüss!*

مرحبا | ありがとう | 对不起' | こんにちは | مع السلامة

Compiled by
Rajesh Khanna – TCE-Blr

Name	What	What Else
 Dr. Poonam Ahluwalia	1. Innovative Solution for Building & Community Rain Water Harvesting Systems	All India Seminar on "Innovative and Cost Effective Products for Water, Waste Water and Sanitation Projects
	2. Institutional Framework and policy changes required for Optimum involvement of Urban Local Bodies in Combating Climate Change	International Seminar on "Urban Challenges in the Context of Climate Change, organized by Civil Engineering Department, IIT Delhi, in partnership with Liberty Institute, New Delhi, with the support of Friedrich Naumann Foundation for freedom, Germany)
	3. Centralised vs. Decentralised wastewater systems	Journal of Indian Water Works Association.
	4. Environmental and Perceived Risks associated with low cost sanitation	National Seminar on Rural Infrastructure: Needs and Issues" organized by Consulting Engineers Association of India supported by Ministry of rural development, GOI. New Delhi, India.
 Dr. Sakthivel	Chemical Engineering Communications	Optimization of operating variables for production of nanoparticles using response surface modeling
 	A Yogathon challenge was conducted at Sankey yoga center, Bangalore, to mark World Health Day on 7th April 2012. During this event more than 100 participants performed Surya Namaskar. Those participants who completed 108 repititions of Surya Namaskar were awarded a Gold certification and Mr. K.T.Veerabhadra Swamy from the TCE Project Office (BWSSB) was one of them.	
 Vikas Singh	Technical article titled *"Discrete controllers for On-Off Valves"* in **Inteq** which is a bi-monthly journal published by International Society for Automation (ISA)-Maharashtra Section.	The article analyses the applications of discrete controllers for on-off valves with open protocol based technology. The write-up enumerates the technical advantages and cost savings which can be of significant use to industries utilizing large quantities of on-off valves.

Space for *state-of-the-art*

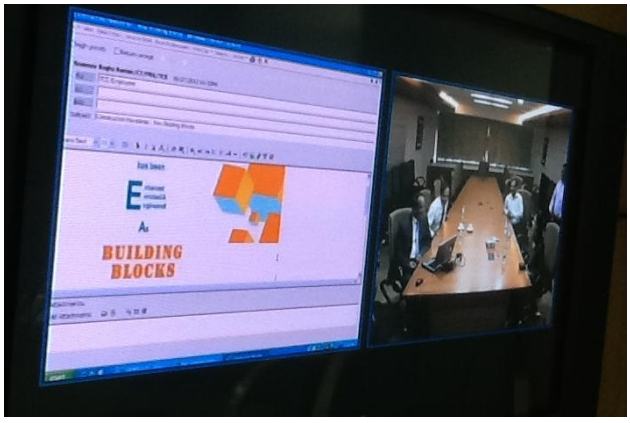
TCE sets its eyes on expansion with 5 acres of space at Bangalore…

TCE has been allotted 5 acres of space in Bangalore and it is proposed to have its own *State of the Art* "International Delivery Centre" housed in these premises. The MOU between TCE and Government of Karnataka was signed by Mr. Mohan Murthy -Sr. Vice President and Mr. M N Vidya Shankar, Principal Secretary-Industries and Commerce, respectively on 7th June 2012 during the Global Investors Meet. The MOU was handed over to TCE by Shri. Murugesh R Nirani – Minister of State for Large & Medium Industries, Government of Karnataka.

The Government of Karnataka in its endeavor to attract investments and to boost the economic development in the State of Karnataka had organized a Global Investors Meet 2012 on 7th and 8th June in Bangalore.

Shri Subodh Kant Sahay, the Hon'ble Union Minister for Tourism, Government of India was also present along with leading industrialist's viz. Mr. B Muthuraman, Vice Chairman, TATA Steel, Mr. N R Narayaana Murthy – founder and Chairman Emeritus, Infosys and Mr. Kumar Mangalam Birla – Chairman, Aditya Birla Group.

