Horizons

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The Newsletter from aarvee associates

From the Editor

A company, like a human being, goes through different life cycle stages. At the start-up stage, like a baby, it is small, weak, and vulnerable. As the scale of operations is relatively small, there will be only a few employees, and the workplace will be one where everyone knows everyone else, and most of what is happening within the company itself. However, as the organization grows in size and scale, more employees join, and the personality-driven informal work culture of the initial stages gives way to a more impersonal policy and systems-driven culture. And inevitably, many of the old-timers will lament the loss of the informality and the excitement of the early days.

With nearly 800 employees now on its rolls, aarvee has grown tremendously over the last twenty years. We have branches and project offices at several locations, and the days when every aarvee employee knew every other aarvee employee are long gone. However, while we cannot go back to the days when the company was a young start-up, there are still ways we can get to know each other better.

This e-newsletter is a part of an effort to bring our different divisions, branches and employees closer together. It will focus on the people and happenings within the company, and with your contributions, will also be a forum where we can all display our creative writing talents.

With the material on these pages, we also hope to give you a better picture of who we are and what we are – in essence, a company that is relentlessly focused on achieving engineering and design excellence.

Happy reading!

In this issue:

Cover Photograph: Ariel da Silva Parreira, stock.xchng

This newsletter can succeed only if people and projects from all our divisions and locations find a place in these pages. We invite you to make it happen, by contributing articles and profiles about your division and your branch, and other issues of interest to your colleagues.

Please send your contributions to aarvee@aarvee.net.

The Musi River Conservation Project

Taking aarvee to New Heights

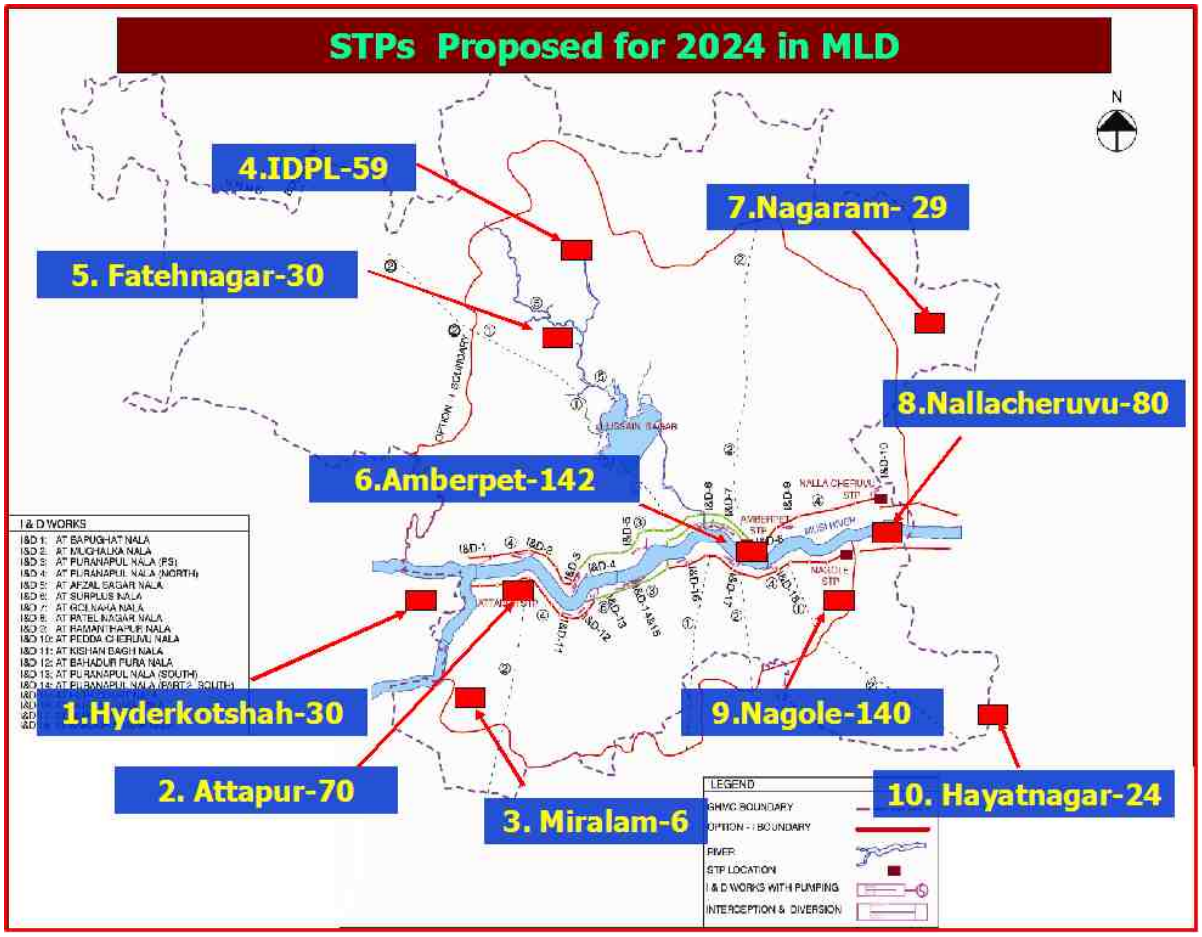
The river Musi is a tributary of the Krishna. Out of its total length of 256 kms, 28 kms are within Hyderabad city limits.

