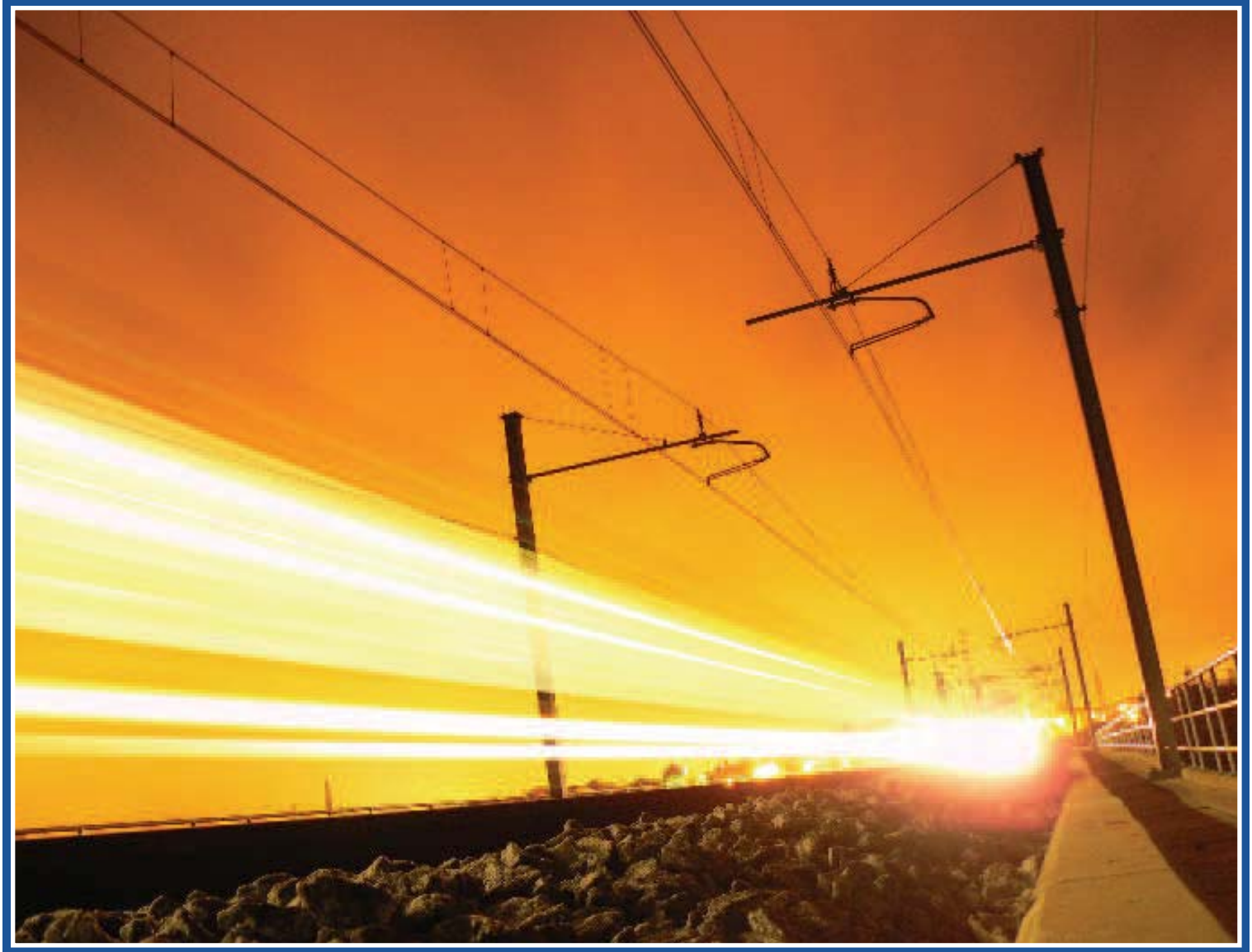
Horizons

Issue 2 *April 2011*



The Newsletter from Aarvee Associates

Peter Drucker on Knowledge Workers…

"The most valuable assets of a 20th-century company were its production equipment. The most valuable asset of a 21st-century institution, whether business or nonbusiness, will be its knowledge workers and their productivity."

"Every knowledge worker in modern organization is an "executive" if, by virtue of his position or knowledge, he is responsible for a contribution that materially affects the capacity of the organization to perform and to obtain results."

"The more knowledge-based an institution becomes, the more it depends on the willingness of individuals to take responsibility for contribution to the whole, for understanding the objectives, the values, the performance of the whole, and for making themselves understood by the other professionals, the other knowledge people in the organization."

(Peter Drucker (1909 – 2005) was a writer and management consultant whose books and articles explored how humans are organized across the business, government and the nonprofit sectors of society. He is one of the best-known and most widely influential thinkers and writers on the subject of management theory and practice.)

In this issue:

Cover Photograph: Palo Perez, 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 newsletter@aarvee.net. or aarvee@aarvee.net

Jawaharlal Nehru Outer Ring Road

India's First 8-lane Access Controlled Expressway with a Design Speed of 120Kmph

Background

One of the most prestigious design projects Aarvee has ever handled was the design of 162 km long 8-lane Access Controlled Expressway as Outer Ring Road to Hyderabad City.

It has provided enough opportunity for the company to exhibit its prowess and innovative talent in working under a most demanding techno-political environment and providing timely inputs for the implementation of the project. It was a learning experience for both the client and the consultants in getting exposure to the international standards and practices in the design of interchanges, and advanced traffic and toll management systems.

Features

The Outer Ring Road is designed as an access controlled expressway with an eight lane divided carriageway with an emergency lane on each carriageway. Access has been provided only at designated locations and 2-lane service roads have been provided on either side to collect and bring the traffic from the feeder roads to the Outer Ring Road. The Right of Way required and reserved for this project is about 150 m.

