OREPA

Old Royalists Engineering Professionals' Association - Student Chapter

Newsletter

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OREPA Services

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Special

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Civil and Construction Engineering - Today and Tomorrow...
An interview with Mr. A. Thiruvalluvar

"OREPA, as a host of technical experts in many facets of engineering and related fields, opens up a reservoir of knowledge, technical expertise and material support in the fields of engineering, architecture and related fields for the benefit of the students and the youth. OREPA is looking forward to become a key stakeholder of the Royal College and the community, continuously working towards the betterment of our society. This Professional Newsletter provides news on our projects, events, innovations and achievements to promote sustainability, new innovations and youth empowerment within and beyond Royal College."

Please send your thoughts and insights to empower our initiatives;
OREPA Student Chapter - Editorial Board
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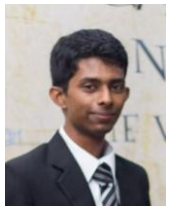

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Building the city of the future

by revolutionizing today's urban transport

The need for better transport infrastructure for Colombo and suburbs is constantly on the rise. A popular suggestion is an underground metro for Colombo. If this is to be implemented, it should certainly undergo several adaptations in order to suit the milieu in Sri Lanka. *Prof. M. T. R. Jayasinghe* (Senior Professor, Dept. of Civil Eng., University of Moratuwa) shares his insights on the future of urban transportation in Sri Lanka.

Sri Lanka would need an improvement in Transportation. However, underground rail transport could be an expensive option. Hence, other alternatives would have to be considered. To identify what should it be, let's look at the real context. If you look at the master plan which was prepared in 2005, one of the main implications is, "do not develop main roads anymore; but develop all the byroads, so that we can divert the traffic from the main roads to smaller roads."

In doing so, what we are doing is allowing people to use smaller roads and get to their destinations rather than getting into the main roads. That's why now you see all these small roads are being carpeted. That is actually an outcome of the highway master plan. Various funding agencies are helping to improve smaller roads or C, D and E class roads. Improvement of these roads was expected to diversify the traffic and reduce the congestion in main roads.

Something we did not foresee when we prepared the highway master plan was the increasing number of three-wheelers in the roads. Those days there were 100,000-150,000 three wheelers. Today we have 800,000. There are two implications of having three-wheelers, one is the congestion of the roads and the other is we are losing the people who are in the right age to do productive work. They simply stay in the three-wheeler, earn some money and go home, which is not a good thing for any developing country because we need our people to work; not to rest. And what is happening today is people are resting in three-wheelers doing only little work. Here we are losing our young generation and they can be suffering from overweight and related illnesses.

This is one of the biggest problems we are going to face in next few decades. So to overcome these barriers we need a very good transportation system. So the question is whether we need subways or whether we need elevated railway systems.

Prof. M. T. R. Jayasinghe
Senior Professor
Department of Civil Engineering

My solution to this is elevated railway systems. Then the next question is how to construct an elevated railway system. I will take an example to show you how it can be done. Then we can extrapolate that to any other area. Let me propose this with regards to Kelani Valley Railway, the railway from Colombo to Homagama. We know that corridor is one of the busiest in Sri Lanka. We have other such corridors on the Negombo – Colombo road, Malabe - Colombo Road, Kesbewa – Colombo Road and on Moratuwa - Colombo Road. These are the most problematic routes. I am going to take this particular corridor from Homagama where there is a railway line as well. In certain corridors, we do not have railway lines, but if we consider Negombo corridor and Moratuwa corridor, we have railway lines. However we do not have one on Kesbewa-Colombo road. But Piliyandala road and Homagama road are on very close approximately and runs almost parallel. Here currently we have only a single railway line and that is a problem. It cannot cope with peak traffic. We need about 4 lanes. How to build a four lane railway system is an intriguing question that many may wonder.

However there is a simpler answer. It should be an elevated railway. It has to be constructed on piles. Large concrete piles should be driven to bedrock at either sides of the existing railway line and those will possess massive carrying capacity. This can be done by acquiring only a small amount of land.

