

# NERDC NEWS

Newsletter of National Engineering Research and Development Centre of Sri Lanka



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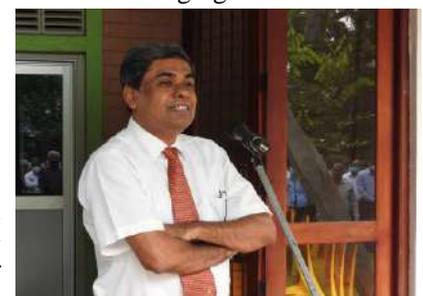
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## NERDC Starts new normal working life with the commencing of year 2021

**1<sup>st</sup>** Jan 2021, the first day of the year in 2021 started with the blessings of Triple- gem by chanting Pirith. All staff members of NERDC refreshed their minds by giving the oath of government servants as the first task in the new year. The Chairman stated the importance of working effectively and efficiently whilst enjoying the duties. And he appreciated the tasks completed so far. The Director General mentioned about the importance of managing time in the work & work-life balance.

All the staff members who worked hard & dedicatedly during the Covid-19 pandemic situation amidst enormous difficulties, were appreciated and awarded by the Chairman & the Director General. About 50 staff members were appreciated for their dedicated services during the period of closure due to Covid-19.



*Chairman addressing the gathering*

A special session was taken up by the Chairman for all engineers & executives at Kulasinghe auditorium during the second half of the day. He highlighted some of the massive engineering constructions in a powerpoint presentation and described how engineers succeeded with minimal errors & casualties. Presently their contribution in value as well as an investment which caters for future needs of the population.

Further he discussed the things we could complete at the NERDC in implementation of the work plan for the year 2021.

## NERDC thrives well in processing their work without having backlog during the second COVID-19 wave

NERDC being the national apex body of engineering research and development stood up to the second COVID-19 wave with grit and determination. The geographical area where the NERDC located was locked down due to the seriousness of the pandemic situation. Nevertheless, the tasks that had already been taken up would be completed to the given deadlines. And the staff members who were essential in providing their inputs to the work in any category of profession attended for the work physically. And it was highly appreciated that they always adhered to the rules, regulations & guidelines which were established due to COVID-19 pandemic situation. Rest of the staff members attended to work from home to complete the work demanded, whilst being ready for presenting to the office when required. With the new exposure to virtual working, NERDC professionals were successfully able to adopt and gain the experience of handling & managing the work to the deadlines, advancing through virtual mode of working.

## NERS 2020 for Engineering innovations & developments towards vistas of prosperity: NERDC holds its' seventh annual National Engineering Research Symposium

The National Engineering Research Symposium (NERS 2020), enriched with the theme of "Engineering innovations & developments towards vistas of prosperity", was held on 10th December 2020 at NERDC. This symposium extended its opportunities by making a wide platform for external stakeholders such as researchers, university academics, technologists, inventors and other industrialists to publish their findings, share their experiences and ideas. There were 52 papers presented and out of those 37 were selected as full papers and 16 papers were selected as extended abstract presentations. The reviewing panel comprised of 29 external reviewers 18 internal reviewers with different professional backgrounds. The presenters and the participants joined in physical as well as virtual modes and this is the first time that NERDC held an annual symposium in hybrid modes. The Chairman of NERDC, Professor Leelanada Rajapaksha, addressed all physical and virtual gatherings during the inauguration. The sessions were scheduled under various engineering disciplines such as; Chemical & Process and Materials engineering, Civil engineering, Computing, Electrical, Electronics and Communication engineering, Energy and Environmental engineering and Mechanical engineering.



And the professionals participated for the symposium revealed that it was a fine opportunity supported them for intra and inter-sector networking and collegial interactions among themselves.

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## NERDC New Appointments

NERDC warmly welcomes the newly appointed Deputy Director General (Services), Director (Finance), Head of Electrical & Electronics Department and Head of Energy & Environmental Services Department. Very brief capture of the introduction is below mentioned and we wish them all the best in their endeavors.

### **Deputy Director General (Services) – C Eng. A.A.S.P. Jayasinghe, MBA, B.Sc. Eng, MIES**

Eng. A.A.S.P. Jayasinghe is our newly appointed Deputy Director General (Services). He has over 26 years of professional experience, out of which 22 years at NERDC. He holds an MBA, has obtained the status of Vocational Trainer in Production Engineering from Polytechnic University of Japan, and a Bachelor of Engineering (Hons) Degree in Mechanical Engineering from the University of Moratuwa. He is a Chartered Engineer by profession and holds the membership of Institute of Engineers, Sri Lanka.