Owing to safety considerations, Two- and three-wheeled vehicles are not allowed to ply on the expressway. Also, the local habitants cannot access the service roads at any location. They have to use the local feeder roads to reach the existing crossing of the service road to gain access.

There are seven high capacity interchanges and 25 rotary interchanges on the intersections with the existing/proposed arterial/radial roads. There are five major bridges, 45 minor bridges, 140 underpasses, four overpasses, four ROBs and 165 culverts. A 25 m wide corridor is reserved to be used as a transport corridor in the future.

Challenges

The challenges involved in providing the services were manifold. Transferring of the alignment from the drawing board to the ground was a very sensitive and challenging task. In fact, the corridor was notified in newspapers on the basis of the alignment drawn on the village revenue maps and the zonal maps without any physical topographic survey. The anomalies or errors inherent in the revenue or zonal maps resulted in errors in the field. The extent of areas affected in the notification and on the ground were different, provoking unrest among the public. The exorbitant land prices prevailing in the vicinity raised doubts on the design process.

The Consultants provided technical justification and pacified all the aggrieved parties and supported the client in litigations.

Fixation of Geometric Standards for the expressway was another challenge in the absence of Indian Standards for expressways. A national level workshop was organized for the purpose of determining the design standards appropriate to the Outer Ring Road. Senior officials at Secretary level were also involved in the deliberations and eventually the cross sectional elements were finalized.

As the entire expressway is on a greenfield alignment, traffic studies posed a serious challenge basically for design of the pavement. Apart from three National Highways, there were six State Highways and many radial roads intersecting the proposed Outer Ring Road. Construction of the Outer Ring Road and the proposed radial roads would change the existing traffic pattern. Volume Count and Axle Load surveys were carried out on all the existing arterials and extensive roadside interviews were conducted at the same locations to assess the desire lines of the traffic. Accordingly, the existing traffic was assigned to various links of the Outer Ring Road and projected further for carrying out the Capacity Analysis and Pavement Design. The Government decided to provide a uniform pavement design in the light of the unpredictable development in the Growth Corridor declared for 1 km on either side of the Outer Ring Road and the Satellite Townships planned around the city.

Irrespective of the accessibility of the site, in case of a bypass/ring road, it is essential for the key experts to walk on site...

Determination of the type of interchanges at each proposed crossing was another challenge. The type of minor road, the traffic projections, the availability of land and the expected industrial or commercial growth around the proposed interchange governed the type of interchange. It was decided to have high capacity interchanges at all the major road crossings with National Highways and rotary interchanges at the other crossings with state highways and radial roads. Various design options like full clover leaf interchange, partial clover leaf or trumpet interchange and double trumpet interchanges were provided. Detailed designs were provided including the structures proposed on the ramps and loops. Final designs were adopted based on the requirements of tolling on the Outer Ring Road.

Providing for cross movement of the people separated by the access controlled highway was another challenge. There were basically two options, namely, provision of underpasses or overpasses. For the convenience of the local public, underpasses were provided at all the existing crossings and at every two km to facilitate crossover of traffic on the service roads on either side of the outer ring road. Pedestrian and animal underpasses were provided as required in inhabited areas and forest locations respectively.

There have been no new demands for providing underpasses owing to the extensive public consultation done during the investigations.

In order to provide a smooth ride on the structures, a continuous deck has been provided on all the major bridges. A three span continuous deck and careful execution of the expansion joints allow for a smooth ride on the major bridges. A minimum opening has been provided for all the cross-drainage structures for the purpose of maintenance and to avoid the tunnel effect of crossing a 60/150 m long passage.

Utility crossings and corridors have been provided all along the highway based on detailed discussions with various service providers and assessment of their needs. Electrification has been designed based on the lighting / load requirements.

Signage was designed based on MUTCD Guidelines.

Lessons Learnt

Maintaining a proper record of all the reviews made and the decisions given is very important in providing answers to the various queries such as why a provision was made, or why a provision was not made which are likely to crop up during implementation.

Irrespective of the accessibility of the site, in case of a bypass/ring road, it is essential for the key experts to walk on site to verify the facilities provided, the adequacy of the cross drainage structures, drainage in interchanges etc. Efforts should be made to carry out the visits along with the client so that the provisions are doubly verified and certified. A conscious attempt should be made to see that all the provisions are properly reviewed by the client. The list of BOQs should be verified for missing items and consistency with the drawings and specifications.

In order to determine the quantity of excavation in hard rock, irrespective of whether it is there in the scope of services, it is necessary to carry out boring in the sections to be cut, up to the proposed depth of cutting as any variation in quantities can lead to huge variations in BOQs which can be quite embarrassing and can attract penal provisions.

Aarvee has gained enormous experience and confidence in the design of interchanges conforming to international standards, and hopes to handle more prestigious projects in the future with greater ease, accuracy and skill.

- M. Kishore Kumar
Director, Highways

A partial Clover Leaf interchange on the expressway

Urban Planning

Innovative Approaches in Urban Planning

Urbanization

Town planning practice in India has come a long way since 1915, when The Bombay Town Planning Act, which enabled preparation of land use plan within the city limits, was passed. During the first four decades planning was piecemeal. It was only after independence that Urban Planning has begun gaining ground slowly and steadily in the country.

In the past few decades, as a result of aggressive industrialization, the urban population of India has grown manifold. In 2001, India had the second largest urban population of the world, with about 286 million people living in urban areas. This is projected to cross 400 million by the end of year 2011 and 533 million by the end of year 2021. The number of metropolitan cities increased from 23 to 35 in the period of 1991 to 2001, increasing the problems of shortage in housing, drinking water supply, sewerage, health care center etc. Further, this has led to increased vehicular traffic, pollution, waste generation and social chaos, thus compromising the quality of urban life.