Greater Hyderabad now covers an area of 625 sq kms, out of which 574.54 sq kms fall within the catchment area of the Musi. As Hyderabad has grown manifold over the years, from a population of 4.68 lakhs and an area of 54 sq kms when the first sewerage system for the city was designed by Sir Visvesveraya and implemented in the year 1931, waste water flows into the Musi have also increased.

However, the provision of Underground Drainage (UGD) systems has not kept pace with the increase in population.

Since a proper sewerage system has not been implemented in the GHMC area, the water in the Musi is being contaminated and the water quality has deteriorated over the years. Despite several schemes initiated by the Government to deal with the problem, including the provision of four STPs with a capacity of 592 MLD under Phase I of the National River Conservation Directorate (NRCD), it is estimated that about 305 MLD of sewage is still flowing into the Musi. Therefore, it became essential to augment the existing collection & treatment facilities in order to reduce the pollution in the river.

Over the years, various consultants were engaged by the Hyderabad Metro Water Supply & Sewerage Board (HMWS&SB) to prepare detailed project reports (DPRs) for sewerage systems for the core MCH area and 12 conurbations. However, as there were many gaps in the DPRs



Repair & refurbishment of existing sewer using spiralwound trenchless technology

prepared by these consultants, HMWS&SB felt the need for a more comprehensive study. aarvee associates, in a joint venture with Weston Solutions, was selected by HMWS&SB to prepare a revised, comprehensive DPR for the project under NRCD Phase – II work in the Musi catchment area.

aarvee has taken up this challenging assignment, engaging experts in the field and using the latest technologies, and design and mapping techniques.

After a thorough study of the catchment area and its topography, the availability of land, regulatory standards, etc., the Musi catchment was divided into 10 sewage catchment areas (See map). STPs of different capacities were provided for each of these 10 areas, and based on NRCD guidelines, a comprehensive DPR was prepared for a project requiring an investment of Rs.750 crores.

After studying the proposals, NRCD decided to adopt more stringent discharge effluent standards for the Musi, because apart from UGD flows from its catchment area, it does not receive normal river flows during the year. Therefore, the STPs were required to meet effluent standards of BOD levels less than 3mg/l, and DO not less than 5 mg/l. Such stringent standards had not been specified before in India, and the selection of treatment technologies had to be made accordingly.

aarvee evaluated the various STP technologies used in India and abroad and also developed an innovative decision making system called the Sewage Treatment Plant Decision Support System (STPDSS), considering the important aspects of Life Cycle analysis, land, technology options, reuse/recycle options and local conditions. River water quality modeling was carried out and a river water quality index was prepared for two scenarios - before project implementation, and after project implementation. Various options for repairing and refurbishing the old sewer trunk lines (like Rib Block, Cured In Place Pipe, Glass Reinforced Plastic, etc.) were also evaluated, and proposals were submitted calling for an investment of Rs.26.76 crores.

Some of the Key Challenges Faced in the Project

- There were many gaps in the DPRs prepared by the previous consultants.
- Because the city has grown rapidly without proper planning, it is difficult to provide for new treatment facilities and conveying mains within the space available.
- There are no natural river discharges flowing in the Musi in the GHMC region.
- The old sewer networks in the city have not been maintained properly and were choked, making their restoration a major challenge.
- While the project area was large (574.54 sq km) the project had to be completed in just 6 months.
- In India, only a few conventional technologies are used in STPs, which made it necessary to look at new technologies being used abroad.

After incorporating the suggestions made by NRCD, a revised DPR for an investment of Rs.830 crores was submitted.

The Musi project is considered to be a prestigious project for NRCD and HMWS&SB, and these organizations are keen to see the project implemented. Like the Ganga Action Plan where seven IITs have been called on to prepare a comprehensive river basin approach for the river Ganges, the Musi river conservation project has reaffirmed aarvee's status as one of the leading institutions reputed for engineering excellence in India.

