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Voice of Kerala Engineers

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CHAIRMAN SPEAKS

Prof. (Dr.) M. Jayaraju FIE



Dear Members,

It is with utmost humility and responsibility, that I have taken charge as Chairman of Kerala State Centre of The Institution of Engineers (India),

the great body of Engineers, with over a 100 years role in the field of advancement of Engineering for Nation building.

Let me first offer my gratitude to each and every State Committee Member for electing me as Chairman unanimously. It was a sudden turn of events which led me to this Office for the remaining part of Session, 2021-22 and the full Session of 2022-23.

I am grateful to all connected with IEI KSC and I bank upon them for the successful conduct of the Centre's activities. Since your good faith has put me in this position, I have the burden to take the Institution to greater heights with your guidance.

In this regard, I request each one of the Members and Staff of this Centre to support and strive hard as a team to bring more laurels to this great Institution.

After two years of on-line mode activities due to Covid19 epidemic, it needs great effort to put our activities back into the rails of off-line mode. Now we have to conduct Seminars, Wednesday Talks and discussions off-line and that needs the participation in person of all concerned. I request all the Committee Members and other Members to work in this direction. What is most needed is to bring in additional strength by enrolling new members, technical institutions and students. Only if students take part in our activities, we can hope IEI to maintain its structure for the future since the future beckons tremendous technical knowhow.

As Engineers, we have a major role in developing our Nation. We have to bring in professionalism in all our activities. More than all, we have to remind ourselves that we have to tread the path of moral values in our activities as envisaged by the great Engineer-Statesman, Sir M. Visvesvaraya.

Let me conclude that working as a team and taking part in maximum activities of the Centre, to the extent possible, will pave the way to bring this Institution to greater glory. This will be beneficial to Engineers, students and the general public in particular.

I solicit the support, suggestions and guidance of one and all including all the Local Centres of Kerala in all our endeavors.

Until next time, then.

HONORARY SECRETARY'S DESK

Er.Roy Mathew, MIE



Upcoming Events

08-06-2022 Wednesday talk on 'Energy Efficient Motors for Industrial Applications' by Er Aneesh Rajendran, Certified Energy Auditor, EMC Trivandrum.

15-06-2022 Wednesday talk on 'Assistive Technology a Path towards Independence' by Dr Suja K. Kunnathu, NISH Trivandrum.

22-06-2022 Wednesday talk on 'A Digital Currency for India: Prospects and Challenges' by Mr. Satish Babu, CEO, InApp.

29-06-2022 Wednesday talk on 'What is Deep in Deep-Learning?' by Dr Achuthsankar S Nair, Director, Dept of Computational Biology & Bioinformatics, University of Kerala.

06-07-2022 Wednesday talk on 'Managing Change' by Er. Madhava Chandra Kurup, Faculty, Asian School of Business.

IEI Kerala State Centre Committee Meeting held on 22.05.2022



PROPOSED COURSES GUIDANCE CLASSES FOR THE GATE 2023 EXAMINATION

The Institution of Engineers (India) Kerala State Centre is proposed to conduct Guidance classes for the GATE 2023 examination for the following branches:

- Civil Engineering
- Electrical Engineering
- Electronics & Communication Engineering
- Mechanical Engineering
- Computer Science & Information Technology

Classes will commence in July 2022.

A Century of Service to the Nation

WORLD ENVIRONMENT DAY CELEBRATIONS

The Institution of Engineers (India) Kerala State Centre celebrated World Environment Day on 05-06-2022. Er. P. Sreekumaran Nair, FIE, Committee Member, Environmental Engineering Division Board, IEI KSC welcomed the participants and the Chief Guest Er. S. Subramanian, IIS, Director, Directorate of Soil Survey & Soil Conservation Kerala. Prof (Dr) M. Jayaraju, FIE, Chairman, IEI Kerala State Centre delivered the presidential address. The Chief Guest inaugurated World Environment Day. Prof (Dr) M Jayaraju FIE, Chairman, introduced the Chief Guest. Er. S. Subramanian delivered the lecture on the theme 'Only One Earth. Er. Roy Mathew, MIE, Honorary Secretary, IEI Kerala State Centre proposed the vote of thanks to all the participants and speaker. The celebration concluded with National Anthem.

The Celebration started with planting of Seedlings at the premises of IEI Kerala State Centre, Visvesvaraya Bhavan. Social Forestry Department Kerala donated 50 numbers of seedlings. These seedlings were distributed to the participants of the celebration.