### **Director (Finance) - Mr J.M.R.S. Jayasinghe, MBA, CIPFA(SL), CIPFA(Ireland), BBA(Colombo)**



Mr. J.M.R.S. Jayasinghe is our new Director Finance. He has over 22 years of experience in the fields of Finance and Marketing where out of the whole experience 15-years of service in the NERDC and 7 years in private & corporate sectors. He holds an MBA from the University of Kelaniya and Membership of both Institutes of Chartered Public Finance of Sri Lanka as well as Ireland and a Bachelor of Business Administration specialized in Marketing from the University of Colombo.

### **Head of Department (Energy & Environmental Services Department) - Eng. Tissa Geeganage, B.Sc(Eng), M.Sc(Eng), AMIESL**

Eng. Tissa Geeganage is the newly appointed HOD of Energy & Environmental Services Department. Prior to this appointment, he worked as a Research Engineer in both Development & Projects Department and Energy & Environmental Services Department. He has over 19 years of experience in the private and government sectors in multiple disciplines of manufacturing, fabrication and production. He holds an M.Sc. in Sustainable Process Engineering from the University of Moratuwa and a B.Sc in Chemical and Process Engineering from the University of Peradeniya.



### **Head of Department (Electrical & Electronic Engineering Department) - Eng. N.S.K.Samarasinghe, B.Sc(Eng), M.Sc(Applied Electronics), AMIESL**

Eng. N.S.K.Samarasinghe is the newly appointed HOD of the Department of Electrical & Electronics Engineering. Prior to this appointment, he worked in the Department of Mechatronics as a Senior Research Engineer. Before joining NERDC, he served in the capacities of Facilities Manager, Factory Engineer, Automation Engineer & Senior Technical Executive at many of Local and multinational private sector companies and has 15 years of industry experience in factory automation, plant & machinery maintenance, manufacturing plant process improvements. He obtained a B.Sc in Production Engineering from the University of Peradeniya and holds an M.Sc in Applied Electronics from the University of Colombo.



## NERDC Collaborates with NARA to uplift the standards of Sri Lankan Fisheries Industry: Interesting improvements in dried fish & Maldive fish processing

According to the statistics, fish and fish based products contribute 38% of total protein intake among the Sri Lankan population. Fresh fish, salted dried fish and maldive fish are considered as high value and tasty side dishes in the food tables of South Asian countries, including Sri Lanka. Although the geographical location of the country situated, fish & fish based products should be the most common and easily found source of proteins at affordable cost, due to the issues in supplying, processing & other matters: these products are sold at high prices in the open market. According to NARA (National Aquatic Resource Research and Development Agency), the major problems associated with Sri Lankan dried fish and Maldive fish industry are use of low quality raw fish and very short shelf life due to improper drying and excessive use of salt. Although fish is an extremely perishable commodity and quality deterioration can start from the time of death of the fish, the processing techniques they use are very primitive in terms of food safety. They use the long traditional process of making dried fish on ground or raised stages/racks open to direct sunlight. However, this is not possible in adverse weather conditions as well as not complies with food safety measures. Conventional Open sun drying method causes many issues such as pest attacks, dust and soil contamination, microbial contamination & possibility of mixing unwanted chemicals.



National Engineering Research and Development Centre (NERDC) supports NARA in the national task of improving the processes of drying of dry fish and Maldive fish with other stakeholder support as well. In this project, the task of NERDC is to design a biomass fuelled dryer for Maldive fish processing and a solar dryer for dried fish production. After developing the technologies, conducting field trials, demonstrations for the fisheries community and popularization of these new technologies in Sri Lanka will be done by NARA. The aim of this project is to improve the processing techniques of Maldive fish and dried fish so that better food quality is achieved.

## NERDC with NEDA for a radical transformation of dairy industry



Dairy farming plays a vital role in the food chain and contributes a lot to the livelihood in the rural communities of Sri Lanka. Although major players have many benefits to their produce to process and supply to the market, small scale dairy farmers seek support to become competitive partners in the dairy industry. In order to improve the efficiency while maintaining standard hygiene in milking operation, Mechatronic Engineering Department of NERDC has developed a motorized milking machine. This is an improved version of the previously developed hand operated device, which has been distributed among the selected farmer community with the support of National Enterprise Development Authority (NEDA).

The latest modification improves the suction capacity & the suction speed than the previous one. It's a portable machine with a 12V vacuum pump, powered by two rechargeable UPS batteries. This improved milking machine will be handed over to NEDA for distributing among the small scale dairy farmer communities for completion of field trials.

## The knowledge Management Innovation Project

NERDC has instated a program which is conducted by internal professionals through which they share their individual expertise. During the month of January, 2021, three of these said sessions were conducted.