Urban planners aim to bring order to "chaos" in cities and municipalities...

Urban Planning can be defined as the design and regulation of the uses of space that focus on the physical form, economic functions, and social impacts of the urban environment and on the location of different activities within it.

Need for Urban Planning:

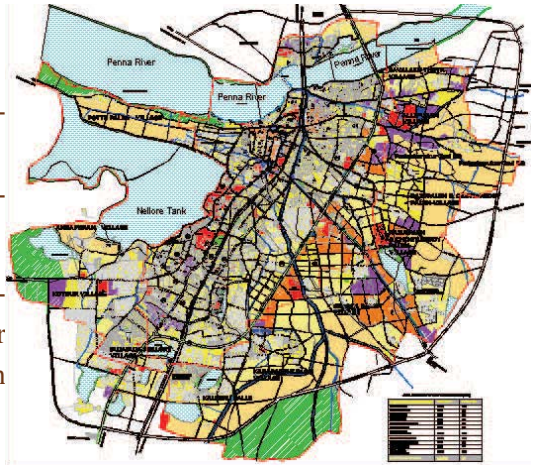
The unprecedented and unregulated over-urbanization seen in India exceeds the absorption capacity of its cities and compromises their identity, character and functionality. It degrades the quality of life and deprives the population of advantages which a city should ideally provide. Characteristic problems of cities are:

- Overpopulation
- Poverty
- Substandard education
- Deteriorating environmen tal quality
- Increasing health problems for residents

Thus, there is a tremendous need for planning for the growth of our cities in a systematic manner.

Various types of plans are prepared to regulate haphazard development of the city and to propose various infrastructure facilities in a systematic manner, so there are different plans for different purposes which are inter related with each other.

A Perspective Plan/Master Plan is a report, supported by maps and diagrams, which provides the state governments and local authorities the goals, policies, strategies for a long period (20-25yrs). In this process Zonal Development Plans are prepared for development of zones. Development Plans conceived within the framework of the approved perspective or master plan, are medium term (~5 yrs) plans providing comprehensive proposals for socio-economic and spatial development of the urban center.



Annual Plans are prepared for new and ongoing projects that the local authority intends to implement during the respective financial year. Plans of Projects/Schemes are detailed working layouts with all supporting infrastructure.

Role of Urban Planners

Urban planners aim to bring order to "chaos" in cities and municipalities. They focus on organizing the use of land and city space. They also differentiate between existing cities and new ones that are expanding. Interventions by urban planners are required in numerous occasions such as:
Infrastructure projects dealing with access to water, sewerage services, or transport.
Efforts to address issues related to housing, urban mobility, public space organization and urban heritage.
Institutional programs entailing assistance to local authorities concerning public service delivery or space management.

Innovative Tools in Urban Planning

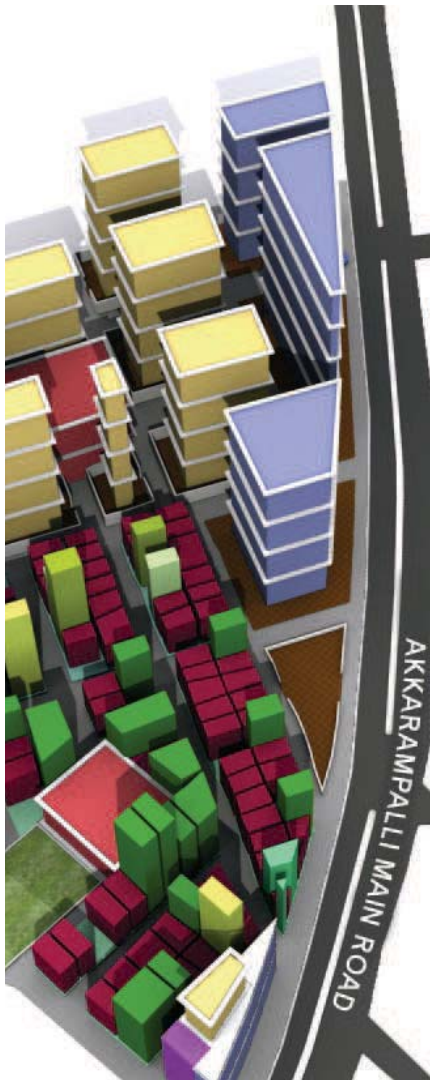
Use of tools such as AutoCAD, GIS, Land Information System (LIS) and Management Information system (MIS), and Cube, are being increasingly encouraged to improve e-governance in many local bodies.

Innovative approaches

There are many innovative approaches that have been adapted and practiced by many cities. For example, The Revised Master Plan (RMP) - Bangalore has been a very unique project, as for the first time, the plan preparation process was outsourced to a private consortium with the objective of bringing in state of the art technology in both planning and management of Bangalore Metropolitan Area. The plan has been innovative on several fronts:

1. The RMP is based on a zoning strategy for a dynamic city fabric as against a static land use based physical plan.
2. It propagates a compact city model with future growth concentrated in the vacant parcels of land in the city center (as against the existing tendency of a sprawl) as a strategy to provide and manage efficient and cost effective amenities and facilities.
3. The plan uses a state of the art data repository created on GIS and its application to understand the dynamic fabric of the city.
4. The plan preparation process incorporated a 'Training and Capacity Building Module' to transfer the process of plan preparation and also to upgrade the skills of the planning authority.
5. It uses innovative tools like the 'Transfer of Development Rights' (TDR) and the 'Coordinated Planning Scheme' (CPS) to facilitate plan implementation.
6. For the first time ever, the city and its environs were ecologically mapped to enable environmentally sustainable development.