Then a pier-capping beam will have to be created atop. It will cantilever about 6m on either side. Here we can easily create a platform which has a width of about 18 – 20 meters. On this platform, we lay four railway lines. The outer lines will be for collectors, ones which will collect people. And middle two will be for express trains. Express trains will stop only at main stations at Homagama Kottawa, Nawinna, Nugegoda, Baseline Road, Maradana and Fort. Collectors on the other hand will stop every 200m. When travelling every 1km, it will have stopped five times. Yet it will be faster than any car travelling in the morning because car's speed is very low. Within those 200m it will move very fast and stop. People will come to the platform at upper level of the station, they will stay just 3-4 minutes, the train will come and they will travel to the next express station.

Express station is a huge platform; a place like Nawinna has space to facilitate such a huge platform. Here commuters can change from one train to another. They

will get into an express train and go to their destinations. Collector will also go all the way to the Fort.

Next problem we have to encounter is question is how to make such trains. We can use prime mover engines which are in the range of 14000 cc. We'll put them on bogies. Then it is a mat-ter of having a simple control system. The reason is that these trains are running one after another and they are not switching lanes. They will turn only at the end. Therefore we will not need a complicated control system. We can have a simple manual control system for emergencies.

This will not even require an automated system; our control system is very simple. That is, the train has to accelerate, move faster and then stop and it does not need anyaother manoeuvre. We can easily make it a computer control system. It will run on welded rails and therefore the ride will be much quieter. Welded rail technology is not a new technology it is already in use in the Colombo - Matara railway line.

Piles for the elevated track will be driven 30m – 40m underground depending on the design. Designing will not be difficult. We already have Orugodwatta Bridge which is 17 meters wide with a 5.3 meters cantilever. We have all the technology and know-how with us and we don't need foreign expertise. Even in Singapore, they are currently doing the same thing. But we have already done it here, a long time ago at Orugodawatta.

The beams will be designed as precast simply supported and then made continuous for part of dead loads, superimposed loads and live loads. The span will be 30m, 40m or 50m depend-ing on the horizontal and vertical profile needed. Any hill be made flatter in the elevated system.

To bring in people from an area like Boralasgamuwa to Nawinna, we can have a two lane system with collectors. We will not need an express line. What we only need is radial arms to extend the collectors. We'll have various arms. Within 45 minutes, everyone will be in Colom-bo. This will replace usual office and school commuters we have today.

Once we start this system, we will also start charging money for entry of private vehicles to the city of Colombo. As an alternative a good registered taxi service should also be started as in Singapore. Train network will also be extended with the city. Anyone will be able to get into a city train only by walking just 200 - 300 meters. Everywhere it'll be an elevated system. Over 5 years we can make sure that we'll have one of the biggest transportation networks in Asia if not in the whole world.
The elevated railway will be operated by a separate company who leased the railroad property on 99 year lease so that SLR will also get more income and would be able to wipe out part of the losses.

What we have to acquire is only a little land area. Their houses can also be rebuilt on cantile-vered platforms. Columns will be so massive that we can have pre-stressed concrete cantilevers and create their houses. We can create up to two floors and these buildings will be shock ab-sorbing, so the vibration from the railway line vibration will not be transferred to the house. All the systems will be shock-absorbing systems supported with rubber pads. We can have a nicely integrated system and we can sort out most of the transportation related problems in Sri Lanka.

Our engineers have that capacity. We also have the capacity to exceed all the guidelines giv-en in design codes. For an instance we could stretch capacities of pre-stressed concrete beyond the normal limits using high strength concrete that we can easily manufacture because sand and aggregates we have here are very strong. Even the railway cabins can be made locally. Since the trains are not expected to be used in high speeds the safety requirements will not be very high. Railway carriages need to be comfortable. Air conditioning them is also a good option and it can be easily done using existing automobile a/c systems. It will be powered by a separate engine.

The trains can be poweredby electricity rather than diesel. Solar power panes harnessing ei-ther Solar PV energy or solar thermal energy can be used to power this system. Using such methods we can make it a landmark case of sustainable engineering.