WORLD TELECOMMUNICATION SOCIETY AND INFORMATION SOCIETY DAY CELEBRATIONS

The Institution of Engineers (India) Kerala State Centre celebrated World Telecommunication Society and Information Society Day Celebrations on 17-05-2022. Er. N. Rajkumar, Past Chairman, IEI Kerala State Centre welcomed the participants and the speaker Dr. S. Jyothi Sankar, ITS, Former Principal General Manager, BSNL Kerala Telecom Circle Trivandrum delivered the lecture on the theme 'Digital technologies for older persons and healthy ageing'. Er. Roy Mathew, MIE, Honorary Secretary, IEI Kerala State Centre proposed the vote of thanks to all the participants and speaker. The celebration concluded with National Anthem.



NEWS FROM LOCAL CENTRES

Kozhikode Local Centre

The Institution of Engineers (India), Kozhikode Local Centre observed "World Telecommunication and Information Society Day-2022 on May 17th, 2022 with a technical talk on the theme.

Er Praveen Chandran (Sub Divisional Engineer (Enterprise Business) BSNL, Kozhikode) delivered the theme lecture and made a detailed talk on the theme of the day "Digital technologies for older persons and healthy ageing" and delivered a detailed lecture on the Recent trends in telecommunication technology. Er K

Shaju MIE, Hon. Secretary, welcomed the audience, and Er. Surendrannathan K, FIE, Chairman briefly introduced the topic of "Digital technologies for older persons and healthy ageing". Er. C. Jayaram MIE Past Hon. Secretary introduced the Speaker.

The talk was much informative and useful and was followed by an active discussion. The speaker cleared the doubts raised by the participants. The function concluded with a vote of thanks by Er Sasi. K, Committee member IE (I) Kozhikode Local centre.



Trichur Local Centre

On 25-05-2022 IEI Trichur Local Centre celebrated World Telecommunication and Information Society Day. Dr. B. Jayanand, Professor & HoD of EEE, SCMS School of Engineering & Technology, Angamali delivered the lecture on the theme "Digital Technologies for Older Persons & Healthy Ageing". Prof. Dr.

C. P. Sunil Kumar, FIE, Chairman, IEI TLC delivered the welcome and presidential address. In the Welcome & Presidential Address, he stressed the importance of providing support to the old with advanced technologies to provide a quality living. New technology development and digital advancements should come to the help of the aged to provide healthy aging. Prof. Dr. Kurien E. K., FIE, Hon. Secretary, IEI TLC proposed a vote of thanks.

Speaker emphasized the importance of old persons in the present population status of the country. More old people than young constitute the population and the challenges faced by the old are much more. The challenges faced by the old people can be listed as those with respect to mobility, hearing, blindness, or vision impairment. These are in addition to challenges with respect to financial, social security, and mental wellness. Technologies that can help older people are the Internet of things (IoT), artificial intelligence, and robotics. The pillars of digital transformation which include artificial intelligence, cloud, IoT, and Data (ACID) can be of great help to support the old. Digital technologies can also come to the support of old. Future predictions of automation and AI will be of great advantage in taking care of the old.



NPOL Director



Dr. K. Ajith Kumar, F-1182325, Scientist 'G' assumed charge as Director, NPOL (Naval Physical & Oceanographic Laboratory), Kochi with effect from 1st June 2022.

NALUKETTU -TRADITIONAL RESIDENTIAL ARCHITECTURE

(Based on the lecture delivered by Ar. Ashalatha Thampuran on 06-04-2022)

Preface

Nalukettu is the popular form of a traditional residential building in Kerala. They are constructed as independent structures or as the main part of the Residential complex. They are considered as a structure that occupies the entire kshetrakhandam (Vastupurusha Mandala) and adheres to Ayadi shadvarga. The positioning of Nalukettu in various plots, small plots, larger plots, or very large plots is different. This paper looks into the planning and positioning of Nalukettu in different situations.

Definition

Nalukettu is a building, combining all the four Diksalas each placed at their respective cardinal position around Ankanam.



Architecturally it consists of interior space and exterior space (both open spaces) and an interspace of built form. It is a form of optimum shape which occupies the universal space of Kshetrakhandam (house site) and is well balanced on both axes. Nalukettu is the Malayalam version of the Sanskrit term Chatussala meaning an edifice comprising of all four Diksalas each positioned in their respective cardinal position with respect to the central Ankanam (courtyard). A fully developed Nalukettu will have four Diksalas and four Vidiksalas all combined forming a continuous built space

around the Ankanam. It follows all principles in Vastusastra like Vastupurusha mandalam, Padavinyasam, Positioning of Padadevathas, Marmams, and Veethi.

Nalukettu is a large family residence traditionally meant to accommodate a growing family setup of a joint family. Each Tharavad (joint family) complex has both residential and non-residential structures. The basic structure in any Tharavad is a Nalukettu which is extended depending on the physical and economic growth of the family and social and cultural attributes of the family. It is considered the fully evolved residential form.