Building Blocks



27th June 2012 marked the beginning of a new wave of communication in the Construction Business Unit (CNBU) in TCE.

The construction newsletter donned a new *avatar* and got into circulation as **"Building Blocks"**. The launch ceremony was conducted on a Video Conferencing mode connecting Pune, Mumbai and Bangalore, TCE offices to facilitate participation of personnel from both CNBU and Corporate Communications.

The magazine was launched by our Managing Director, Mr. J P Haran who emphasised on the need for safety, quality and connectivity in CNBU.

Slated to be a bi-monthly newsletter, the first issue of Building Blocks carried a foreword by The CNBU Head - Mr. A S Prabhudesai who aptly termed it as an endeavor to shrink the distances between sites and expand TCE's know-how in the world of construction engineering.

Click here to read Building Blocks

Travel Quest

"A Journey of a thousand miles must begin with a single step"

Lao Tuz

The successful launch of **e-travel management** at TCE through Quest 2 Travel portal was inaugurated by Mr J P Haran, Managing Director on 16th May 2012.

Travel Management at TCE is now completely automated, faster and easy to understand. Implementing the e-Travel Management solution at TCE has made travel bookings quick and easy for employees travelling.

The solution offered is internet-based and technology-driven backed with exceptional service and software expertise, which will help TCE reduce their travel related expenses.

The new system will help us in streamlining travel procurement process, reduce the operating cost, and eliminate the delays, sanction and unnecessary paperwork. It will also help TCE to gain cost benefits arising out of increased efficiency.

Launch of e-travel management by MD & CEO Mr. J P Haran

Aiming for Quality

"AIMS- Audit Integrated Management System" was inaugurated by Mr. J P Haran, Managing Director in the month of May. As the name indicates, this is a system which has automated the Systems Audits - be it Quality System, Safety System, Environment System etc. This system is the result of hard work put in by our IT team and the team of professionals of the vendor- M/s Bluezone under the guidance provided by Business Excellence Head. Inputs were also taken from many internal auditors in designing the system.

The main benefit of AIMS is that it has taken out the drudgery of the audit for the QMSC and the auditors. It has streamlined the entire audit process through work flows and it can generate many MIS reports to help managers take proper decisions. TCE plans to extend the scope of AIMS to Safety audits too, in near the future.

AIMS will lead to many process improvements. Identifying the root cause is a "must" for Non Conformities, and this will lead to higher customer satisfaction in years to come."

Accelerating Techno-Business Excellence

Technical Expertise, Technical Excellence, Technical Knowledge – are these the only fuels for Organisational Growth?

Corporate Success calls for *Techno-Business* Excellence.

Today, when TCE is eyeing the Global Market with a greater thrust on the Domestic Market Share, Tech-Excellence with Biz-Excellence turns out to be the voice for the day. TCE, recognized for its technical efficacy, wishes to paint its canvas with a blend of Technocrats and Business Drivers.

While sound technical knowledge is critical, the concepts in functional business areas such as; Operations, Finance, Project Management, Organizational Behaviour and Marketing are imperative.

In-line with the thought to leverage market demands, as one of the steps, TCE identified a group of TCEites through a rigorous selection process. The group was selected to pursue higher studies in Business Management under the banner of program ACCEL (Accelerate Employee Evolution). It is time-honored that the concept and understanding of Business Management, facilitates successful delivery, in technically oriented business roles.

A Structured Developmental Plan was carved for the ACCELites. It included an Executive MBA course, rotation through various functions and participation in company's strategy planning & various corporate committees. The participants were assigned a pool of Mentors, to facilitate their development plan. The selected ACCELites, as part of Executive MBA, underwent a 21 months Post Graduate Executive Management Programme (PGEMP) at SP Jain Institute of Management and Research, Mumbai.

Post convocation, the participants had an experience sharing session with Mr. JP Haran(MD), Mr. Rakesh Gupta (Sr. EVP) and Mr. Dhananjay Savarkar (VP-HR). The participants narrated their exhilarating experience about the 21 months learning and self-intensification.