- By Thilina Ashen, Dulan Nakandala

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OREPA

Old Royalists Engineering Professionals' Association - Student Chapter

OREPA Student Scholar Programme

an opportunity towards a brighter future

Knowledge is power, knowledge is power indeed. Ask yourselves…after two and half years of exploring the realms of combined mathematics, physics and chemistry, have you quenched your thirst for knowledge? If your answer is no, please proceed… Are you patient enough to wait one more year to continue your hunt for knowledge? If your answer is no, please proceed… Do you wish to have a glimpse of what awaits you in the field of engineering? Are you ready to have some first-hand experience of what the university life would be like? If your answer is yes, then this is the exact place for you to be.

This is a project to provide internships for students who have sat for their Advanced Level Examination in the Mathematics stream. In Sri Lanka, students have to wait for around one year after their A/L examination to gain entrance to a university, and most of the students do not achieve anything useful during that time period. Under this programme, a group of students who have done well in Grade 12 and 13 term tests in the Mathematics stream will receive internship opportunities. Students will be selected based on their term test results and will be assigned to the internships starting from October 2015.

During the internships, the selected students will be assigned as assistants to the senior lecturers in University of Moratuwa where they will gain exposure to the fundamentals of engineering. The project committee has a future plan to expand the internship placements to industries as well. Based on our appraisal on this initial pilot programme, such a growth strategy will be planned and implemented in time to come.

This programme will enable the Maths stream students to gain maximum use of the time period after A/Ls, by gaining exposure to engineering applications. This will be an extremely valuable opportunity as they will get to work under some of the most experienced and most qualified academic professionals in the field of engineering.

We believe that this programme will also serve as a motivation for the future A/L students to perform well in their examinations so that they can get qualified for this prestigious internship programme.

Project Chairperson:
Hasindu Siyambalape

Project Team:
Samavath Mallawarachchi
Vajira Lasantha
Sachith Tissera

Olympiad Training Programme

What is the dream competition of any math nerd? Yes, the title gives it away. But in 20 years of our participation, the most prestigious mathematics competition for high school students is yet to see a Sri Lankan grabbing a gold medal at it, or a silver for that matter.

One might think we are not good enough, but the truth is that we simply do not try hard enough. Countries like China identify children gifted in math at the age of 13 or 14 and train them separately for one purpose – winning the gold at the International Math Olympiad. And they achieve it, extravagantly – since 1997, China was the overall winner 14 times and they haven't slipped past the second place. Which prompts us to scratch our heads at the education in Sri Lanka. And that is why Olympiad Training Programme is one of the main initiatives undertaken by the OREPA Student Chapter when it comes to the academic sector of Royal College.

Initiated at the request of the Principal, this serves as a platform for the students of Royal College to discover their talents in math and aims to help them achieve glory at national level as well as at international level mathematics competitions.

The program first took off in March 2015, with the participation of 35 students who were selected through a preliminary test. The limited number in the student count was mainly due to time constraints enforced by the imminent date of the first round of the Olympiad selection test (known as the Sri Lanka Mathematics Competition) - 25th of April, 2015.

Project Chairperson **:** A.K. Ruwanpathirana
Project Team **:** S.G. Jayaweera, K.T.S. Kumarage, D.R. Atapattu

Training Programme for IESL

Robogames 2015 - OREPA Student Chapter

The whir of rotating motors…flashes of LED lights… clicketyclack of the mechanical parts…a tiny robot crawling towards its target…will it accomplish its task? Or will it fall behind? Pin drop silence in the audience…hearts pounding ever so swiftly as the decisive moment arrives…the robot unfolding its claws slowly… Welcome to the Robogames 2015 folks!

Robotics and Automation is a trending technology that the whole world is very passionate and excited about. The era when robotics is limited to countries like USA, Korea and Japan is long gone. The potential and the interest is immense even in the developing countries like Sri Lanka. That is why as engineering undergraduates, we decided to share the pieces of knowledge we have with the students of our Alma Mater. This training programme is a result of that initiative taken by the OREPA Student Chapter in order to make students aware of the latest robotic technologies available and to guide them to develop a robot which could compete in the Robogames competition.