Aaroodham and Sala concept in Nalukettu

Each Nalukettu has four Diksalas. Each of these salas has independent annular support for the roof. The concept of Aaroodham and the designation of Salas are unique to Kerala. The Manushyalaya Chandrika, a treatise on residential architecture produced in Kerala during the 15th century by a famous Sthapathi Mangalathu Neelakantan Namboothiri discusses this concept in detail. This is mainly seen in the load-bearing structures of central and north Kerala and forms part of the structural system. The roof pattern is clearly translated to the floor plan. This concept is not seen in Nalukettus which is constructed on the framing concept. Later other Shapathis in Kerala adopted this concept. It also has social relevance. Each sala is separated and can be used for the designated functions. As per the practices followed in Kerala even today, a sala is defined only when it stands separated by an ante space Antharala. In the absence of Antharalam the attached space is only an extension known as Koottikkettu.

Nalukettu is a social unit that satisfies all functions of a family-physical, intellectual and spiritual. Orientation of the structure takes care of the micro climatic and environmental factors and makes the design flexible. Treatises state that this type of building is favored for all social categories except the working class (Sudras) and other lower classes.

Evolution of Nalukettu

There are two possibilities by which the evolution of Nalukettu can be explained.

1. From Ekasala by repetition

Nalukettu evolved from Ekasala by repetition to higher forms like Dwisala (two units), Trisala (Three salas), and ultimately Chatussala (Four salas). The existence of Dwisala and Trisala though rare points to this.

2. From Mandapam

In Kerala, Nalukettu evolved from Mandapam. -Mandapam is a square structure with a roof supported on concentric rows of columns. The smallest structure is one with 4 columns. The next configuration has 12 columns and the next one has 20 columns and so on. In Kerala, two types are generally seen with 28 columns and 36 columns. The first Nalukettu has a courtyard surrounded by 4 columns and the second one has a courtyard surrounded by 12 columns. From the study of Nalukettu, it may be presumed that first or two concentric columns define the courtyard. The next two concentric colonnade define the Salas and the last concentric colonnade define the external periphery. Depending on the size of the courtyard, the number

of columns around the courtyard is either 4 or 12 and that of the external colonnade is 28 or 36, i.e. the Nalukettu is either in a Mandukapadam (8x8) or in Paramasayika Padam (9x9). Most of the Nalukettus in Kerala are in Paramasayika Padavinyasam. The requirement of column less space has resulted in the removal of columns in the central built portion. However, the columns around the courtyard and the exterior are retained.

Positioning of Nalukettu in designated space

Nalukettu is associated with the residence of a higher caste and the elite; it is always constructed in larger or very large plots. There are exemptions where Nalukettu as an independent structure is constructed in a small plot.

Small plot

When the measurement of the plot is less than 8Dx8D (D=2.88 to 3m) and cannot be divided into 4 sectors it is considered a small plot. Here the entire plot is considered as the universal space and the Nalukettu is planned as per the requirement of the owner. The smallest Nalukettu is of the dimensions 4DX4D. Depending on the Kshetrakhandam larger Nalukettus can also be planned. The space beyond the Nalukettu is used for the construction of other structures.

Large plot

A large plot is one that can be divided into four sectors and the Nalukettu can be constructed in one sector. The minimum dimensions of such a plot are 8DX8D. Nalukettu is constructed either in Devakhandam (NE) or Manusha Khandam (SW). In Kerala, Manusha Khandam is preferred over Devakhandam. Devakhandam is kept as an undisturbed green space (Kavu). The other two sectors are used for constructing utility structures, additional storage space, tanks, cow sheds, etc. The entire plot is enclosed by a high wall with a Padippura with a gate on the eastern side.

Very large plot

For the construction of a Tharavad which is the habitat for a large feudal joint family, the plot is divided into 18X18 padams (Karnashtaka Padavinyasam) with a minimum dimension of 18DX18D. The plot is divided into 4 sectors and 9 concentric Veethis. As in the case of a large plot, one sector is used for constructing the Nalukettu. Depending on the space requirement of the family, Kshetrakhandam can be of 4 sizes viz. 2X2 padams, 4X4 padams, 7X7 padams or 8X8 padams. Once the Kshetrakhandam is defined it is considered as a self-contained space. It is then divided into Padavinyasam Veethi nirnayam etc and the structure is planned.

Planning of Nalukettu in Kshetrakhandam

Once the size of the Kshetrakhandam is fixed with respect to the space requirement of the Nalukettu, the actual planning begins. The Ankanam is fixed to occupy the Brahmaveethi of the Kshetra khandam. In Kerala, Nalukettus are planned in Paramasayika Padavinyasam with Brahma Veethi of 9 padams. The Diksalas in the respective yonis with independent Aaroodhams and the Kone salas are planned in the next two Veethis. Care is taken to see that the external walls of the various salas and the internal walls around the courtyard are in the same line. Any adjustment in the measurement to

suit the desired Yonis are done in the ante space (Antharala). The principle of Madhyankana (central yard) pramanam is used where the built space is designed with respect to the centre point of Ankanam. All principles of Vastusastra viz Ayadi Shadvargam are followed. It is to be noted that the Kshetrakhandam has always one corner touching the Brahmasthalam. In this way, whether it is a large plot or a very large plot Karnasutram only will pass through the building. Care is taken to see that the sutram does not pass through the Diksalas.

