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SAIAE News

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South African Institute for Agricultural Engineers

SAILI is again conducting a member perception poll by means of a questionnaire

In this issue you will also find the very interesting distillation project of Mr. Colin Talanda.

We also report that the Dalein Group of Companies received the Golden Award from SAIAE.

The new SAIAE Council has also been announced and the names appear on page five.

Furthermore, the SAIAE history is now recorded and all possible contributions are awaited.

Read the interesting contribution from Mr. Geurt Bloem on the pioneering irrigation project in Nkomazi

Nominations for the ECSA council closed on 11 February 2005, but the notice is still included and the SAIAE Council has already been announced.

From the President's desk

To measure is to know

The new SAIAE Council was elected and although their first meeting is scheduled for April, they are already working behind the scenes on the aims and strategies for the coming two year term.

Firstly the market forces driving the SA Agricultural market are being identified, as well as opportunities. Regarding opportunities we consider existing as well as new opportunities opening up, or that should be opened up with specific reference to Agricultural Engineers. Then we determine strategies and relevant action plans and develop supporting infrastructure to attain our identified goals.

Simultaneously SAIAE is again busy with a follow-up of the members' perception survey similar to the 2004 study as part of feedback to the new council. These results will also be compared to the 2004 results to determine whether the SAIAE actions were successful. To measure is to know. Members will receive the survey questionnaire via e-mail or mail where no e-mail address is on record and are requested to endeavour to return it to Rika Reinders by the end of March. This will enable us to compute results for the Council meeting on 5 April 2005.
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THE DESIGN, CONSTRUCTION AND EVALUATION OF A MOBILE DISTILLATION UNIT USED TO EXTRACT ESSENTIAL OILS FROM HERBACEOUS MATERIALS

Colin Talanda, ARC-ILI

The ARC-Institute for Agricultural Engineering has developed a mobile essential oil distillation unit that can be used to isolate essential oils from herbaceous materials in areas where electricity is not available. Essential oils are volatile and odorous fractions are located within the tissue of various herbaceous materials. Once extracted, they are used as sources of aromatic and flavouring chemicals in food, industrial, and pharmaceutical products. Essential oils are high value, low volume commodities and present the opportunity to generate high incomes per hectare. As a result there has been a considerable interest from the agricultural sector in South Africa, especially from members who wish to diversify their farming operation.

South Africa has a diverse range of climatic areas that suit a large variety of oil bearing plants and also accommodates a range of indigenous plants from which essential oils are produced and are used internationally. The world essential oil demand is growing and South Africa has potential to develop and grow into an internationally competitive essential oil industry. Essential oil production in South Africa is not only suitable for commercial farming, but is also suited to emerging farmers in rural communities requiring economic upliftment.

With an essential oil steam distillation system the plant material is placed in a distillation charge vessel and is supported by a perforated grid under which the steam is injected by a steam generator. The steam

passes through the plant material and as it condenses, the oil glands are ruptured due to the release of its latent heat. The molecules of these volatile oils then evaporate. The vapour containing both water and the volatile oil compounds then passes through a condenser where they are condensed. The oil either floats on top of the water or sinks to the bottom, depending on its density, and can thus be separated.

The mobile distillation unit consists of two charge vessels, with the intention that the one vessel can cool down and be emptied and reloaded respectively while the other vessel is distilling, thus increasing the productivity of the unit. The vapours from either charge vessel can be directed to the multi-tubular condenser mounted between the charge vessels, by a three-way valve. The condensate then passes from the condenser into a separator where the oil is separated from the water.

A basket mechanism is used for charging and emptying the charge vessel. With this method, a basket filled with plant material supported by a grid at the bottom of the basket, is placed inside the vessel. Once a distillation is complete, the entire basket is lifted out of the vessel, by means of a crane fitted with an electric hoist powered by a generator. The basket is then emptied and reloaded next to the still at ground level. The distillation unit and the crane are mounted onto a trailer and the diesel fired steam generator with its ancillary equipment together with a generator is mounted onto the second trailer. The trailers can thus be parked alongside each other and the flexible hose transferring the steam from the steam generator to the distillation unit can be connected as illustrated in Figure 1.



Figure 1. Mobile essential oil distillation unit in operation.

The area that the distillation unit can serve for the various crop types are illustrated in Figure 2 below. It must be noticed that the areas were calculated by assuming an average of five distillations per working day during the harvesting season under ideal circumstances i.e. maximum plant production per hectare. Field tests have been conducted with lemon grass, rose geranium and lemon balm and satisfactory results were obtained.