- N. Sukeerthi
PGTE, Urban Planning



In conversation with

Mr. T. Vishwanathan

Director

Can you please tell us something about your family, childhood and education?

I spent the earlier part of my childhood in a place called Mayuram, in Tanjore District of Tamil Nadu. After completing my schooling and pre-university I moved to Ranchi to complete my engineering, as my father who belonged to the all India Service, was working in Patna, Bihar at that time. I completed my Bachelors from Birla Institute of Technology, Ranchi and later obtained a Master's degree in Structural Engineering from the Delhi University. My family is a small one. Besides my wife, there is my daughter who is currently working in USA. She got married last year. I had a son who died in a car accident in 2000.

Why did you choose civil engineering as a career?

50 years ago there was not much awareness. I did not have any particular option, whichever branch was allotted to me by the Institute I had gladly accepted and completed the studies.

Where was your first job? Can you tell us more about your career before joining Aarvee?

Before joining Aarvee I had served in several organizations. I started my career as a design assistant in the marine design cell at the Director General Naval Project (DGNP), Vishakhapatnam. After serving DGNP, I joined CPWD and worked there for 3.5 yrs. I joined the ministry of shipping and transport next and then moved over to STUP Consultants and worked there for 5 years. I then went to Iraq to work with the state organization for roads and bridges. After 5 years, I returned to India and continued to work with STUP Consultants. I moved to Rail India Technical and Economic Service (RITES) after 2 years. After 8 years with RITES, I joined M/s Scott Wilson Kirkpatrick of UK and worked there for the next 6 years. I joined Aarvee in 2004 and have been here since. In the 42 years of my professional experience I have served all forms of organizations: government, private, public sector undertaking, foreign government and multinational.

Can you tell us more about your life at Aarvee and the high-points of your work here?

The life at Aarvee was very tough in the beginning. It was rollercoaster ride. Only an office boy and office assistant were available when I joined. One of my friends, a contractor, wanted me to carryout designs for bridges in Afghanistan when I was to join Aarvee on 1st of April 2004. But as he wanted all the designs to be completed by that time I had to advance my joining by one month. With no engineer and draughtsman I had got the designs done. It was more of a management problem. Suddenly in the month of April the contractor wanted me to go to Malaysia and get the designs approved by the proof consultant. I went and got the designs approved. Without a single engineer in the division I got the task completed within a period of two months. It was one of the difficult times. Life in Aarvee is generally smooth but with occasional bumpy rides. Coming to the high points, there are several. I want to mention one instance in particular. When we were carrying out the design for the Beas Bridge for M/s IVRCL, M/s CES was harping on concentration of flow and the flow has to be taken only in four spans out of 14 spans. I had given the reason why the river will flow from bank to bank. M/s CES became a stumbling block and did not approve the design. From the month of August to October the battle went on. I had advised M/s IVRCL to bring in hydraulic experts. They did not listen to me. Finally, in the month of January they requested me to appoint

experts. I had requested Prof. Ranga Raju of University of Roorke and Prof. Gangadaraiah of IIT Kanpur to study my view and give recommendations. They studied the problem and gave the recommendation upholding my view. Presentations were made in NHAI and finally CES had to accept our view. The decision came in April, and then the monsoon started. Hence, the work could not start. The project was resumed in September after a delay of one year. After completing the bridge, Mr. R.K.Sigh, M.D. of IVRCL and Mr. T.S.Prasad came and thanked me profusely which I can never forget.

What has been the proudest moment in your engineering career so far?

Though there are several moments throughout my career three moments are worth mentioning. Two of them came during my RITES tenure and one at Aarvee. Bridges had to be constructed on Khohalpur, Mohalli Road in Nepal where severe artesian conditions were existing. Lee associates of Canada were first appointed by Govt. of Nepal, and NBCC was appointed as contractor. After the construction of the first bridge, the foundation settled and the bridge collapsed and the work was stopped. After a few years, the work was awarded to RITES. In RITES nobody was willing to touch this project due to artesian conditions. I was given the responsibility. Right from soil investigation we had to plan properly to take care of the artesian conditions. During the investigation, we got the information that the artesian pressure was about 8m and about 10,000 lit/minute was the discharge. By adopting special design procedures and construction techniques the bridges could be constructed. After completing the work Mr. S.A.Reddy the Deputy Managing Director of Gammon India informed me that procedures suggested worked very well. I was extremely thrilled and that was my first proudest moment. I had published a paper also in IRC Journal which was presented by me in the IRC session held at Hyderabad.

When I joined RITES there were six complicated bridges to be designed in Himachal Pradesh, which used horizontally curved and continuous spans. One bridge of 100 m length had to span a deep gorge of 75m. No engineer was willing to touch this project. Engineers in RITES got it written cleverly in my recruitment file that in case I join, the project had to be handled by me. RITES was close to getting blacklisted as they did not do any work in the course of three years. I took over the project, completed the design and got it approved from MOST. When I was informed that all bridges had been constructed without any problem I was satisfied and this was my second proudest moment. A year ago, unprecedented floods occurred in Karnataka. Aarvee was supervising the construction of a bridge across river Tungabhadra - Krishna and Hundri Bridges. One evening I received a call from Mr. Chakrapani informing me that at Tungabhadra, the flood waters overtopped the old bridge and the crash barriers got washed off. I suggested a procedure to restore that traffic which worked. After the flood receded, it was observed that some spans of the new bridge had been displaced and rotated. The contractor was not willing to bring the bridge back to its original position. It involved risk as the height difference between the bed level and deck level was quite considerable. I was confident the bridge deck can be brought back to its original position and gave the solution. Dr. Raina was on contractor's side and was against the shifting. After a gap of eight months one day I received a call from consultant P. V. Raj that the bridge had been brought back to its original position without any problem using on the procedure I had suggested. This was my third proudest moment.