Extension of Nalukettu

Nalukettu is the central structure of any residential complex. It accommodates the common family activities like religious, ritualistic, cooking, dining entertaining the guests, etc, and private activities like rest and sleep. When the size of the families increased, it necessitated the addition of space resulting in more appendages to the Nalukettu. Two types of additions are observed, structurally attached additions and independent additions.

Structurally attached addition can be horizontal, vertical, or both. Horizontal additions are seen everywhere but vertical additions are confined to Nalukettu of load-bearing nature. Additions are physically connected.

Horizontal extensions

Horizontal extensions are generally seen on the eastern (Kizhakke kettu) and northern (Vadakke Kettu) sides of the Nalukettu and are used as additional utility spaces. The climatic conditions necessitated the built area to be one bay wide and have resulted in structures with courtyards. There is no restriction on the number of courtyards and the size of the courtyard. These extended structures do not have Aaroodhams and have been designated as Koottikkettu. There are cases where salas are repeated on the Southern or western side of the Nalukettu with additional courtyards to produce larger structures of Ettukettu or Pathinarukettu.

Vertical extensions

Vertical extensions are provided on the western and Southern sides and are strictly used for residential purposes. In Very rare cases extensions are provided on all four wings around the courtyard. These are normally seen in Nair Tharavads of Northern Kerala.

Independent extensions

Independent structures are added when more space is required. They are in the form of Ekasalas and are used as residential areas. They are connected to the main structure by covered corridors. Other utility structures like dining, kitchen, store (Pathayappura), tank shed (Kulappura), cattle shed (Thozhuthu), Gatehouse (Padippura), etc with or without Aaroodham are also provided, making the complex with innumerable corridors and courtyards.

Conclusion

The traditional residential architecture of Kerala is unique due to its isolation from the rest of India. Various types of residential structures have evolved here taking into consideration of

climatic social, environmental, and other factors. The practice is still alive. Numbers of practitioners are engaged in practice, especially in rural areas. Even in cities, their services are highly solicited in setting out and performing ritualistic activities before construction and after construction before occupying the building. But they are not involved in the actual design process. Lack of awareness among builders and the owners also contributes to this. As a result, the merging of traditional wisdom and modern technology is not happening. It is highly essential to bridge the gap to produce modern structures with a traditional base.

STUDENT CHAPTER ACTIVITIES

IEI student chapter Mechanical Engineering Department, NSS College of Engineering Palakkad Kerala

IEI student chapter (Mechanical) from NSS College of Engineering Palakkad Kerala visited the industry M/S Hailstone Ltd Kanjikkod on 28/05/2022.

The Industrial visit to Hail Stone innovations was conducted on 28/05/2022 by the Institution of Engineers (India) (IEI). A total of 31 students and 2 staff members participated in the Industrial visit. The team departed from college at about 8.40 a.m. and reached the industry by around 9.25 a.m. Upon reaching the industry, HR at Hailstone innovations, Mr. Sreejith handled a session that detailed the history and workings of the company. After the introductory session, the students were taken on a visit to see and understand the workings of the company, all the while being guided by Mr. Sreejith.

As Hailstone is a company manufacturing crushers and related equipment for the mining industry, the factory was massive, to say the least. The unit at Kanjikkod was focused on assembling all the parts and building the final device. All the parts were manufactured at their other units or bought from other vendors. All in all, the industrial visit to Hailstone innovations was a wonderful opportunity, where the students got to see and understand the manufacturing and working of large crushers and related mining equipment.

Kerala State Centre- WEDNESDAY TALKS - Glimpses

11.05.2022 Wednesday talk on “Timber Construction for Residential Buildings in Australia” by Biju Balakrishnan, FIE Aust CP Eng NER, National Technical Engineering Manager, Intrax (Housing), Intrax Consulting Engineers Pty Ltd., Melbourne, Australia.



18.05.2022 Wednesday talk on “Value of Big-Data” by Dr. Geetha Govindan, Scientist-G, Computer Division, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum.



25.05.2022 Wednesday talk on “Electric Vehicles” by Dr Nisha G K, Department of Electrical & Electronics Engineering, Mar Baselios College of Engineering & Technology, Thiruvananthapuram.



01.06.2022 Wednesday talk on “Leakage in Concrete Roofs & Floors” by Er. R. Subhash Chandra Bose, Superintending Engineer (Retd.), Kerala Public Works Department.



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