A view of the Amberpet STP

Roads and Highways

New Directions, New Challenges

The road sector in India witnessed healthy growth in the fiscal year 2009-10, with the Union government awarding a large number of Public-Private Partnership (PPP) projects. The various agencies involved in the sector at national, state and rural levels have worked together to construct an average of 13 kms of highways a day during 2009-10, as compared to around 4 kms a day in the earlier years. However, this is still far less than the 20 kms per day targeted by the Ministry of Road Transport and Highways (MoRTH). Altogether, 2,387 kms of highways were completed in 2009-10.

Several factors are believed to have contributed to this improved pace of highways development – for example, policy changes made in line with the recommendations of the B. K. Chaturvedi Committee, a greater emphasis on PPP projects, the relaxation of equity lock-in norms, greater attention to land acquisition issues, and revised financial and technical qualification thresholds for projects. Many of these factors have made highway projects more attractive to investors, resulting in improved growth in the sector.

Challenges

In spite of the optimism, the sector still faces many challenges, like raising the huge resources required to fund highway projects, and maintaining the already built-up roads. Also, land acquisition continues to be a vexatious issue, causing inordinate delays in many projects. The government also needs to take more proactive steps like strengthening the role of Independent Engineers, and providing single-window clearance facility for projects, if the growth in the sector is to be sustained. And it must be remembered that although India, with about 33 lakh kms of roads, has the third largest network in the world, it still lags behind many developed and developing countries in terms of the density and the quality of the network. Even with all the recent investments in highway projects, India has only 3 km of roads per 1,000 people, which is significantly lower than the world average of about 7 km per 1000 people. Similarly, in terms of quality, about 80% of our roads are in a poor condition and require huge investments for repair, renovation and increase in the number of lanes. In addition, only about 2% of this network consists of national highways, with an even more minuscule percentage being accounted for by express highways. which is very critical considering that about 40% of the total road traffic is handled by national highways.

The Road Ahead

In the future, the use of high-end technology has the potential to transform the highways sector in India. Also, operate-maintain-toll (OMT) projects will be managed in a more efficient way than at present. In addition, the sector could see the entry of many new international companies, with sophisticated, modern construction equipment and processes, and the financial capacity to undertake large-scale projects.

In conversation with

B. V. Reddy

Director - Irrigation Division

Please tell us something about your childhood, education and family.

I was born and brought up in a village called Janampet in Mahaboobnagar district. I also had my early schooling in the same place. After school, I moved to Hyderabad and did my diploma from Polytechnic college (in 1986), and B.Tech (in 1991) and M.Tech (in 1996) from JNTU Hyderabad.

My father retired as MEO and my mother is a housewife. I have one brother (in the US) and three sisters (all married and settled down in Hyderabad).

What was your first job? Please tell us something about your career before joining aarvee.

My first job was with aarvee, and probably my last job too will be aarvee.

Please tell us something about your years with aarvee, and the achievements of your division.

Last 20 years of my association with aarvee have been so great that I cannot even imagine my life without aarvee. I've learnt everything here. I've faced many kinds of situations and learnt lessons from every one of them.

As regards to the achievements of the Irrigation Division, we started with a small dam project in 2003 with just two experts. We have been growing since then, and today we are the largest consultancy firm in this discipline in the state.

What are the things you enjoy the most about your work? What are the biggest problems you face on a day-do-day basis? How do you deal with these problems?

I enjoy the fact that we are given a lot of freedom in our work. We as division heads are responsible for delivering client requirements, and there is very little interference from anyone, unless a division head himself desires it.

As regards to the day-to-day problems, multi-tasking (looking after different areas like buildings, irrigation, survey, etc.) is a challenge. Other problems include clients becoming unhappy with us for one reason or another. Then of course, we go into the problem in depth, and resolve the issue so that the client is happy again.

What are the opportunities and challenges that your division is facing now? What are your plans for the division's future?

There are certain opportunities in other states but price competition is fierce. Due to a shortage of funds, new projects are also not moving ahead as fast as we anticipated. This has affected us, as we were doing several big projects simultaneously. The challenge now is to win new projects in other states/countries.

We are also planning to enter the power sector, once we can find suitable personnel for the division.

What, in your opinion, are aarvee's strengths? What are the areas that need to be strengthened?

Our strengths are our commitment to work and our accessibility to clients. One area which we can strengthen is business development, where we can perhaps develop better systems and procedures.

How would you describe your style of leadership? What are the qualities that you think are important in a leader?