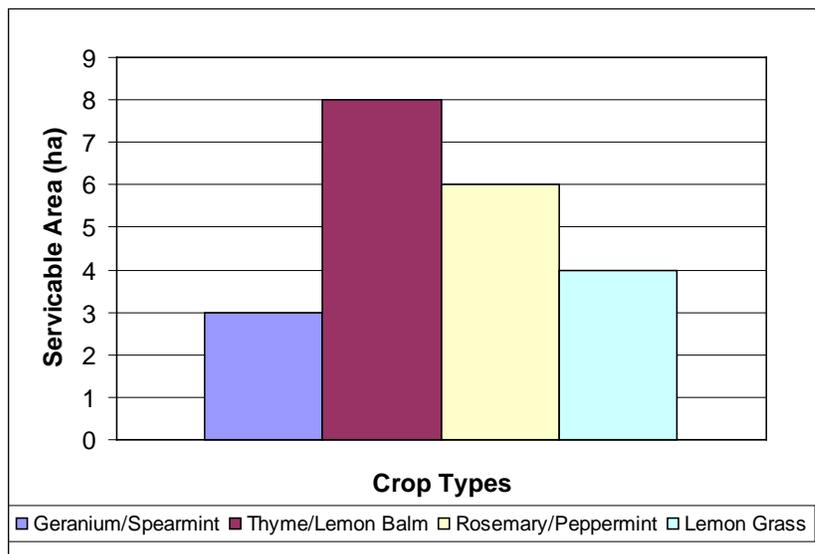


Figure 2. Crop areas that the distillation unit can serve with an average of five distillations per working day during the harvesting season.

Dalein group receives golden award

Congratulations to the Dalein group of companies which received a golden award from SAIIE for their role in the Agricultural Engineering field in South Africa. This company received this award for the following aspects:

Background

The Dalein group of companies was founded in 1976 with the establishment of Dalein Plaasbou (Edms) Bpk (intensive animal housing systems) and has grown with the addition of Dalein Agriplan (milling and mixing equipment), Dalein Voere (stock feeds) and Dalein Estates (piggeries for demonstration and training purposes).

The company as employer

The company was operated as a one-man business for the period 1976 to 1982. Since 1982, one additional professional engineer was appointed and a second in 1994. From 1997 to date, three full-time engineers are employed.

Activities and technology development

The group of companies delivers a comprehensive professional service to farmers and farming organizations. This includes, among others, farmyard planning, handling systems for cattle on farms and at abattoirs, handling systems for sheep, shearing sheds, cattle feedlots, bull pens, fodder processing facilities, complete pig, chicken, and milk feeding systems. Equipment has been designed, tested, upgraded, and optimised continuously over the past three decades, for use in South African conditions.

Among the projects and clients handled, are Mangweni Dairy in the former Kangwane, Dept of Public Works, Animal Improvement Institute Irene, SA Development Trust in KwaNdebele en Kanhym Investments Ltd. Dalein Plaasbou was contracted as sub-agent for the design of handling facilities for the Pyramid abattoir at Pretoria.

This was the first of its kind in the Republic of South Africa and the company Burger and Pretorius Inc., as main agent, received a silver medal for this project from the South African Institute of Civil Engineers.

Over the past ten years, Ibis Piggery at Pietersburg and Penvaan Estates at Vryheid, as well as Taaibosch Boerdery at Fochville, were upgraded with Dalein Plaasbou technology. These units represent the Agricultural Engineering profession well.

The company also consists of a newly built ultra-modern 650 sow unit piggery, in which various housing techniques are demonstrated and tested under commercial farming conditions.

Dalein Agriplan is currently the leader in coarse fodder handling, as well as the automation of feed mills. A unique automated system of evaporation-cooling in intensive housing systems for pigs and chickens was also developed locally as a first and is currently presented country-wide.

Involvement in training and publications

Various final-year thesis projects were sponsored for students over the years. An annual thesis prize has also been awarded for many years.

Except for Dalein Heyl's own sons (also agricultural engineers), one student was provided with a full study bursary over four

years and another's study bursary was redeemed from the government.

Final year students at the University of Pretoria are received for a **training visit in pig housing** annually. Training courses in pig farming management has also been presented to advanced diploma students of the then Pretoria Technikon.

Various scientific and popular articles have been published in the *SAIAE Journal*, *Landbouweekblad*, *Farmer's Weekly* and *Porcus* over the years.

Achievements

The need for mixing own pig, cattle, sheep and chicken feed gave rise to the design and building of a mini-mill.

An ETA (Eskom's Effective Energy Design Competition) award was won in 2002 in the category industry, commercial, agriculture, and residential. The cost-effective, dust free milling and mixing equipment with electronic control for the manufacture of stock rations was the category winner.

The new convection-ventilated house design was entered in the 2004 ETA awards and has already reached the panel round at the time of going to press.

The group of companies has made a substantial difference to the South African agricultural market over the past three decades. It has put across the Agricultural Engineering Profession to students as well as agriculturalists in South Africa in a professional and responsible way.