What is it about your work that you most enjoy? And what are the biggest day to day problems you face? How do you tackle them?

The things about my work I most enjoy are teaching youngsters and tackling complicated structural engineering problems. My biggest day to day problem is to make the engineers work and to complete the task within the stipulated period. Our engineers at the site often refer the problems they are experiencing to us. To study these problems and offer solutions is a challenging job. Site problems are solved based on experience and consulting international codes and literature. The responsibility is such that I should ensure that the work does not come to a halt. For complicated issues I tackle the problem directly and for other cases I teach the engineers and ask them to take decisions.

Can you tell us more about your division and its achievements?
This division started with no Engineers and draughtsmen. When I joined, due to my past reputation, the organization was awarded the job of designing the bridges in Afghanistan. I had to complete the job without any technical support. I started the division from scratch, and today we have a good number of engineers and draughtsmen and we have completed several prestigious projects successfully.

What are the opportunities and challenges that your division is facing now? What are your plans for the future of your division?
The opportunities are plenty. Working with the contractor for BOT projects is going to be the future avenue. But I find that our engineers are unable to get approvals from IE's for design and unless the situation changes it will not be possible for us to succeed. Good engineers are not available in the market. Most of the engineers are addicted to the computer. They neither have an understanding of a structure nor its behavior. They believe whatever output the computer gives them - as Prof. Leonhardt used to call it, "Garbage in; Garbage out". My plans for the future are to recruit engineers and train them. The new limit-state for concrete bridges is under publication. Currently we are involved in bringing out a handbook. My main work will be to make the code familiar to the Engineers.

What is your secret mantra for managing your division? What do you think are the most important qualities in a leader?
You have to be friendly with your staff. However, where they have to be spoken to, they have to be spoken to clearly. It is a mixed bag. This is what I am practicing. The most important quality is to get things done without being harsh. Once you start teaching them they would like to be always with you. But at times you need to be tough.

What, in your opinion, are Aarvee's strengths and what are the areas that need to be strengthened?
Aarvee's greatest strength is that it is a multidisciplinary organization. Various types of expertise is available under one roof. Areas to be strengthened cannot be discussed in this interview. It has to be discussed separately.

In one sentence – what is your philosophy of life?
Whatever you do, it should be the best.

What is your advice for the young engineers who are beginning their careers at Aarvee?
I would advise them to read a lot, go through articles, international codes and keep on updating their knowledge. Do not become computer maniacs. Develop the basic concepts and come out with unique solutions. Behind every clause of the code, there will be a reason. Try to find out this reason. Try to work hard and learn as much as possible.

Office Fitness

If you are desk bound for most of the day, it is important that you should sit well, as a poor sitting posture can cause stress in the back, neck, shoulders, arms and legs, and also can add significant amounts of pressure to the back muscles and spinal discs.

The natural tendency for most of the people while sitting in an office chair for a long period is to slouch over or slouch down in the chair, which can overstretch the spinal ligaments and strain the discs and surrounding structures in the spine. Hence, it is imperative that a person should sit well as it affects not only the relationship of all the parts of the body, but also the breathing status.

Here are a few DO's and DON'TS while sitting that can make an appreciable difference:

- Adjust the height of the chair in proportion to the height of your desk in such a way that you do not have to collapse your spine or your chest, hunch your shoulders, or contract your neck.

- Make sure that your feet are flat on the ground.

- Avoid winding your legs around the legs of the chair.

- Rest your hands in your lap when you aren't using them, because using the arms of the chair to rest your elbows and forearms creates tension, as the muscles of your neck, shoulders and upper back work needlessly

- Sit up with your back straight and shoulders back and down

- Avoid keeping your back in one position for a long period. Remember to stand, stretch and walk for at least a minute or two every hour.

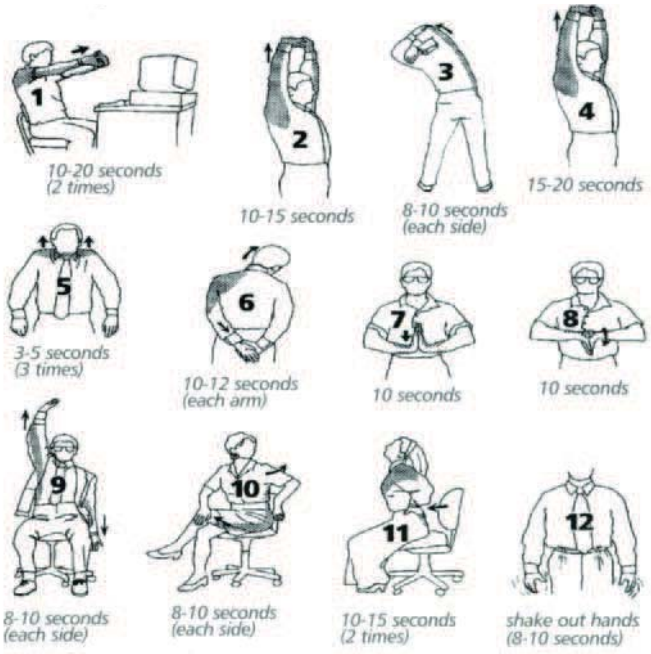
- Apart from the above tips on sitting posture, a few simple breathing exercises (deep breathing) will reduce stress, improve your flexibility and help you stay fit, as the breath connects the mind to the body and creates better circulation throughout the brain and body.

A TIP...

Sit in a relaxed position
Slowly inhale through your nose, counting to five
Let the air out from your mouth, counting to eight, as it leaves your lungs. Repeat several times!