The programme structure consists of hands on workshops and group wise instructing. The participants are divided into groups and each group is assigned to an instructor. The undergraduates who act as instructors were given a training prior to the commencement of the programme and we are approaching more people who are willing to give their support.

Each student group is encouraged to develop a robot which will be competing at the school level first, to be selected for the IESL competition. The necessary guidance and technical knowledge is provided through workshops and sessions. It is very encouraging to see the enthusiasm and the feedback of the current participants. OREPA Students Chapter is more than willing to continue this programme annually at Royal College.

IESL RoboGames-October 2015

"Challenging the youth of Sri Lanka to use their creativity to construct and program autonomous robots."

The competition will be held in two categories; School Category and Undergraduate Category. The theme of the game task is to demonstrate a warehouse situation. Additional information will be provided to participants.

"I just want the future to happen faster. I can't imagine the future without robots"

-Nolan Bushnell-

"Design is not just it looks like and feels like. Design is how it works"

-Steve Jobs-

Project Chairperson:
Isuru Weerawardhana

Project Team:
Program is targeted for grade 6-12 students of Royal College. Undergraduates from Department of Computer Science and Engineering and Electronic and Telecommunication in University of Moratuwa, are involved in delivering sessions and instructing.

Innovation Programme

Old Royalists Engineering Professionals' Association

Driving the young minds at school towards coming up with new ideas is no easy task, especially given the heavy load of academic content they pull just to get through school. That is the official job description of The Young Inventors Club and they are more than happy to take up the challenge. Their joy is encouraging students with new ideas to bring them to life in the form of innovations. An annual exhibition is held as the prime event in achieving this goal, which showcases the best products that have seen light through the efforts of children.

Going by the books, innovation can be defined as the process of translating an idea or invention into a good or service that creates value, or for which customers are willing to pay. To be called an innovation, an idea must satisfy a specific need and must be replicable at an economical cost. It involves deliberate application of information, imagination and initiative in deriving greater or different values from resources, and includes all processes by which new ideas are generated and converted into useful products. But modern innovations emerging through students have deviated from the core concepts of innovation- most tend to imitate ideas they find on the internet, which doesn't require much effort from their brains.

In our mission to change this situation and educate students on technological backgrounds and the disciplines of innovation, we have successfully integrated with the Young inventors Club (YIC) and conducted two workshops thus far.

The first of the workshops was focused on how to apply electronics for innovations. The other is being carried out in two groups; grade 6 - 8 as the first group and grade 8 and above as the second group. This workshop series is conducted by the lecturers of University of Moratuwa with the guidance of Architect Mr. Prasanna Liyanage. It aims to develop a positive attitude among students on innovation and teach the process of innovation & its aspects. It includes hands-on activities which are specially designed to develop the thinking patterns of students in the matters of innovation.

On top of these workshops, we also work along with the YIC in their projects in case they need assistance on technical or any other aspect. It's a helping hand extended by Royalists for Royalists, which ultimately targets the betterment of all human lives through innovation.

Project Chairpersons:
Dinuka Salwathura
Kavindu Kularathne

Project Team:
Sudaraka Jayathilaka
Janaka Chathuranga
Viduruwan Geekiyanage

OREPA REUNION - 2015

"Fraternity Bound by Fervour and Valour"

26th of July 2015 saw The OREPA Reunion, the most anticipated event in the OREPA calendar, kicking off in grand style at the ClubPenthouse Island Resort in Bolgoda.

As a start, participants had the luxury of entering the hotel through boats which gave a novel beginning to the event. At the dawn of the day, Dr. Chandana Gamage enlightened the gathering with an inspirational welcome speech highlighting the motive behind the event, followed by a few words on the progress of the ongoing projects.

After a friendly chat, Royalists mustered to boats with the intention of paddling into the enchanting waters of Bolgoda Lake in dire need of exposing themselves to the breeze mingled with bright sunlight. Participants were able to make golden memories filled with fun and frolic during the ride and returned to the hotel when they could no longer ignore their stomachs yearning for delicacy.