ACCELites' Testimonials

"The learning highpoints were highlighted as application opportunities for the knowledge gained, coupled with marketing, strategy and other aspects of project requirements in detailed working of operations and job deliverables. The program has elevated the understanding of how to effectively deal with internal and external customers. This would help perform the current and future roles in a better way. It was a great insight into the analytical situations which is dealt in our usual business operations.

The entire program was an eye opener with varied stints in areas like Negotiation Skills, Business Strategy, Operations Management and identification of constraints. As part of the curriculum, participants were exposed to practical applications of understanding of the various management challenges, how management decisions are made and what factors are involved for customer differentiation.

It was more of looking back in terms of customer interaction, externalization of strategy and people performance. Though the learning has been immense, one of the significant learning is reinvention of deliverables and services which can be done by tailoring the desired requirement based on the outcome of customer feedback. The connotation of the inter linkage between different functions and certain day to day aspects like importance of time sheets, negotiation skills etc. has been enhanced.

The practical exposure amplified the entire learning by bringing in a different perspective. The earlier orientation had thrust on Design Engineering as 'the thing', but the other side to it is, the processes, which are equally important."

In a nutshell, the program enhanced the overall self-approach and bestowed an insight on how macro economy impacts the business of any organisation. TCE is now extending the canvas of development programs and watch this space, for more news…

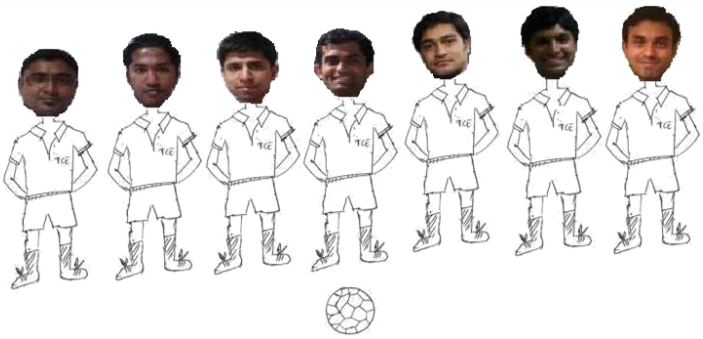
Complied by Divya Minz, TCE-Blr

A workshop on best practices for Administration and Facility Management was organized by the Tata Network Forum. About 13 Tata Group companies attended the workshop, Mr. K Sanyasayya and Mr. Vishal Dutta attended the workshop from TCE Delhi.

Facilitating Facilities

A workshop was held at TCE-247 Park for all the *location leave coordinators* to standardise the Leave & Attendance practices handled through EPIcentre (the HRIS at TCE)

TCE Day @ Chennai on 21st April



A Tata Ball Game

Tata Sports Club (TSC)-Mumbai , conducted an All India Tata Group football tournament at Bangalore. The tournament was sponsored by Titan Industries. About 8 Tata Group companies participated in the Football tournament. TCEites Aritria BRC, Umesh C Parsargi, George Kurian, Karthik B, Satyajith Shetty, Ravi Dewangan & Manju Sood represented the Tata Sports Club, Bangalore.

TSC –Bangalore, Committee Members

Office Excursion

Bangalore Infrastructure Office went on a team outing / excursion to Ramnagar on the 22nd of April 2012.

The one day outing was organized at 'Hill View Resort' in Ramnagar which is about 30 kms from Bengaluru. The day was filled with various fun filled activities such as cricket, football, volley ball, swimming, shuttle, Table tennis, trekking, etc.

The highlight of the excursion was a *10 km* trek to Ramadevara Betta (Hill) on which a Temple of Lord Rama exists. This also happens to be the place where the shooting of the famous film '*Sholay*' was done.

To sum it up, the excursion in the midst of a calm and clean environment was a refreshing and energizing experience and a retreat from the hustle and fast paced lifestyle of the city / metro. It also provided an opportunity towards greater understanding and team building which would help in establishing a better and more congenial work environment for the Bengaluru Infra team.

