



SAIAE News Bulletin

South African Institute of Agricultural Engineers February 2007



Welcome to this first issue for 2007: Meet the new President, two most interesting articles, ICID's 2nd Africa Regional Congress and we have a look into SA irrigation in a global context as well as the astonishing world of mathematics in nature as explained through the Golden Ratio and Fibonacci.

Meet the new President in this issue. His colourful career contributed greatly to Agricultural Engineering. He was involved in research from 1979, until he eventually became involved in marketing at Eskom's Agrelek and later entered academics, where he is lecturing at two different Universities. He has been deeply involved in SAIAE throughout his career and his term as President is for two years. He also tells us of the political pressure that Agricultural Engineering has endured since 1994 and the academics went through a difficult time. He also mentions the proposed upcoming CPD event.

Agricultural Engineering students who earned the highest awards at engineering institutions are also mentioned in this issue. Two students and a Professor at BEEH received awards.

A very interesting article deals with the design and evaluation of a semi-mechanised sugarcane harvesting system by means of a modified brush cutter.

Enjoy!

Editor

From the Council

Meet the new President

Personal background

I started working at the former Division: Agricultural Engineering as an assigned student under the guidance of Mr Philip Henning and Mr Jeep Veenstra in the Animal Production Division in 1979. After a very eventful period at University, I obtained my B.Eng (Agric) degree at the University of Pretoria. The foundation of my career was laid at the former Directorate: Agricultural Engineering and Fisheries when I was co-responsible, with Ernst Kapp, for the milking machine test program. I also concentrated on animal housing, milk parlours, zero-grazing systems and the handling of animal waste.

In 1989, I sought greener pastures and started working for Westfalia Separator as sales engineer. I had to learn the flipside of the industry very quickly. The pressure on sales, marketing and client services in the private sector had me out of my comfort zone of research very soon. It was just a pity that the milking machine industry went through a difficult time during that period.

In 1991, Heinrich van der Merwe lured me to Bloemfontein where I started work for Agrelek, Eskom's marketing arm in the

agriculture in the portfolio: Agronomy and Forestry. I had to haul out my irrigation, cooling and drying manuals and understood thermodynamics for the first time. I frequented the doorstep of Mendel Eloff, young engineer, whose University knowledge was still fresh at that time. Agrelek was a very dynamic part of Eskom that developed new electrically-driven products for agriculture, marketed the concept and gave an after-sales service. I also had exposure to strategic planning and training of advisers. After Eskom scrapped the Agrelek trade name, I was allotted to the North-Western Distributor of Eskom in Bloemfontein as Product Development engineer in the Marketing Services department.

In my “free time” I act as part-time lecturer at the Department of Food Sciences at the University of the Free State where I present the subject Food Engineering and I am also part-time lecturer at the Central University of Technology where I present the subject Agricultural Engineering to the Agricultural Management students. I have also been elected as the President of the Free State and Northern Cape division of the South African Junior Golf Foundation for 2007

Involvement in SIAIE

I served on the SIAIE Council from 1997 to 1999 when I was the chairman of the Central-branch and was co-responsible, with Skillie Rautenbach, for the SIAIE-symposium in Port Elizabeth in 1999. After the exodus of Agricultural Engineers from Bloemfontein it was very difficult to keep the Central-branch going. It was then decided in 1999 that the members of the Central branch would join the Pretoria branch again. Former colleague and President of SIAIE, Louis Lagrange, involved me in the SIAIE Council again four years ago to handle the marketing arm of SIAIE.

It is a great honour and privilege for me to serve as the SIAIE President for the next two years. Since 1979, when I had my first exposure to Agricultural Engineering, men such as Jeep Veenstra, Jabie Bruwer and Charles Crosby, under who I served and who were a few of the pioneers and founder members of Agricultural Engineering and also of SIAIE, took the lead. About 10 years ago I

realised that some of these people are nearing the end of their era and that younger blood must start to take over in order for Agricultural Engineering to survive as a career.

Since 1994, with the new political dispensation, the number of Agricultural Engineering students came under pressure and began to decrease, so much so that the University of Pretoria had to close its doors for this degree. One of the main reasons is the name “Agriculture” that is attached to our profession. Thanks to the initiative of Prof. Peter Lyne, who led the change in the name of the school at the University of KZN to “Bioresources Engineering & Environmental Hydrology” (BEEH), a record number of students are reading for this degree, although the name of the degree remains BSc Eng (Agric).

Agricultural Engineering is currently identified as one of the scarcest professions in SA. There is a need for more than 50 students per annum to complete their studies to satisfy the needs of the country. The SIAIE Council is especially concerned about the fact that there are so few Afrikaans-speaking students who study in this field.

The previous President made a tremendous contribution to create a basis for the role of the Agricultural Engineer in the changing SA. I would like to follow in his footsteps and ensure that Agricultural Engineers and Technicians working in this field become more involved.