Then came the (seemingly) most precious part of the event for many, which was none other than the lunch. The menu consisted of "Sunday Special Buffet of ClubPenthouse" which was truly a delicious mixture of food items to satisfy both tired eyes, withered noses and the hungry souls of boat riders. After having lunch, the partakers took some photographs to keep the day's memories safe for a lifetime. Then they travelled back to the shore and left for homes with a reinvigorated brotherhood, which marked the closure of the first ever reunion of the OREPA, sparking hope for a brighter future with Royalists willing to serve their Alma-Mater.

Project Chairpersons:

Tharindu Dhanusha Fernando
Lovindu Wijesinghe

Past Paper Discussion Programme

for Advanced Level students

Learning of books is undoubtedly one of the major techniques in mastering a subject, but one cannot simply overlook the importance of verbally discussing their content. This ensures a better grasp of the applications of core concepts and minute details of many a subject learnt at school. That's the principle behind the advanced level past paper discussions conducted by the B.Sc. Engineering undergraduates and the junior lectures of the University of Moratuwa.

Three consecutive weeks through 08th to 23rd of June saw various papers being discussed for the benefit of the students facing the advanced level examination in 2015 in physical science stream.

The main objectives of this project were to familiarize the students with questions in G.C.E. advanced level past papers and enhance the awareness of students about the theories & their applications in Mathematics, Physics and Chemistry. Past paper questions from 2010 to 2014 of these subjects were discussed with the 80 or so students who felt it worthwhile to get involved in these discussions.

Being conducted by the qualified junior lecturers and undergraduates of university of Moratuwa who passed the advanced level examination with flying colours, it was quite beneficial for the participants due to their experience and the high exposure to subject matter. Students were also pleased about the lecturers' commitment for the discussion, which showed them dedicating time for the juniors even with all the academic work they have at the university. As a final note, the college authorities and the prefects' council deserves an honourable mention for their assistance in conducting these discussions.

Project Chairperson:
Bhanuka Abeygoonawardana

Green Initiatives 2015

To create a generation of civic conscious young people who value sustainable living

"We are living on this planet as if we had another one to go"

These are the words of the recipient of the Goldman Environmental Prize in 1997, Terri Swearingen. No other elucidations are necessary to remind us of the hapless destruction of the environment due to human activities which have resulted in the destruction of the human kind itself. Thus, it is the high time to ask ourselves, should we continue on this path towards our imminent doom or should we follow a different path? Perhaps a greener path?

Environmental conservation and sustainable green living seems to be the only plausible path we can follow. Yet, adopting such a style of living is a long journey. Every long journey begins with a small step. OREPA Green Initiatives is one such step taken to help this noble journey towards making the world a better place to live.

OREPA Student Chapter Green Initiatives are implemented to promote collective responsibility for environmental conservation and sustainable living at Royal College. Under these initiatives, a series of audits are planned to be conducted at the College premises. As the initial step, a waste audit has been conducted. Further, an energy audit and a water audit are to be conducted in the near future.

The results of these audits will be utilized to introduce a waste management system and also to propose an energy management policy to the school. Dr. Jagath Manatunge from the Division of Environmental Engineering of the University of Moratuwa is guiding the programme.
We have also taken steps to carry out capacity building programmes for the students of the Green Circle of Royal College. We hope that these programmes will allow us to spark an enthusiasm among students to get actively involved in the projects implemented under our green initiatives. In addition to that, workshops and field visits are to be organized. Most importantly, the OREPA Student Chapter is planning to get partnered with the Central Environmental Authority. This partnership intends to conduct a series of workshops for students and teachers to bring about a positive attitude in them that strives to have a better surrounding at school.

Project Chairperson:
Pamodh Alwis

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Nipun Pravinda
Sandesha Weerasinghe
Udara Bibile
Charitha Wickramaarachchi
Dulana Gajaba

Foreign Presence in the Sri Lankan Construction Industry

Sri Lankan Construction Industry has been booming for the past few years with the emergence of several mega projects. These Mega Projects are currently led by foreign consultancy and construction companies with foreign investments, and this has caused several concerns for the local construction industry.