Hoping for more such excursions in the future…

Complied by
Infrastructure Team-Blr

A Beautiful Flower & A Wonderful Moral

A Beautiful Flower!

Everyone in the world loves it,

It appears in different colors,

Every human being enjoys looking at it.

One has to cross the thorns to reach the flower,

Which means that we have to cross many difficulties in life to achieve something.

Different colors of the flower represent different ambitions and goals

Which vary from person to person!

"It's the Rose, which teaches us a Wonderful Moral in Life!"

Girivasu K Pavuluri, TCE Raj Plaza

Chocolates

Do not eat too many chocolates...

Do not eat too many chocolates
Your teeth will be bad...
Was what I repeatedly heard
When I was a kid of third...

Do not eat too many chocolates
You will start putting on weight...
Was what I repeatedly heard
When I was just eight...

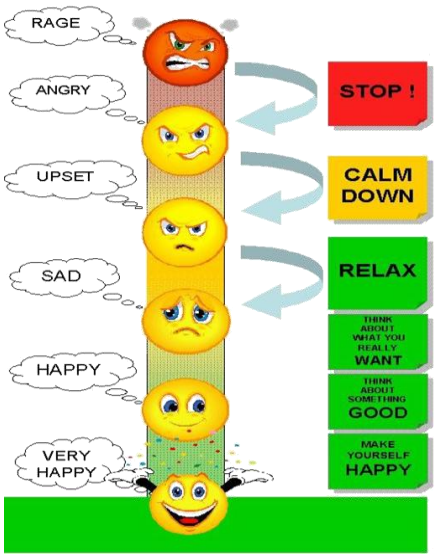
Do not eat too many chocolates
You will get pimpled visage...
Was what I repeatedly heard
Since I entered teenage...

Do not eat too many chocolates
They kept saying all the way...
I Say, I want to be sweet...
So, I am eating chocolates anyway...

Divyesh Joshi, TCE Raj Plaza

Managing Stress

The ABC Strategy



Techniques for managing stress

Awareness - Change your thinking

Balance - Change your Behavior

Control - Change your life

Stress is a part of human life. Stress has been defined as a physical, mental or emotional response to any event which causes mental or bodily tension. Sometimes, when we have to complete something in a limited time or a short period, a little stress makes it perfect. It is good when stress is less but it is worse when it increases, because when stress increases it starts affecting our mind, health and lifestyle. So, stress management is very important for all of us. While handling a stressful situation, the brain signals release stress hormones, which in turn triggers a set of responses that provides the body with extra energy: blood-Sugar level rises, the heart beat speeds up and blood pressure increases. The muscles tense for action, the blood supply is diverted away from the gut to the extremities to help the body deal with the situation at hand. We definitely cannot avoid stress but yes we can control it.!

Awareness: First of all we should find the cause of our stress and try to find a way out of it.

Balance: Is a fine line between positive /negative stress, how much you cope with it before it becomes negative? We should make a schedule for ourselves and work according to it. One of the most important thing which helps in reducing stress is to eat well and sleep well. We should also build new type of thinking. When we find ourselves worrying, we should immediately change our thoughts and start thinking about something else.

Control: We should always speak up. We often burry our thoughts or our wants inside us which creates anger, which leads to tension and finally stress.

But before applying all these we should first try the simplest way to come out of it, which is our *"self confidence"*. If we believe in ourselves then we can accomplish each and every goal very easily and without any stress.

Nikeeta Ray, TCE-Jamshedpur

An American Break

I decided to take a short break from daily activities and visit a new place to refresh and rejuvenate my mind.

On March 16, 2012 I got an opportunity to visit USA, the richest and the most prosperous country of the world. I have a curiosity to know about the place, people and their culture. Few places that I visited were the state of Maryland, New York and Pennsylvania. It was worth appreciating the behavior of American citizens and their attitude towards foreign tourists.