It is very important for the continuance of SIAIE and the survival of our profession that we should keep our members. It is however sad that members have to be suspended each year because of non-payment of fees for three or more years. We would also like more members to become more

involved in SAIAE activities. The Council must also guard against becoming its own worst enemy. We are going to try to bring SAIAE closer to its members. Our doors are open to criticism, since we see criticism in a positive way and we use it to build and to grow. Our doors are also open to any suggestions. We want members to speak to us so that we will know what their needs are.

We would also like to assist members to market their activities by making use of the radio talks that will be broadcast once a month, and to publish and advertise with us in the Landbouweekblad and Farmer's Weekly. We would also like members to make use of the SAIAE website, which is for members' use. The website will also be linked with the websites of other engineering organisations such as ECSA, CIGR, SETAG, NSTF, SANCID, ICID, SABI, etc, and will be maintained as in the past. We will also try to influence decision makers and to look for opportunities for our members. We constantly need publications from members that we can place in our newsletter, engineering magazines and other publications.

We will again have a "Multi-day" CPD Event for 2007, possibly in the Western Cape, where engineers can gather points to maintain their professional registration. We are also requesting members to contact us should they want to present CPD events in their region so that we can assist them in this

regard. We would like these events to be closer to the members so that more members can participate.

We will also try to do more marketing at schools and we want to make a standard DVD of all the different speciality fields and successes where agricultural engineers and technicians are involved in and we would appreciate any information. The initial costs for the making of the DVD can be high, but can be reproduced rather inexpensively afterwards. Our plan is to obtain sponsors to assist us with a large part of the costs. Companies will also have the opportunity to advertise on the DVD in the process.

All of us were students at one stage and we also went through the pains of paying for our studies. We are planning to obtain more bursaries as well as job opportunities. We also request from members that are in a position to assist students during holidays with temporary jobs to make contact with us. We also made a decision to make limited funds available for student loans.

Agricultural Engineering is a precious profession and close to our hearts and one that we should be proud of. Come let's join hands with SAIAE and build our profession to new heights and accept the challenges that the future will bring. Let's assist SAIAE to assist its members.

Neels Bezuidenhout

President

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BEEH STUDENTS SCOOP TOP AWARDS AT ENGINEERING SOCIETY AWARDS

Swastika Maney

The Faculty of Engineering at the University of KwaZulu-Natal held its 7th Annual Engineering Society Awards at the ICC Durban on the 1st December 2006.

The main objectives of the annual function are to acknowledge contributions from industry to the Engineering Faculty and to recognise both staff and students who have excelled in the faculty. At the banquet held on 1 December 2006, various categories of awards were presented to companies and organisations for their financial contributions and support of the Engineering Faculty during 2006. In addition, research productivity awards were made to staff for excellence in the research field, and 3rd and 4th year engineering students were recognised for their academic achievements in 2005.

Two students from the School of Bioresources Engineering and Environmental Hydrology (BEEH) received awards for their outstanding academic performance in 2005. Madimetja

Isaiah Mashamaite received the award for the best 3rd year Agricultural Engineering student and Nicola Bailey received the award for the best 4th year Agricultural Engineering student in 2005.

Prof Graham Jewitt, an academic staff member from the School of BEEH, also received an award for Excellence in Research Productivity.

Various industries were also recognised for their support of the Faculty. Awards were presented in three classes, viz. Platinum (for contributions over R1 million), Gold (R 0.5 million to R1 million) and Silver (R 0.25 million to R0,5 million). Organisations associated with BEEH and which received an award were the Water Research Commission (Platinum award) and AECI Ltd (Silver award).

Design and evaluation of a semi mechanized sugarcane harvesting system using a modified brush cutter

Prof. Jeff Smithers

Sugarcane is an important crop for South Africa. It provides employment and valuable foreign currency that stabilises the country's economy. In South Africa there are three sugarcane harvesting methods used, namely, manual, chopper and whole stalk harvesting of which manual harvesting is currently the dominant harvesting method. However, it is labour intensive and may be sensitive to issues, such as HIV/AIDS and the attraction of working in industry. The majority of South Africa's sugarcane is planted on steep topographies where mechanical harvesters are unable to operate. It has, therefore, become important to re-evaluate manual cane cutting devices in an attempt to make sugarcane cutting easier, cheaper and more efficient.

The objectives of the project undertaken by Mr Mathew Langton*, under the supervision of Professors Peter Lyne and Jeff Smithers and Dr Carel Bezuidenhout, were, firstly, to design a blade that can be attached to a brush-cutter to cut sugarcane effectively and efficiently and, secondly, to integrate the brush-cutter into an economically and ergonomically sound sugarcane harvesting system. A brushcutter based harvester was developed, called the Illovo Sugarcane Harvester, and trials were conducted on the Lower South Coast to assess performance, efficiency, economics and blade durability. A major constraint with the design was the durability of the blade and this limitation contributes significantly to the cost of the system. Using the system it was found to harvest sugarcane effectively and economically but further aspects are outlined for further research.