The first topic, being on the “theoretical investigation on dimensional analysis of ball bearings using the Buckingham PI theorem” was conducted by Eng. Nalaka Samarasinghe on the 11th of January.



The topic of ‘Technical writing’ requires a greater sense of understanding the target audience and how to communicate the message efficiently.



This presentation was executed by Eng. J.A.A.D. Jayasooriya, the Deputy Director general (R&D), which provided the guidance for the improvement of technical writing of NERDC professionals; which was held on the 18th of January

As, agricultural productivity is the only solution to cope with the high food demand as the population grows. Principle Research Scientist, Dr. Champathi Gunathilake, had delivered the



last of the three recent presentation on the topic: Technologies to enhance agriculture production in order to fulfill future food demands.

Many actively participated in these sessions, which included: The Chairman, Director General, Senior Management, all engineers and scientists of NERDC. As a mark of their contribution, all presenters were awarded a plaque of recognition respectively.

## Get to know about Research Fellows at NERDC



Eng. Kapila Peiris B.Sc. (Mech. Eng.), M. Phill. (Agriculture Eng.), M.A. (Buddhist Studies) MIESL

Eng. Kapila Peiris is a Research Fellow who serves NERDC for more than 20 years. He is an expert in Advance Thermodynamics, Engineering Mechanics, Engineering Mathematics and Eng. Applied Thermodynamics & Refrigeration.

He has published more than 30 research publications in various journals on Engineering Mechanics, Structural Analyses, Ancient Technologies, Sustainability, Bio – spiritual nature of ancient knowledge system and F.E.M. In addition he has written 80 articles for Vidusara science newspaper on science and engineering concepts.

He Serves as a Visiting Lecturer in Universities of Moratuwa, Ruhuna, Open University of Sri Lanka and Vocational University. He furthermore, serves as a member in the indigenous knowledge committee of N.S.F. and as a member of the Museum committee at I.E.S.L. Currently he acts as an advisor to the consultation of Sandha hiru seya (Anuradhapura). His special interest areas are engineering mechatronics, engineering applied thermodynamics & refrigeration, Philosophy of Science, Indigenous technologies, Bio – physical dichotomy in ancient system & sustainability, the supreme science Buddha, Dhamma for ultimate relief from dukka & understanding the reality. Currently he leads the refrigeration expertise group of the NERDC & contributes to develop a young group of engineers into known personalities in the country in a few years.

## The great creation which shows the high end irrigation technology we had in ancient times: “Biso Kotuwa”

“Biso kotuwa” is one of the great examples that reflect the profound knowledge of our ancient irrigation engineers. This precious creation enables drawing water out without damaging huge dams in the range of 30-40 feet height from irrigational reservoirs. Biso kotuwa is of the form of a rectangular well, located at the water side of the dam. Primarily, water enters Biso kotuwa before passing through the sluice at the dam side. Biso kotuwa smoothens up the rapid flow and high pressure that could be destructive to the dam and sluice.

The effect of Biso kotuwa causes an increase in the length of the streamlines of water flow near the exit of the main reservoir. Consequent viscous forces reduce the pressure of water at the exit of the sluice. The reduced pressure at the exit causes a higher flow through the sluice. Due to this reduced pressure the water level inside the Biso kotuwa is always lower than that of the reservoir.



If there is any turbulence in or nearby Biso kotuwa, in addition to viscous effects, turbulence itself can cause reduction of pressure. This is caused by collision of water particles among water particles. For completion of all these effects, the Biso kotuwa should be adequately large and the gate at the exit of the Biso kotuwa should be larger than the gate at the entrance. Biso kotuwa had been effectively used in ancient irrigation systems to distribute collected storm water during the rainy season into sub reservoirs which were at lower levels.

## Evolution of NERD Centre

During the year 2003 the material lab was established at NERDC, attached to the Department of Civil Engineering. The hostel facility was also established in the same year and both of these facilities were assisted by Asian Development Bank. Hostel facility was aimed to provide accommodation for researchers and trainees whenever required.



Solar and PV lamp testing laboratory of NERDC received the international accreditation in 2004. Since then until today it performs the standard testing & issues certified reports. Our customer base, benefited by this service are private companies, public quoted companies and state sector organizations.

In the year 2006 the idea of setting up an Engineering Museum within the Technology Park premises came up. Today the Engineering Museum plays a major role along with the Technology Park, in providing learning & sharing experiences for school children & university undergraduates as well as students who are attached to technical colleges.

Requirement of Mechatronics Engineering laboratory was under discussion and during the year 2007 Mechatronics lab was established. The purpose of the Mechatronics Engineering Dept. was to provide the facilities to industrial sector island wide in the field of mechatronics.