The day I landed at Washington Dulles (IAD) airport, I could feel the sense of hospitality among them. They always greet with a smile and say a sweet hello. A pedestrian is considered more important than a person driving a big Limousine car. Every person is valued irrespective of his caste, creed, origin and position. They are honest and love to work at any time and any place.

Niagara Falls

Lincoln Memorial, Washington DC

Empire State Building, NY

One very encouraging thing that I have observed in them is "Work while you work and play while you play". This is something we also need to practice in our life.

Dhruva Chakravorty , TCE Delhi

This quarter's candid camera section captures the ***work*** and ***beyond-work*** moments of TCEites and associates involved in international projects.

work

B P Umesh TCE B @ Alstom , Nigeria

Pre-Bid Engineering for QIPP Project, Nigeria Project Kick-off meeting with Daewoo Team from Korea

Aslam Basha –Blr with Zuma Energy team, Nigeria

Environmental Inspection team @ BHPP-Uganda

Vijaya Kumar Reddy,, MD Hydromax, Iren Muroni- Energy Minister-Uganda

beyond work

J L Thakkar after office hours in South Africa at the Lion Park

Delhi team @ Uganda

Karthikeyan with L&T team - Kuwait

Dinner with MD @ Nigeria

An Identity Endeavour

TCE is driving its Corporate Sustainability program in a concerted way, driving sustainability across four focus areas - Engineering, Environment, Education & Community. TCEites contribute to the CSR programs and the TCE Corporate Sustainability program needed to be formalised with a unique identity. TCE announced an Identity development contest through TCExpression.

The contest called for a name and tagline which would encompass the four thrust areas of TCE's CS activities, namely Engineering Services, Environment Conservation, Community Service and Educational Service. The contest details were cascaded across TCE with a poster campaign that showcased the four thrust areas as the *Joys of Engineering, Giving, Sharing & Going Green*.

The campaign created awareness about Corporate Sustainability within TCE and provided a pride in ownership to the program.

The Joys of Corporate Sustainability – Poster Campaign

Mr. Sanjib receiving award from OH-Delhi

Mr. Jeeva Ratnam receiving award from OH-B'lr

Mr. Sandeep B receiving award from OH-JSR

The contest drew 73 responses from all TCE offices and sites making evaluation a tough job for the panel members, Ms. Mallika Sriraman, Mr. R Prabhudesai and Ms. Sowmya Raghu Raman. After a final round of discussions with the MD Mr. J P Haran and Sr. EVP Mr. Rakesh Gupta, three winning entries were declared.

The CS drive at TCE now has a new name **TCEndeavour** – the winning name as conceived by **Sanjib Kumar Das,** Delhi **and G. Jeevaratnam,** Bangalore**.**

The Tagline will be **Care-Serve-Restore** as developed by **Sandeep Bangera,** Jamshedpur.

The winners were awarded gift coupons from CROMA by Office Heads of the respective offices.

Environment Day @ TCE

Tree Plantation @ Delhi

Walkathon @ Delhi

The World Environment Day propelled TCEites across locations to do their bit for the environment. Blueprinting to reduce Carbon Footprints, they set about making their mark in a variety of ways. On June 5th 2012, the excitement began right from the time TCEites switched on their computers to be welcomed by a 'green' screensaver.

Awareness was spread through talks and sensitization to the environment by TCE employees across all offices. TCEites in Trivandrum kick started with a pledge at the site (TCS IT SEZ site).

Engineers and Architects from TCE - Delhi joined the Tata Network Forum – North and celebrated World Environment Day by organising – 'Harit – Ek Pahal', in association with Govt. of Delhi, Citizens of Delhi and other Tata Companies, which included a walkathon, tree plantation, painting and a debate competition for children, followed by an environment awareness presentation and quiz. The activity fruitfully resulted in plantation of approximately 500 trees.

Towards the close of day, TCE offices across locations switched off power for 15 minutes. This exercise was a small little nudge to bigger things to come in terms of conserving energy. The offices worked out the math to indicate approximate carbon emission cuts. The 15-minute power-off switched on a consciousness to conserve energy and TCE offices will henceforth monitor savings by switching off lights during lunch hours and other means in the respective locations.