During the period of conflict for over 30 years, no significant mega scale project was introduced due to severe hardships prevailing in Sri Lanka. But now the situation has changed and a number of Mega Projects have emerged since 2009, most of which are funded by foreign direct investments (FDI) as mentioned in the table.

Country/ Funding Institute	Maga Project	Approximate Value (US $ million)	Project Duration (Years)
China	Hambantota port	1500	3 5
	Colombo Katunayake Expressway	350	4 0
	CICT Colombo International Container Terminal	500	3 0
	Trincomalee Outer Circular Road	340	3 0
India	12 500 houses in the Kilinochchi and Mullaitivu Districts each	250	4 0
Japan	Monorail for Colombo	1300	4 to 6
China South Korea & UK	Colombo Port Expansion Project	>800	3 0
World Bank	Metro Colombo Urban Development Project	213	5 0

However, in most of these projects the local construction companies are only acting as subcontractors to the main foreign company. Further, not many Sri Lankans are working at managerial and senior engineering positions in these projects. Therefore the expected technology transfer through such projects is very unlikely.

Reasons for foreigners to dominate the construction industry

The main reasons for the foreign consultants and contractors to dominate the construction industry of Sri Lanka need to be first identified.

- **Funding Issue**

Most of the Mega Projects have gone into the hands of the foreign companies since they come up with the money. Quoting an industry expert "The problem that the local construction industry is facing, is the accessibility to Finance at reasonable Interest Rates", depicts the true picture.

- **Technology and Capacity Problems**

Lack of capacity and the technology has been an issue for the local construction companies to directly lead mega projects, according to some industry professionals, especially in the design and construction of harbours, port city, monorails.

- **Lack of qualified people**

In some cases, especially when considering newer projects like port city, monorail, bus rapid transit (BRT) systems, light rail transit (LRT) systems, Sri Lanka does not have adequate prior experience of such. Therefore, qualified people to carry out such specific projects have become scarce.

- **Problems Inadequacy of legislation**

Inadequacy of laws prevailing in Sri Lanka has been another issue which allows easy access to foreign players. For example, countries like India have required legislation to prevent direct involvement of foreign companies.

Solutions for the issues identified

Several effective solutions have been identified which would limit the involvement of foreign companies.

- **Setting up an infrastructure development fund**

Since the projects have been awarded to foreigners due to financial incapabilities of local players, establishing a fund would be a suitable option to some extent. Drawing from previous experiences in Sri Lanka, the suitability of a fund could be governed by the lessons learnt from past failures. Countries such as India, Japan, Korea, and Malaysia have developed with the help of such funds.

- **Public- Private Partnership Model**

Public- Private Partnership - PPP Model can be a suitable way forward for a developing economy such as Sri Lanka. In a background where the government does not have adequate finance to provide for mega projects, mechanisms such as build-operate-transfer (BOT), build-operate-own-transfer (BOOT), and build-operate-own (BOO) would be quite useful.

- **Strengthening of local banks**

If local banks can be strengthened and encouraged to provide capital to kick start some mega projects it would be a good initiative, especially as it would prevent dependency on foreign money.

- **Bid as Joint ventures with local companies**

When operating as joint ventures two firms are considered as one, where the capacity of the venture would increase, making it a suitable option to hand over a major project. But it should be noted that the projects are different as well as the Companies, which could sometimes affect the suitability of such initiatives.

- **Put in place adequate legislation to restrict the direct involvement of foreign companies**

Passing adequate laws would prevent unacceptable interference that the foreign companies may cause in the Sri Lankan construction industry. Laws should be made, so that foreign companies cannot lead mega projects, but would take the role of a partner which would be more beneficial to the local construction industry.

- By Nadika Jayasooriya

Civil and Construction Engineering

Today and Tomorrow

(An interview with Mr. A. Thiruvalluvar)

Mr. A. Thiruvalluvar is the director of Construction Management at MAGA Engineering (Pvt) Ltd and a Corporate Member of the Institution of Engineers, Sri Lanka. Having commenced his tertiary education at the prestigious University of Moratuwa in 1973, he graduated in 1977.