An ergonomic study was performed and the results suggest that significantly less energy is required to harvest sugarcane per ton compared to manual harvesting. More energy is, however, required in a work shift and might be detrimental to the labourer. An additional study was performed on the lower back, which is often the leading cause of musculoskeletal disorder experienced in the workplace.



Results were favourable and clearly showed that there is less stress and strain on the back when using the semi-mechanised system compared to manual harvesting. The system was implemented in a commercial environment and as a consequence several recommendations are made. These included further refinement of the brush cutter and the development of a system for topping and windrowing. If the system is adopted by the industry, it is estimated that there is a potential saving for the industry of over R4 million per annum as a result of increased productivity and a 30% reduction in labour costs. Less effort is required to operate the brush cutter and this should make the job more attractive.

* MSc Engineering student and Agricultural Engineering graduate from the School of Bioresources Engineering and Environmental Hydrology (BEEH) at the University of KwaZulu-Natal

ICID – 2nd Africa Regional Congress

The Second South African Regional Conference of ICID (International Commission on Irrigation and Drainage) will address the contribution of rain-fed and irrigated agriculture in Africa. These aspects will be discussed in depth with the focus on the five important assets in agriculture (natural, social, human, physical and financial capital) to find creative solutions by means of increased productivity to alleviate poverty in Africa. SANCID (South African National Committee on Irrigation and Drainage), in collaboration with SARIA (Southern African Regional Irrigation Association) are organising the conference,

which is of world interest for all professional persons involved in the management of agricultural water.

The conference will also present an opportunity for representatives from all countries to meet their fellow experts in Africa and exchange knowledge on these subjects. The conference takes place in Johannesburg at Glenburn Lodge in the newly declared World Heritage Site, “Cradle of Humankind”, from 5 November to 9 November 2007.

For further information, contact Felix Reinders at 012 842 4009 or find full information on www.SANCID.org.za

SAIAE Pretoria branch

Branch meeting and presentations

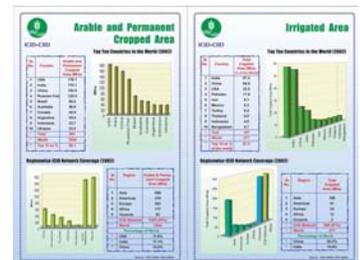
The Pretoria branch of SAIAE will be hosting a branch meeting on Thursday, 12 April 2007. It will be held on the ARC-ILI premises at Cresswell Avenue 141, Weavind Park, Pretoria. It will start at 18:00 and the costs are R30 per person. RSVP is for 5 April 2007 with FP Dafel at the Pretoria branch.

The evening should prove to be a great success and we are looking forward to the following presentations:

Irrigation in South Africa within a global context

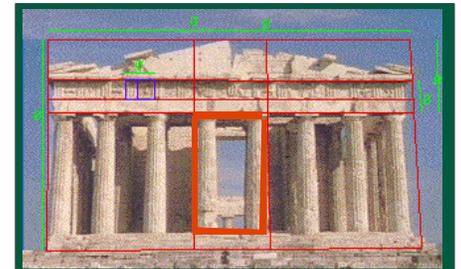
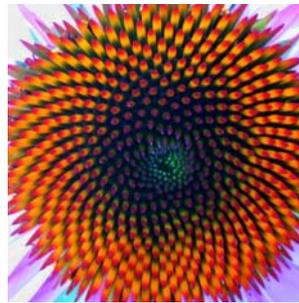
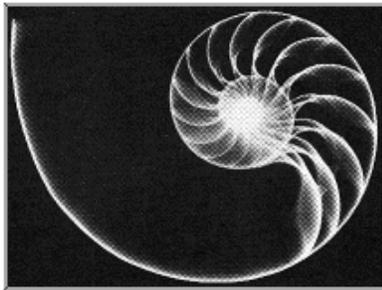
Felix Reinders - ARC-IAE

Felix will give a presentation on interesting facts and figures of water and irrigation in a global context. He will point out the impact of water availability and use for food production. Some interesting aspects of irrigation development in South Africa and internationally will also be discussed.



The Golden Ratio and Fibonacci

Francois van der Merwe - DWAF



Have you ever had a careful look at the petals of a flower? How are these beautiful patterns formed and how much do we know about the mathematics behind it?

Nature will never stop to astonish us and we should admit that the Creator that put everything together so neatly, is much more inventive than we may think. We see the Golden Ratio and the Fibonacci series in growing plants, in the colours of the rainbow and we hear it in beautiful music. From the

viewpoint of the natural sciences we may say that the universe is one huge computer program of which we have only deciphered the first few lines, but overall we start getting the feeling that the creation is an orderly and pleasant ensemble that demonstrates amazing harmony down to the most subtle detail.

In the next meeting of the Pretoria branch of SAIAE, you will be given an introduction into the astonishing world of mathematics in nature.