Complied by
Mallika Sriraman, TCE-Mumbai &
Karthik B, TCE-Blr

Trivandrum - Awareness pledge at site

Symbolic Switch Off

Go Green Screensaver

FEEDBACK

I do think this is an enormously worth while venture. It provides an overall view of what TCE is up to for your many colleagues who might otherwise see only a sliver. But in addition I admire the admixture of arts, news items and even fundamental science.

Sir Eric Ash
Advisor,TCE

A true connect between each and every employee of TCE and also with the outside world on a real time basis! Full of technical and other general information coupled with fun articles.

A good way to share our success stories across various units in this challenging environment. This will definitely inspire our employees to do something different from their comfort zone!

Best wishes to the entire Editorial Team!"

Mr. D M Dave
GM-International Marketing

I find TCE Expression very informative and invigorative. It is a very good step in the right direction, to keep TCE family together and apprised of all happenings around. Kudos!"

Mr. Sandeep Puri
VP – Domestic Marketing

Response received for Mr. G D Nigudkar's Creative Clique – Issue 3.

Thanks, Mr Nigudkar for your mail and the note.

You may like to clarify the difference between vacuum energy and dark energy cited in your note.

Prof. Narendra Bhandari,FNA,FASc,FNASc.
Honorary Scientist,Indian National Science Academy

I really liked the article. It's very concise but awakens one's curiosity about the subject matter. Including how it is explained in Vedas.

Sushama
M.Sc. (Physics), M.S.Drexel University. U.S.A.

Thank you for your mail and your thoughts on the expanding universe.

R R Navalgund
Vikram Sarabhai Professor, ISRO, B'lore

TCExpression the in-house magazine is the most required need of the employees of TCE. TCE community is spread over the seven cities in India and at few other locations overseas. The different cultural background are expressed in this magazine in equally varied colourful manner.. The various sections in the magazine facilitates the expression in all the fields such as managerial, technical as well as individual 's hobbies and creativity. I congratulate the editorial team to have done an excellent job in bringing TCE community together through TCE expression..

Mr. S M Palekar
GM- Nuclear BU

Initiative of TCExpression is appreciable and it brings out very interesting & dynamic topics. It is a very good platform for showcasing the various activities across the organization.

It is noteworthy that the magazine is covering all CSR activities, Project happenings, festival celebrations & individual contribution in the form of poems, jokes etc. This magazine also acts as a mechanism for building the image and brand value among the clients.

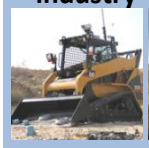
I wish the editorial team all the very best !

Mr. B M Nichat
VP-Chemical BU

Robotics and Engineering

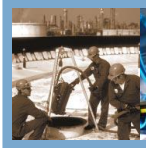
A **robot** is a mechanical or virtual intelligent agent that can perform tasks automatically or with guidance, typically by remote control. In practice, a robot is usually an electro-mechanical machine that is guided by computer and electronic programming. **Robotics** is the branch of technology that deals with the design, construction, operation, structural disposition, manufacture and application of robots and computer systems for their control, sensory feedback, and information processing. These technologies deal with automated machines that can take the place of humans, in hazardous or manufacturing processes, or simply just resemble humans.
This article explores the applications of Robotics in some of the business areas that TCE operates viz. Power, Mining, Chemical, Nuclear Power and Construction industries.

Robots in heavy industry – Mining




Automated operations are winning over today's mining industry. Whether it is automated trucks, tele-operated drills & blasts or automated logistics applications, mines are increasingly introducing these kinds of equipment and solutions. The extraction and processing of primary raw materials are and remain vital operations. Steel remains the world's most important material. Due to the increasing scarcity of resources, however, the extraction of raw materials is becoming even more capital- and labor-intensive. It is thus more important than ever before to optimize the degree of utilization of systems and to modernize work processes. Robots master industry-specific challenges, such as resistance against heat, dirt and aggressive substances, just as easily as requirements for maximum payload combined with minimum footprint. From raw material production, smelting and primary forming to the production of semi-finished products and the manufacture of high-quality end products, robots with decades of experience in the metal-producing and metal-working industry also benefit the mineral-processing industry.