To know more, go through the various books and magazines on 'Yoga' and fitness that are available at our Head Office library.

- T. Sujitha
GTE, HR



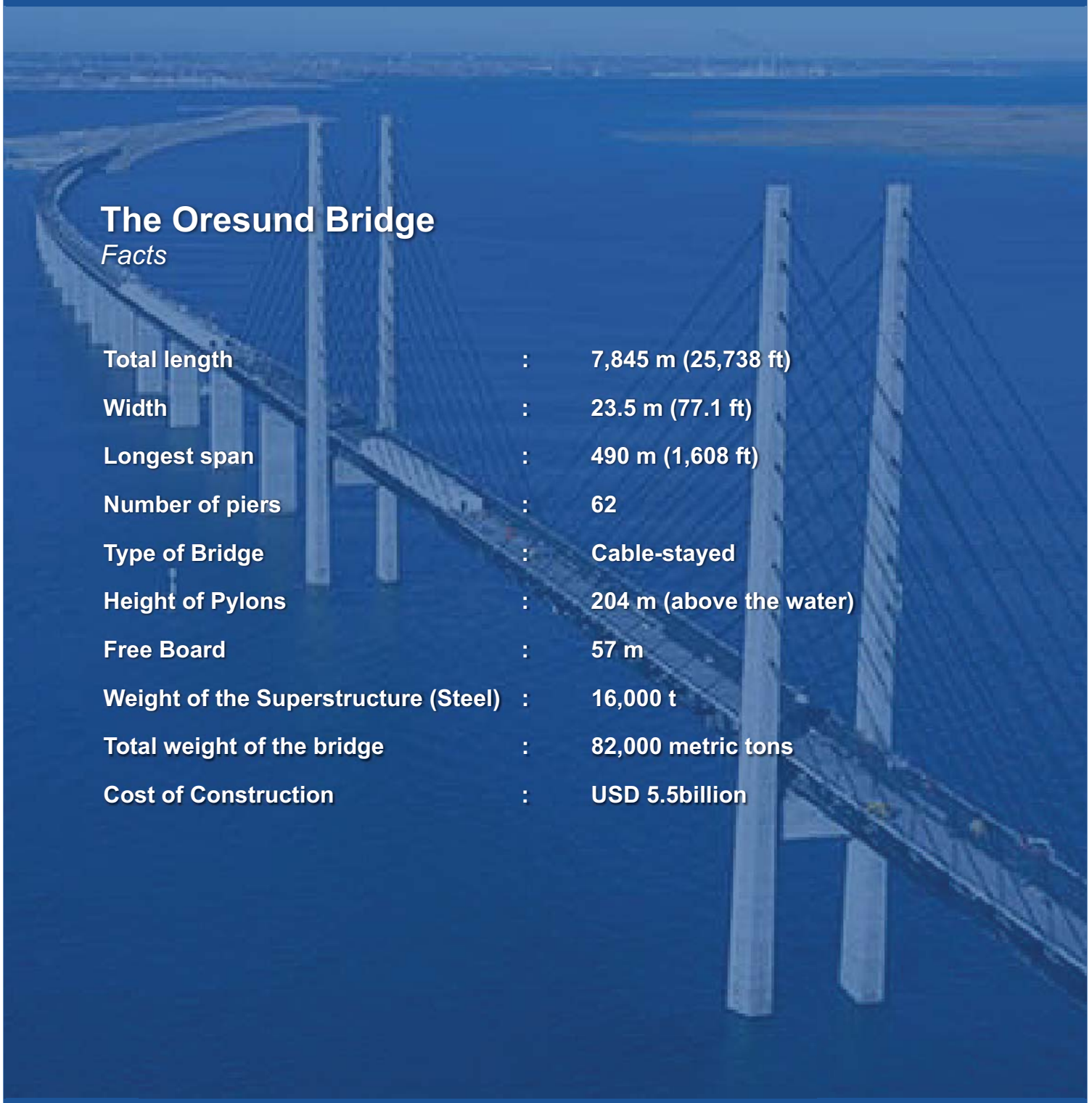
The Oresund Bridge

The Oresund Bridge connecting Denmark and Sweden is a combined two-track rail and four-lane road bridge across the Oresund strait. It is the longest combined road and rail bridge in Europe and was designed by George Rothne.

In May 2003 the Oresund Bridge won the IABSE Outstanding Structure Award for its innovative planning, design and construction management as well as its compliance with the time schedule, budget and tough environmental requirements.

The 16 km long bridge-tunnel has three main components:

- 4 km long tunnel (under water) with two rail tubes and two motorway tubes on one level
- 4 km (approx.) long artificial island, Peberholm, linking the tunnel and the bridge
- 7.8 km (approx.) long, two-level bridge with the motorway on the upper level and the railway on the lower level.



The Oresund Bridge

Facts

Total length	:	7,845 m (25,738 ft)
Width	:	23.5 m (77.1 ft)
Longest span	:	490 m (1,608 ft)
Number of piers	:	62
Type of Bridge	:	Cable-stayed
Height of Pylons	:	204 m (above the water)
Free Board	:	57 m
Weight of the Superstructure (Steel)	:	16,000 t
Total weight of the bridge	:	82,000 metric tons
Cost of Construction	:	USD 5.5billion

ANNUAL DAY

Aarvee day, this year, was celebrated on 25th January. The programme commenced with presentations given by the heads of the divisions. This was followed by the presentation of shields to the employees who have completed a decade of service with Aarvee and they also shared their experiences with the company.

The presentations were followed by a skit - 'C show'by the EWSS division. Prizes were distributed to the winners of the the Independence day-2010 and Republic day-2011 sports competitions. Division wise group photographs were taken before dinner.