The first stop in his career after graduation was the Central Engineering Consultancy Bureau (CECB). Looking back, his first undertaking was a hydro power project, followed by an overseas water supply project from 1981-1989. Then he shifted to the State Development & Construction Corporation (SDCC) and worked in several construction projects including railway lines, bridges and buildings. After the successful completion of a building construction project at the Open University, parallel with MAGA and other two contractors, he was invited to join MAGA as a project manager. Since 1991, he has been working with MAGA in a vast number of construction projects and has occupied almost all the positions so far, ascending the corporate ladder. Now the director of Construction Management at MAGA Engineering, he has reached the prime of his corporate career. He has been a prominent figure in coordinating many landmark projects including the Taj Exotica Hotel, Barnes Place Residencies and Kandy City Centre. 37 years of contributing to both local and overseas projects, in both government and public sector institutions, accounts for his wide experience in construction and civil engineering. He is undoubtedly a tremendously valuable asset to our country

The contribution of MAGA to the field of civil engineering...

MAGA is the trend-setter. We introduced ready-mix-plants, brought the latest lifting equipment, and introduced mobile & tower cranes, concrete placing booms and system-formwork systems to the industry. So we have been setting the trends and we are the first to diversify as well. Being very flexible with the customers, we do many projects for the same clients because they stay with us. We also have dedicated teams and staff, but with a very flat organization structure. People walk into the Managing Director's office even without an appointment - there is always an open-door culture inside.

Word on street - civil engineering is a politically sensitive industry affected by the changes in government policies. Your thoughts...

There could be interim problems; but in the long run, the industry has been growing on its own. Of course, the continuation of some projects may depend on the political leadership and government visionaries. For an example, in the 1970s, the focus was on hydro power & irrigation. Projects like Mahaweli Movement started utilizing public wealth and foreign grants. Back then, our industry wasn't mature enough to handle those projects on our own, so foreign companies with expertise knowledge came to Sri Lanka and partnered with local engineers & the technical workforce. At that time, projects ran over decades and resulted in a great level of technology transfer. The development was independent of politics and the industry grew by leaps and bounds.

In fact, unplanned and unwanted development should not take place. There must be proper feasibility studies and integrated development plans before starting up a new project. The negligence of government policies and non-value addition of proposed projects can lead to huge losses and high debts.

In some industries like IT, there is considerable and gradual growth that we can actually observe. But by its inherent nature, there are fluctuations in civil engineering. Your opinions...

That is basically the effect of economy on the industry. At first, the basic needs must be addressed and thereafter when the economy starts booming up only, the development takes place. Economy and development are always linked, because you can always postpone the constructions and development; but you can't postpone your meals. This is like a cycle; it has been like that and it is going to be like that.

Your track record in the construction industry is 35+ years. In your point of view, the advancements that we have achieved in the Civil Engineering industry in Sri Lanka....

We can consider the advancement of civil engineering industry under 3 aspects;

1. **Project planning**
   Latest tools and effective communication methods are developed to facilitate easy planning for budgeting, scheduling, procurement, negotiations, etc. It leads to reduced bought-in prices, production costs and lead-times.
2. **Construction methodology**
   For an instance, in concrete production, nobody uses small mixtures now and they always pursue custom-built components. E.g.: Mivan formwork system against traditional beam and column construction.
3. **Quality Assurance**
   Plan Quality control has now been replaced by quality assurance practices to get things right at the source itself. Sophisticated labs have been newly put up as opposed to manual mixing methods.

Lessons to be learnt from the civil engineering practices in other countries...

Institutes and authorized organizations are not properly integrated in Sri Lanka, although they all work for a common goal or in the same project. Other countries design their integrated plans before starting up a project. Then they work as a team to achieve common goals. Since it is a planned development, it is easy to implement and continue. The parties involved are aware of future projects coming in that area.