Robotics in Chemical Industry




As the average age of bulk liquid storage tanks used in the petroleum, chemicals, and forest products industries increases, so does the need for environmental and safety inspections. Conventional inspections involve draining, cleaning with water or solvents, ventilating, containing waste residues, and certifying tanks as gas-free for manned entry. Inspection of the tank bottom, interior structures, and structural coating systems can be carried out only after completion of this series of hazardous, costly, and time consuming activities. This expensive process can be avoided by using a remotely operated robotics inspection vehicle submerged in the liquid. Process waste cleaning and disposal are vastly reduced, and venting requirements and associated emissions are minimized. The robotics system also minimizes personnel exposure to toxic waste materials, and the cost of maintenance inspections is lowered.

Robotics in Construction


No matter what the area of application, be it structural engineering or civil engineering, road construction or landscaping, public-sector or private building projects: the construction industry never grinds to a halt – irrespective of the ups and downs of the economy. Modern energy management and building services engineering have been on the rise for years, providing new growth impulses.
Resistant to heat, dust, acids, alkalis, impacts and corrosion, extremely tough and available around the clock, robots are the ideal solution for every task in the construction industry. Unlike conventional machines, their flexible programming and modular structure mean that they can be quickly adapted to modified production conditions with the result that they offer long-term security of investment in the ever-changing construction sector.

Robotics in Nuclear Power Plants

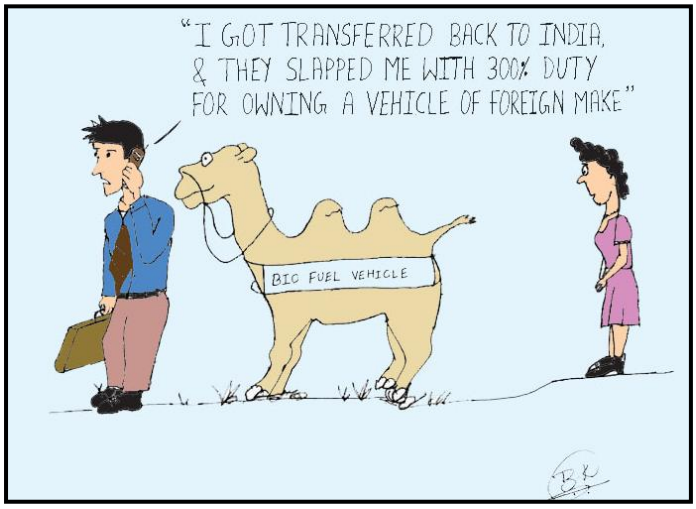
Nuclear energy has become a major energy source worldwide, even though we are still debating the environmental and safety aspects. In order to cope with the safety issues related to the nuclear power plants, the uncertain human factors needs to be minimized by automating the inspection and maintenance work done by human workers. The demands of a robotic system in the nuclear industry have been growing to ensure the safety of nuclear facilities, to detect early any unusual condition through an inspection, to protect the human workers from any radiation, and to maintain it efficiently. Robots are in use today for tasks such as pipe cutting, welding, steam generator tube inspection and repair, and ultrasonic scanning of pipe sections for crack detection.