The day ended on a high note in the traditional Aarvee way, with some of the more ebullient participants showing off their dance moves and Mr. Kishore Kumar singing.

TEAM LEADER CONFERENCES

Head Office-Team Leaders (Highways) interaction meetings were held at Hyderabad in two different sessions on 30th October, 2010 and 26th February, 2011. Team Leaders from different projects which are at various stages of construction and maintenance attended the meetings. From the Head Office, the meeting was attended by all the project heads of the Project Management cell, the Board of Directors, in-house experts, and the heads of the finance and the administration departments.

The main objective of the meetings was to facilitate exchange of views on implementation of the Independent Consultant and Supervision Projects. The Team Leaders presented the status of their projects and interacted with the Head Office team. Mr. M. Kishore Kumar, Director–Highways, gave a presentation on effective Contract Administration. Issues relating to company policies on various matters were also discussed.

Mrs P. Adi Lakshmi
Mrs V. Krishnaveni
Mrs K.L.A. Pavani
Mr Khaleel Basha
Mr K.K. Paul
Dr B. Raghavendra

Congratulations on a decade of service at Aarvee!

1, 2, 3, 4, 5, 6 : Aarvee Day

7, 8 : Team Leaders' Conferences

9, 10, 11: Republic Day Sports Meet (January 22, 2011)

Projects won (from October 2010)

Water Resources & Irrigation:

- Detailed Project Report for Comprehensive Safety of Tungabhadra (TB) Dam, Karnataka. Client: TB Board, TB Dam.

- Detailed Project Report of Lower Penganga Inter-state Project, Andhra Pradesh.
  Client: I & CAD.

Environment, Water Supply and Sanitation

- Comprehensive Planning of Water Supply Service Improvements in 1) Palasa Kasibugga Municipality 2) Guntur Municipal Corporation and 3) Markapur Municipality, Andhra Pradesh.
  Client: Andhra Pradesh Municipal Development Project

- Detailed Project Report for Integrated Group Water Supply Scheme for 1513 Villages & 27 Towns of Dewas, Shajapur and Ujjain Districts of Madhya Pradesh.
  Client: Public Health Engineering Department

- Development of Master Plan, DPR and Detailed Engineering for Water Supply, Sewerage and Solid Waste Management Projects for Sri Bhramarambha Mallikarjuna Swamy Vari Devasthanam, Srisailam, Andhra Pradesh.
  Client: Endowments Department

Urban Planning

- Revised Master Plan for Rajahmundry Municipal Corporation Area and its Vicinity, Andhra Pradesh.
  Client: Rajahmundry Municipal Corporation

- Master Plan, DPR and Detailed Engineering for Water Supply, Sewerage and Solid Waste Management for Srisailam Temple Town, Andhra Pradesh.
  Client: Endowment Department

- Traffic Impact Assessment Study for the Residential Project at Raidurga Village, Ranga Reddy District, Andhra Pradesh.
  Client: DLF India Ltd.

- Labeling, Inventory, Sample Traffic Survey and Prioritization of the Major Roads 3-lane and above under GHMC Jurisdiction, Andhra Pradesh.
  Client:GHMC

Highways & Bridges

- Lender's Engineer for 2-laning of Trichy-Karaikudi Section (km 10.000 to km 94.000) of NH-210 and Trichy Bypass (km 110.016 to km 135.930) of NH-67 under NHDP-III on DBFOT (Annuity) Basis, Tamil Nadu.
  Client: South Indian Bank

- Lender's Engineer for 2-laning with paved shoulders of Dindigul-Theni Section (km 2.750 to km 73.400) of NH-45 (Extn.) and Theni-Kumili Section (km 215.500 to km 273.600) of NH-220 under NHDP-III on DBFOT (Annuity) Basis, Tamil Nadu.
  Client: South Indian Bank

- Independent Engineer for 4-laning of Kundapur - Surathkal Section (km 283.300 to km 358.080) and Mangalore - Kerala Border [Nantur Circle to Mahaveer Circle (km 375.300 to km 376.700) and Mahaveer Circle to Kerala Border (km 3.700 to km 17.200)] on DBFOT Basis, Karnataka.

- 4-laning of Hyderabad-Yadgiri Section (Km. 18.600 to Km. 54.000) of NH-202 on DBFOT (Toll) basis, Andhra Pradesh.
  Design Services for 4-laning of Srinagar - Banihal Section of NH-1A (60 Km), Jammu & Kashmir.

- Detailed Engineering Services for 4-laning of Bhopal Bypass (35Km), Madhya Pradesh.

International Projects

- Design of External Road Connectivity to Port at Gabon (24 Km), Africa.

Railways & Metro Rail

- Consultancy Services for Railway Siding and Infra Plant Network at Rampura Agucha Mines and Railway Line to Rupaheli RS of North Western Railway for Hindustan Zinc Ltd., Rajasthan.
  Client: Shivkriti International Ltd.

- Feasibility Report for the Rasi Strips Pvt. Ltd. Siding near Jairamnagar RS of South East Central Railway, Chhattisgarh.
  Client: Rashi Strips Pvt. Ltd.

- Feasibility Report for the M/s. Ozone Steel & Power Ltd. Siding near Jairamnagar RS of South East Central Railway, Chhattisgarh.
  Client: Ozone Steel & Power Ltd.

- Reconnaissance Survey, Final Location Survey and ESP for Proposed Siding near Attipattu, Pudhunagar, Chennai, Tamil Nadu.
  Client: Penna Cement Industries Ltd.

- Study of Warehouse Charges and its Revision at Siluguru and Kolkata Tea Auction Centers, West Bengal.
  Client: Tea Board of India.