E.g.: electricity, water, telecommunications.

For example, the Road Development Authority (RDA) of Sri Lanka is already practicing project steering meetings and representatives from all the related ministries and authorities attend them. This way, they help us to expand the project with a foresight. Presently, they have good systems and they must be getting involved in project planning, so that they can avoid the co-ordination issues.

In all other industries such as IT, electronics, electrical, biomedical, chemical, automation, etc., they have new innovations coming up. What's new in civil engineering as per your experience so far...?

To a certain extent, automation, quality improvements, concrete construction methodologies and computerized systems are being used in civil engineering industry as well. We are also trying to integrate the new technological practices in other industries, but not up to that level - in this industry, lagging in advancements is inevitable due to the fact that buildings have to be slowly, physically built in order to be seen.

For an instance, you can find ways to produce materials economically. The thing is that in Sri Lanka, it is the other way round. If you mechanize it, the cost goes up, whereas the cost should go down technically. The reason is that people try to recover all the costs within the first year.

It is often difficult to compare this industry with other fields, because of its nature. The demand conditions are not fixed; requirements are totally different from one another. After a project has been completed, the team is dismantled and all the skills and the trained labor force get into something else to survive and they may forget everything they gained by experience. The best thing is to repeatedly practice. When you do the same thing repeatedly, the productivity goes up.

What about the opportunities that will be available in the industry in the future...

Civil engineering will certainly be better-off in the future. The industry will shift considerably. Within the last 20 years, I think, nobody has invested. The problem is that most of the private sector projects and legally-awarded contracts are over by now. But at the moment the future seems bright. The last decade saw increasing land prices as well as population. People will demand more services and facilities and construct new buildings demolishing the old houses and factories, which are 10-20 years old. The current trend is to go sky-high, the high-rise buildings. That's going to be a good time for us. A major area promising many opportunities in the future is Modular conservatory systems. Especially for apartment construction, you can design a model and repeat it. Now-a-days, the cost of manufacturing is also going up, due to variations in the housing requirements. But you can standardize it (using models) and bring down the costs.

You have to go more into the usage of technology in planning, which is where we do most of the changes currently. If not, that might adversely affect the costs as a whole.

Green concepts are popular in many countries and we have to put more concern on how to address the green initiatives and maintain them economically. E.g.: efficiency in material and equipment usage, less energy consumption, use of ecofriendly resources. In Sri Lanka, if we use local materials efficiently, we can save billions of money spent on imported materials.

Grooming of engineers and MAGA's contribution in grooming up engineers...

Of course, you need to develop a fixed skill to survive in the long run. Strong mental power is needed; this is not a place for weak-minded. We have to take everything in a positive way and move on.

At MAGA, we provide both external and on-the-job training for the highest number of engineering and technical trainees, accounting and administration staff. More than 20,000 direct employment opportunities are provided. On top of that, we help external higher education institutions as well.

Words of advice to civil engineering undergraduates and those who aspire to follow the discipline...

Get into the details. Learn thoroughly. There is no half-learning. Whatever you learn, do it in depth. In any industry, at the start up, you must know what we are going to do, why we are doing it, how we are going to do it, who will be doing it, when it will be done, where will it be done and what things are to be completed.

First know the fundamentals and then start working, that way you will be successful. Engineers should do the basic things correctly. For anything you don't know, you can go and refer something. For an instance, go and look at another building and see how it has been built or how it is being built. By observation, you can learn a lot. That's very important.

Suggestions for a fresh graduate and your opinion about specializing soon after graduation...

It depends on your luck. I would prefer learning everything at the beginning. Learn the fundamentals. Not only about engineering, but it is also the ideal time for you to learn accounting, marketing, human resource management, etc. When we go into the industry, we have to analyze the behavior of people and understand what motivates them. There's no point of shouting at people; they may have personal problems. Wrong actions will only make us lose that person. My advice is to learn everything first, then specialize on one field.

But whatever you do, you have to specialize in it. You have to master your subject. Whatever you do, be the master of your game!

- By Thilina Ashen and Geethanga Wijesinghe