I encourage staff to take a lead role in projects, and commit less and deliver more, while maintaining cordial relations with clients.

In my opinion, some of the important leadership qualities are the ability to direct, motivate, support the team, decision making ability, the willingness to shoulder responsibility, and the ability to improvise.

As an engineer, what would you say has been your proudest moment?

When users described our "shooting range project"as one of the best in the world. I put in all my efforts in the project, although it was altogether a new type of project for us.

Who was your role model while growing up? Tell us something about the people -living or dead - whom you admire the most.

One of my teachers during my school/college days. I also admire Swamy Vivekananda.

Similarly, what feats of engineering/structural design have impressed you the most?

High-rise buildings in Chicago with not even one metre gap between them, and a bridge (very sleek) in Singapore.

If you could express your philosophy of life in one sentence, what would it be?

My philosophy is "keep doing something, and eventually the returns will come"

What advice would you give to the young engineers who are beginning their careers at aarvee?

Transform your casual attitude to something serious with commitment, and that will certainly be recognized one day.

Photo: Mario Alberto Magallanes Trejo, stock.xchng

Building a Winning Team

What Every Project Manager Needs to Know

Today, few complex engineering jobs can be completed by an individual working alone, with the result that most of us have become quite used to working in teams. Undoubtedly, each of us will have our share of stories to tell about the dysfunctional teams and team members that we have had the misfortune to have known; and if we are lucky, we may even have a few stories about highly productive and effective teams.

The common definition of a team is 'a group of people working towards a common goal'. However, a good team is much more than the sum of its parts, while a dysfunctional team is often considerably less.

Winning teams are characterized by:

- A focus on results
- Team members trusting, supporting, and respecting each other
- Every member of the team contributing to achieving team goals, and generating ideas, solving problems, and taking decisions as they are needed.
- Members sharing leadership responsibility and assuming different roles when necessary.
- Members confronting interpersonal issues and problems, and solving them through amicable discourse, rather than ignoring them and hoping that they will go away.

In contrast, according to Patrick Lencioni, the author of the book, "The Five Dysfunctions of a Team", there are five factors that can cause a team to fail:

- Absence of trust
- Fear of conflict
- Lack of commitment
- Avoidance of accountability
- Inattention to results.

This naturally brings us to the crucial question: *How do we create winning teams?*

Here are some things that can be done to ensure that a team is productive and effective:

- Be clear about the team's goals, i.e., what the team is expected to accomplish. Define these goals clearly and objectively.
- Identify the kind of skills that the team must have to attain its goals. Select people with these skills to join the team. Identify the roles that each team member must play in the team, and spell the responsibilities associated with these roles.
- Set ground rules and norms for the team – for example, the manner and frequency of reporting progress, operational procedures, etc.
- Specify individual performance parameters for each team member and for the team as a whole. Provide feedback on their performance to team members on a regular basis. Provide training to improve performance where necessary. Recognize and reward outstanding performance.
- Make sure that the team has the necessary support structure, and the tools (such as software) to accomplish its task.
- On an ongoing basis, continue to do things that will contribute to team building, and improve team cohesion and performance.

So, whether you are a team leader or a team member, go ahead – ***Make your team a winning team!***

Brain Teasers

1. What mathematical symbol can be placed between 2 and 3, to get a number greater than 2 and smaller than 3?

2. A five digit number is represented by ABCDE. If we add the number 1 in front of ABCDE, then times 3, the result number will be ABCDE appended by the number 1 (as shown below). What is this five digit number?

1ABCDE X 3 = ABCDE1

3. The four digit number PQRS which is a perfect square, the first two digits of the number i.e. PQ is a perfect square, the last two digits of the number is also a perfect square i.e. RS. Find the number PQRS? (Condition to be satisfied: The difference between the digits R and S is 2).

Photo: Michel Mejane, stock.xchng

Super Structures

The Millau Viaduct

The Millau Viaduct is a cable-stayed roadbridge that spans the valley of the river Tarn near Millau in southern France. The viaduct is part of the A75-A71 autoroute from Paris to Montpellier, and was designed by the French structural engineer Michel Virlogeux and the British architect Norman Foster.

The construction of the Viaduct required some of the most innovative and advanced construction techniques and materials, including laser technology, GPS, hydraulic rams, climbing formwork, special asphalt, high performance concrete, etc.

The bridge received the 2006 IABSE Outstanding Structure Award.

