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Science Week focuses on Lankan inventions

by Manjari Peiris

World Science Day will be commemorated on November 10. In parallel Science Week will be held from November 5th to 10th, islandwide along with an exhibition at the premises of the Industrial Technology Institute (ITI).

The Chairman of the National Engineering Research and Development Centre (NERD), Jayantha Ranatunga, elaborated on the activities and the progress NERD has made since its inception.

The National Engineering, Research and Development Centre was founded in 1974 by the late T. B. Subasinghe, then Minister of Industries, to fill the much-needed gap in industrial and applied research and development of technologies appropriate to the country. The Centre was first located at Kollupitiya with five research engineers. Vidya Jyothi Prof. K. K. Y. W. Perera was the then Chairman of the Centre. At the time laboratory and workshop functions were carried out at Moratuwa University. Early research was confined to renewable energy and electronics.

In 1977 under the chairmanship of Vidya Jyothi Dr. A. N. S. Kulasinghe, the Centre was shifted to a 12-acre site in Ekala. During this period the emphasis was shifted to

fabrication and pilot plants. Cost effective construction methods and use of alternative energy were the focus of research and development during that era. The staff and the infrastructure of the Centre grew rapidly during this period.

At present the Centre has 400 employees of which 50 are engineers. Cost effective construction methods, finding alternative to timber and gasifier technology took center stage during this period. The development of water turbines saw the rapid increase in mini and micro hydro projects throughout the country. Battery powered fluorescent lamps, better known as 'Prashakthi' promoted many entrepreneurs to set up manufacturing units to serve the rural areas not connected to the CEB grid.

In 1985 Centre was assisted by the UNDP to set up a Centre of Excellence for Energy Management. It has made remarkable progress by conducting over 100 energy audits and has helped industry to install and commission energy efficient plants and machinery. It has since acquired the competence in reducing noise in the factories to comply with the environmental regulations.

Agricultural engineering machines

The NERD Centre has successfully developed a cost effective modern storage method of preserving



paddy at farm level until it is sold at a high price. The bin has a similarity to the conventional paddy bissa, which is constructed using fibro cement technology. It has a 2,500 kg holding capacity, which is equivalent to 100 bushels of paddy. This is a completely airtight container constructed on three v-shaped vertical columns. At present three such bins have been constructed at Hindogama, Anuradhapura district,

Galamuna at Polonnaruwa district and Daraluwa in Kurunegala district and evaluated for socio-economic benefits by storing paddy obtained from the recent Yala harvest.

NERD has also developed a windmill water pump for agricultural and industrial purposes. Agriculture is the main livelihood of most of the population in the dry zone in Sri Lanka. However there is very low and uneven distribution of rainfall during the year. Therefore lift irrigation is essential to practise agriculture intensively. Wind energy is identified as one option to fulfill the energy requirement for lift irrigation in the dry zone. NERD's objective of this study was to predict the performance of the existing windmill-pump and modify a pump to improve its performance. The test results revealed that dimensions of the pump and size of the air vessels of the pump was modified to achieve optimum performance.

An economical paddy husk fuelled bakery oven to bake bread and other bakery products were invented by NERD. The main feature of this oven is that sawdust is used instead of firewood. This is ideally suited to start a small-scale bakery industry.

Engineering exhibits

Florescent lights operated on 12v

DC battery, fan regulators, optical switches, electronic soft toys, induction generators, florescent lamps with electronic ballast, school teaching aids and mini lab system such as motor principle, transformer principle, diode action, current rectification, alternative current, capacitor principles and gyroscopic phenomena etc. are exhibited.

The forced draft smokeless wood gas stove enables the wood to convert into wood gas and then burn releasing the heat to the pot on top. Wood or any biomass chips may be used. The main features of the stove are smokeless, portable, low body temperature and the overall efficiency is 34 per cent. A fan of 2 watts DC is used to supply air for gas generation and combustion. Residue is a few grams of ash. The total weight of this stove is 10 kg and the height is 50 cm.

The sawdust fuelled food dehydrator introduced by NERD is suitable for dehydration of vegetables, fruits, potatoes, jackfruit etc. for preservation.

The vegetable drier has the capacity of 25 kgs of vegetable matter per batch. The drying time is approximately four hours per batch in comparing with the designing calculation. The advantage of this type of drier is to keep certain humidity values constant or minimum fluctuation throughout the

drying period. The drying rate can be adjusted according to the desired level specified for a particular vegetable matter by the food technologists. This is ideal for testing purposes in a laboratory as well.

The bio gas system invented by NERD is the first pilot project in the country and has adequately demonstrated the technical viability of a truly local technology. It is built in an environmentally friendly and productive manner. This technology is applied to solve the problems of vegetable market garbage, water hyacinth and salvenia in the canal system in Wattala, Kandana, Gampaha and Ja-Ela area. In the process of anaerobic digestion, biogas will be produced and after the retention time of 4 months, the digested biomass will be further processed into organic bio-fertiliser.

The large-scale biogas projects produce a large proportion of biogas. Such an amount of biogas may be used for electric power generation. Through the feeding system of biogas an average of 60-65 per cent of diesel oil may be saved. The fuel saving device made by NERD helps in saving oil at 85 per cent - 89 per cent. Therefore the use of biogas in compression ignition engines seems to be a good proposition. NERD won an International Silver Medal from Geneva, in 1996 for this invention.