*(To be continued for next issue)*

## “Contribution of BOI towards Economic Development of the Country” – Presentation by BOI “Executive Director (Zones)” as invited speaker

The knowledge & experience sharing presentation on how BOI contributes to development of the country was held at NERDC. The topic of the presentation is “Contribution of BOI towards Economic Development of Sri Lanka”. The resource person Eng. Lawrence Madapatha, shared his expertise and best of his 29 years of industrial experience, including BOI sector. Further, Eng. Madapatha appreciated of conducting this kind of presentation series to improve the competencies of their own staff, as a government sector organization. The session was held at Kulasinghe auditorium on 25th February, 2021. 2021. The senior management and all engineers of NERDC participated in the session. This session was held as one of the series of sessions that NERDC conducts for the improvement of it’s own expertise in different levels & fields of exposure, which was initiated by the Chairman.



## Construction of “Child Psychiatric Unit at Jayanthipura hospital” incorporating NERDC cost effective construction technology

NERDC Cost Effective Building Technology is one of the major innovations that support infra-structure development of the country by providing value for money. Jayanthipura hospital in Polonnaruwa, was in need of a building for child psychiatric unit and NERDC took over the responsibility of building using our cost effective building technology. During the construction of the unit, applications of NERDC technologies such as Compressed Stabilized Earth Blocks (CSEB), pre-stressed columns & beams & NERDC pocket foundation system were used. This project was consulted by NERDC & completed by GPC Constructions, one of our licensee whom offered the tender through a formal bidding procedure. The total floor area of the building is 100 sq. meters the total cost is 8 Million LKR.



The time duration for completion is 4 months and the building is already handed over to Jayanthipura hospital.

## The first commercial license agreement for the year 2021

About 85% of energy comes from non-renewable sources, such as fossil fuels-oil, natural gas, coal, etc. Bio-gas is one of the solutions for replacing non-renewable energy sources by contributing sustainable energy and organic fertilizer. NERDC has entered into an agreement and licensed the manufacturing of industrial bio-gas digesters to Biotech Constructions; for manufacturing & distributing the NERDC Industrial Biogas Digesters.



The agreement was signed by: Director General of NERDC, Eng. D.D. Ananda Namal and the Managing Director of Biotech Constructions, Mr. K.M.C.W.B. Wickramathilake, on 1<sup>st</sup> February, 2021. The Deputy Director General (Services), CEng. A.A.S.P. Jayasinghe awarded the license & the certificate to Mr. Wickramathilake in the presence of Head of Department of Techno Marketing Department Eng. Yamuna Pathiraja and their staff members.

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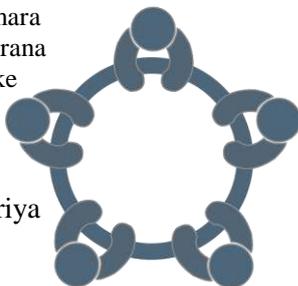
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## Retirement - Mrs. Y.M.M.K. Ranathunge

Mrs. Y.M.M.K. Ranathunge served as a Principle Research Engineer, attached to the Agriculture Engineering & Machine Development Department at NERDC. She retired on 19th December, 2020, after 37 years of remarkable career history along with NERDC.



Mrs. Ranathunge joined NERDC on 16<sup>th</sup> March 1983, as a Technical Assistant (chemical), as she graduated from University of Moratuwa as an N.D.T. diploma holder. Recognizing her contribution & talent in engineering, the NERDC kept promoting her with more responsibilities to many posts and finally as the Principal Research Engineer in 2010.

She has obtained patents for virgin coconut oil expeller (domestic type) & palmyrah juice extractor. And has developed many other mechanical devices to improve the domestic & small scale industries and the livelihoods of people in the grass root level. A dryer for Palmyrah pinattu (dried fruit pulp), ayurvedic medicine crusher, herbal juice extractor for ayurvedic medicine, paste making machine, pills making and pills polishing machine for Ayurveda are only a few out of many machines that were initiated & developed with her expertise. Mrs. Y.M.M.K. Ranathunge participated in many international forums and was awarded with a Silver medal at the 30<sup>th</sup> International Inventions Exhibition at Geneva. She also has won the Presidential Award (Silver medal) in 2000 for the innovation of virgin coconut oil expeller. Apart from these, she has conducted many training programs, shared her expertise in many projects and served as a consultant in various multi stage projects. We greatly appreciate Mrs. Y.M.M.K. Ranathunge's many years of excellent service to the Nation, and wish her the very best of luck in her future endeavors! May the future bring her the best of health and happiness for many years to come!