Photo: Michel Collot, stock.xchng

The Millau Viaduct

Some Vital Statistics

Length: 2,460 m

Width: 32 m

Maximum height: 343 m, or 19 m higher than the Eiffel Tower

Height of the tallest pier (P2): 245 m

Height of the pylons: 87 m

Number of piers: 7

Length of the spans: Two end spans of 204 m each and six central spans of 342 m each

Number of stays: 154 (11 pairs per pylon laid out in one mono-axial layer)

Tension of the stays: from 900 t to 1200 t

Weight of the steel deck: 36 000 t, or 5 times that of the Eiffel Tower

Volume of concrete used:206 000 t

Cost of the construction: 400 million Euros

Contract duration: 78 years – 3 years for construction and 75 years of operations

Structural guarantee: 120 years

Training Program

In August 2010, aarvee conducted an induction and training program for all newly joined PGTE/GTEs from all divisions. The program, spearheaded by Mr. M. Kishore Kumar (Director, Highways Division) covered case studies, overviews of different sectors in Civil Engineering and leadership skills. Among the highlights of the program were the sessions conducted by experienced aarvee managers, which gave the participants good insights in to the various fields.

Topics covered in the program included:

- Principles of Surveying
- Pavement/Material Investigations
- Subsoil Investigations
- Traffic Surveys
- Analysis of Data
- Highway Design
- Overview of Railways
- Principles of Estimation
- Contract Administration
- Cement Concrete Mix Design & Quality Control
- Quality Assurance in Design
- Preparation of Master Plan for Water Supply, Storm Water & Sewerage (A case study)
- Leadership Skills

New Projects

Growth with Excellence

Highways Division

- Independent Engineer for 4-lane Elevated Road from Chennai Port to Maduravoyal in Tamil Nadu| Client: NHAI
- Independent Consultancy Services for 4/6 laning of Cuddappah gh- Kurnool Section of NH-18 in Andhra Pradesh | Client: NHAI
- Independent Engineer for Jaipur to Deoli Section of NH-12 in Rajasthan | Client: NHAI
- Preparation of DPR for Rehabilitation and Upgradation of Wardha-Yeotmal-Nanded District Border and Ausa-Sangli Section of MSH-3 in Maharashtra | Client: NHAI

Railways Division

- Pre-feasibility Study for railway siding to the coal based thermal power plant near Ghanmukh village, Maharashtra | Client: Jinbhuvish Power Generation.
- Preparation of Conceptual Plan, Feasibility Report, DPR for railway connectivity to upcoming 1320 MW thermal power plant at Titilagarh, Orissa | Client: Sahara India Power Corporation Ltd.
- Pre-feasibility Study on rail connectivity between site near Lunsapur village and Pipavav station, and Pipavav port facilities | Client: Patel Energy Ltd.
- Consultancy Services for railway siding & marshalling yard for Singhithiral Thermal Power Project | Client: Athena Chhattisgarh Power Pvt. Ltd.
- Detailed Survey and Feasibility Study for proposed rail siding for Sterling Port Ltd. | Client: Sterling Port Ltd.
- Pre-bid Consultancy Services for part design and construction of elevated viaduct on the Mansarovar - Chandpole section on East West corridor of Metro Rail Project, Jaipur | Client: Maytas Infra Ltd.
- Concept to commissioning of proposed railway siding of PCIL at Tandur on South Central Railway | Client: Penna Cement-Tandur, Andhra Pradesh.
- Services for taking up RTC, FLS in connection with proposed siding taking off from Kotarlia railway station | Client: Zeal Metaliks Pvt. ltd.
- Services for electrification of common railway siding and in-plant railway siding at Malkapur | Client: The India Cements Ltd.
- Detailed Survey, Detailed Project Report and Detailed Engineering and Project Management Services for modification of existing railway siding | Client: ACC Limited.
- Prefeasibility Study for rail connectivity from Bangrod station | Client: GSEC Logistics Ltd.
- Survey and Feasibility Report for the proposed railway siding taking off from Saragbundia railway station | Client: Hind Energy & Coal Benefication Pvt. Ltd.
- Feasilbility Study in connection with proposed rail connectivity between proposed UTCL plant at Roorkee of Northern Railway | Client: UltraTech Cement Ltd.
- Feasilbility Study for proposed rail connectivity between proposed UTCL plant near Bugana & Barwala station | Client: UltraTech Cement Ltd.
- Detailed Project Report for coal transportation to Chitrangi Power Project | Client: Chitrangi Power Pvt. Ltd.
- Planning, Investigation and Design of ROB on main spinal road from KPHB to Hitech city | Client: Hyderabad Metropolitan Development Authority.
- Consultancy for two railway sidings at Mahuamilan Railway station and proposed Birotoli railway station on East Central Railway | Client: Corporate Ispat Alloys Ltd.

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