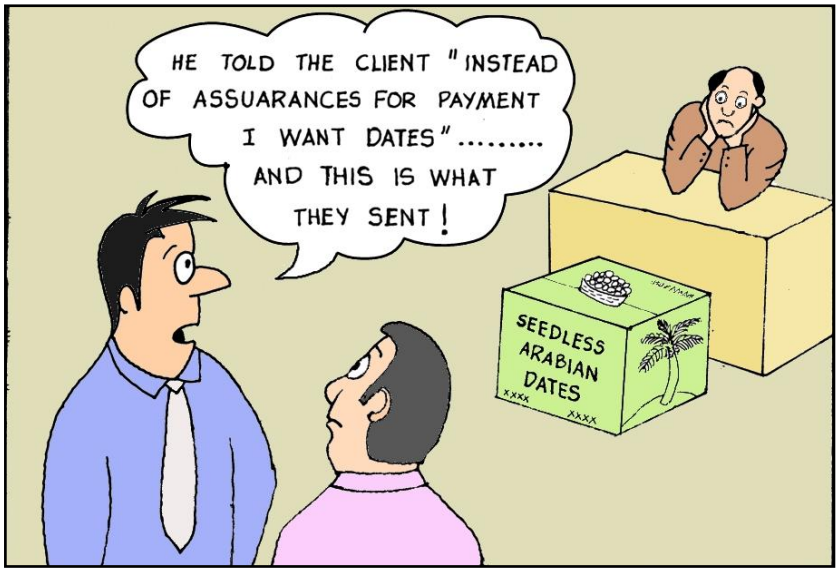
Robotics in Power Industry


Power production and distribution industry has developed transmission line and power systems maintenance robots. Hydro-Québec Research Institute (IREQ) developed and BC Transmission Corporation have developed the new LineScout, a Power Line Inspection Robot. This nifty robot is able to work on the power lines while they are operating (at very high tension). It possesses a vast array of cameras and tools that allow the remote operators to inspect and conduct (albeit minor) repairs on the power lines without needing to put off the service or risking their lives.

Sources:
en.wikipedia.org, AEA Bulletin, Autumn 1985 , IEEExplorer Digital library, www.kuka-robotics.com, www.robotshop.com

Complied by Divya M N, TCE-Blr





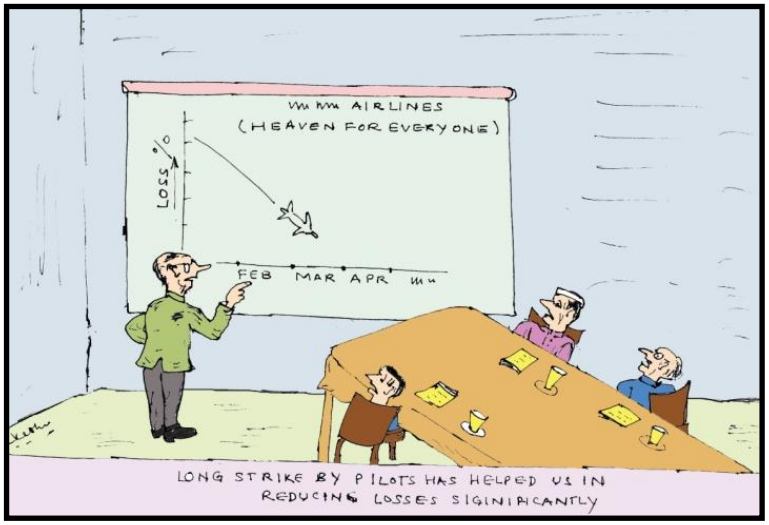
Scientist to his wife: Do you know a billion years later all the energy of the Sun will be exhausted and will endanger life on the Earth?

Scientist's wife: And do you know that Gas in the kitchen has already been exhausted in the morning. So if a new cylinder is not booked immediately, life in our house is going to be in danger.

Interviewer to the candidate: Now the last question! Do you agree that boss is sometimes not right?

Candidate: With due apology, I don't agree with you.

Interviewer: Then sorry gentleman, you are not fit for the job in our Company.



Contributed by Kailash Chandra Keshre, TCE Delhi

Feedback / Suggestions – Welcome to ***TCExpression@tce.co.in***

TCExpression

TCE House Magazine

TCExpression Magazine is a quarterly communication channel and an in-house newsletter for Tata Consulting Engineers Ltd., that strives to capture the happenings across TCE and keep every TCEite (& the world beyond) informed, inspired and involved.

TATA

TATA CONSULTING ENGINEERS LIMITED

Concept and Management: TCE Corporate Communications