- Development of Railway Siding Facilities for Handling Iron Ore near Jaraikela RS, Jharkhand.
  Client: SESA Goa Ltd.

- Detailed Survey, DPR and Detailed Engineering for the Proposed Kribhco Infrastructure Ltd. ICD Siding Taking-off from Pali RS near Rewari–Ringus Section on Jaipur Division of North Western Railway, Rajasthan.
  Client: Kribhco Infrastructure Ltd.

- Detailed Engineering and Project Management Consultancy for the Upgradation of Dandugopalapuram RS, and Construction of Railway Siding and Marshalling Yard for the 1320 MW Bhavanapadu Thermal Power Project Unit 1&2, Andhra Pradesh.
  Client: East Coast Energy Pvt. Ltd.

- Detailed Engineering and Project Management Consultancy for the Proposed Private Siding and ICD at Ennore RS, Chennai Division, Southern Railway, Tamil Nadu. Client: Kothari Industrial Corporation Ltd.

- Reconnaissance Survey, Conceptual Plan, Pre-feasibility, Feasibility, and Approvals for Proposed Railways Siding at Hathbandh RS on South East Central Railways, Chhattisgarh.
  Client: Shree Nakoda Industries Ltd.

- DPR for Rail Connectivity and Railway Infrastructure Facilities for 4000 MW Krishnapatnam UMPP, Andhra Pradesh.
  Client: Coastal Andhra Power Ltd.

- Reconnaissance Survey, Conceptual Plan, FS, FLS, DPR and DE for Fuel Transportation and Railway Siding Study for 2 x 660 MW Shahdol Thermal Power Project near Sijehra Village, Madhya Pradesh.
  Client: Banas Thermal Power Pvt. Ltd.

- DPR for the Proposed Crossing Station at Jahangirpura for Improving Line Capacity of Kosad–Hazira Kribhco Railway Line and Kribhco Hazira Yard Modification on Vadodara Division of Western Railway, Gujarat.
  Client: Kribhco Infrastructure Ltd.

- Prefeasibility Study, FLS, Detailed Engineering, DPR, Approvals, and Project Supervision Services for Construction of Railway Sidings at Sindri, Kharagpur & Jamul.
  Client: ACC Ltd.

- PMC for the Proposed Rail Infrastructure (3.2 km) of Vedanta Aluminium Ltd. at Village Burkhamundra, Jharsuguda, Orissa. Client: ENCEE Rail.

- Design, DPR and DE for the Proposed Siding Taking-off from Robertson RS to the Inplant of Mahavir Coal Washeries, Chhattisgarh.
  Client: Mahavir Coal Washeries Pvt. Ltd.

- FLS, Marking Centre Line, Soil Investigation and Detailed Design Engineering for Proposed Doubling of Abu Road–Karjoda (50.2 km) Section on Ajmer Division of North Western Railway, Rajasthan.
  Client: RVNL-Abu Road-Karjoda.

- Detailed Total Station Survey and DPR for Modified Layout Plan to Scale of Railway Siding at RTPS Marshalling Yard, Karnataka.
  Client: Karnataka Power Corporation Ltd.

- Detailed Engineering and Project Management for Augmentation of Manikgarh Cement In-plant Yard.
  Client: Manikgarh Cement

- Reconnaissance Survey, Feasibility Report, FLS, DE, DPR and Approvals for the Private Siding Taking-off from Gangadhara RS on South Central Railway, Andhra Pradesh.
  Client: Sandiya Agencies.

- DPR for the Railway Industrial Siding from Dahej RS to the OPaL Plant in Dahej SEZ, Gujarat.
  Client: Bharuch Dahej Railway Company Ltd.

- Feasibility Studies and Approvals for the UTCL Grinding Unit near Sigriyama Halt RS, Tamil Nadu.
  Client: UltraTech Cement Ltd.

- Project Management Consultancy for the Construction of the Railway Siding at Kudathini RS in Hubli Division, Karnataka. Client: Sathavahana Ispat Ltd.

- Preliminary Engineering Cum Traffic Survey for the New BG Line between Bapatla–Nizampatnam–Repalli Stations (50 kms), Andhra Pradesh.
  Client: South Central Railway.

- Survey and DPR for the Proposed Machilipatnam Port Railway Siding Taking-off from Pedana RS on Vijayawada Division, Andhra Pradesh.
  Client: Machilipatnam Port Ltd.

- Feasibility Studies and Approvals for UTCL Grinding Unit near Chas Halt RS, Bokaro, Jharkhand.
  Client: UltraTech Cement Ltd.

- Upgradation of Existing Railway Yard at Binanigram, Sirohi.
  Client: Binani Cements.

- Feasibility Study of the Proposed Railway Siding at Jharsuguda RS, Andhra Pradesh.
  Client: Hindustan Petroleum Corporation Ltd.

- Feasibility Study for the Railway Siding for Gadarwara Super Thermal Power Project (2 x 660 MW).
  Client: NTPC.

International Projects

- Investigation, Design and Construction Supervision for Conversion of Meter Gauge Track into Dual on Parbitipur–Kanchan–Panchgarh & Kanchan–Birol Border Section of Bangladesh Railway, Bangladesh.
  Client: Bangladesh Railway (West).

- Detailed Survey of the Track Alignment for the Restoration of the Railway Track from Omanthai to Pallai (90.50 Km) in Northern Province, Sri Lanka.
  Client: IRCON International Ltd.

aarvee associates
architects engineers & consultants pvt. ltd.
Ravula Residency, Srinagar Colony, Hyderabad - 82, India
Tel: +91-40-23737633, Fax: +91-40-23736277
e-mail: aarvee@aarvee.net; web: www.aarvee.net