The new SAIAE Council for 2005 to 2007 has been announced:

Louis Lagrange	President
Adriaan Louw	Immediate Past President
Johann Fuls	Branch Chairman – Pretoria
Chris Venter	Branch Chairman – Western Cape
Dan Ciolkocz	Branch Chairman – KZN
Neels Bezuidenhout	Council member
Jeff Smithers	Council member
Massoud Shaker	Council member
Felix Reinders	Honorary Secretary

Please send your contributions not later than the 15th of the specific month to the Editor at fax: 012 804 0753 or e-mail vdMerweD@arc.agric.za

SAIAE: LIVING HISTORY

40 YEARS

(1964 – 2004)

The South African Institute of Agricultural Engineers has just celebrated its 40th year of existence. To conserve this historic milestone, the history is now being recorded. Anyone who has information, photographs, stories, etc. are requested to send contributions to SAIAE for possible inclusion. The possible framework in which the history will be recorded is as indicated.

Contributions can be sent to:

SAIAE-history, P.O. Box 912719, Silverton, 0127 or reindersr@arc.agric.za. If possible, we would like to receive contributions by 18 February 2005.

We look forward to each contribution!

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THE NKOMAZI MIRACLE

Geurt Bloem

For probably the first time in Africa the hard discipline of engineering had maintained a strong focus on social and environmental issues.

MBB harnessed technology to make the management of the irrigation systems simpler for the local farmers. Although the schemes are essentially communal, systems were designed which allows each farmer to take responsibility for the success, or failure, of his farming enterprise.

The Nkomazi Irrigation Expansion Programme was conceived as a result of the granting of 7 200ha of water rights, the establishment of the R600 million Komati Sugar Mill and the issuing of sugar quotas to small growers. The sugar industry's contribution of training and post-development funding, in the form of the Financial Aid Fund (FAF), completed the necessary ground work.

The then Premier Mathews Phosa had high praise for the development which has brought social, economic, farming and environmental successes to the region.

"This unique programme has helped to spread economic growth and development and wealth across the board in an organised way," said Mr Phosa, who believes the programme supports the Maputo Corridor concept and provides neighbouring countries with a valuable development model.

For probably the first time in Africa the hard discipline of engineering maintained a strong focus on social and environmental issues throughout a project. Community involvement was extensive and ACER (Africa) ensured that the people fully participated in all stages of the decision-making process.

Considerable time and energy were invested in surveying the political and social ground and overcoming initial stumbling blocks which included a highly sensitive political climate, a prolonged and serious drought and false expectations about the overnight creation of wealth from sugar cane. The fact that the seven projects stretched over land under the control of four tribal authorities also provided its challenges.

Project committees were formed in each community who, with input from the consultants, identified the development area, recommended farm sizes, selected the type of irrigation system and decided on the crop to be planted.

Labour intensive construction methods were used to create jobs. Also by subdividing contracts into categories about 60% of the work was awarded to emerging contractors. For more specialised work, joint appointments were made between experienced and emerging contractors. This enabled the emerging contractor to learn from a skilled and established one.

Membership information

The feedback of membership information is good and it is important that we receive everyone's information back. This request was posted to everyone on the 15th December 2004 and if you need a new form, you can send an e-mail to reindersr@arc.agric.za to get one.

Thank you for your co-operation

Process for establishing the next Engineering Council (ECSA) and obtaining nominations for persons to be appointed

(This was presented by e-mail with the January 2005 issue of SAIAE
Newsbulletin)

The term of office of the present Council (ECSA) expires in August 2005. Part of the process of appointing a new Council is the identification of Nominating Bodies who may be invited to submit nominations of persons to be appointed to the Council. It is important to note that it is the merits of nominees that are really important in formulating recommendations for appointment to Council, and not the attributes of nominating associations and bodies. Furthermore no association or body can be assured that its nominee(s) will be appointed to the Council. Once appointed, members of the Council serve in their personal capacity and not as mandated representative of any association or body.

Nominating Bodies consists of six very broadly defined groups of organizations that can be seen as having a sound knowledge of the circumstances under which engineering projects and products are delivered by persons registered under the Act and relating in particular to having a sound understanding of the effects on the members of society who are the end users of these projects and products.

- a) Statutory Bodies and corporations who are major employers of registered persons or who use the services of registered persons;
- b) Private sector business associations whose members employ registered persons or use the services of registered persons;

- c) Bodies representing institutions of higher education;
- d) Statutory Bodies concerned with standards in engineering education, training, competence and professional practices;
- e) Umbrella Organizations representing persons that can be regarded as users of engineering products or services.

A list of Nominating Bodies identified is included. Organizations whose names do not appear on the list are welcome to submit a motivated application for placement on the list. An application form is also included.

An open invitation to bodies wishing to be considered for inclusion as a nominating body will also be published on ECSA's Corporate Website (www.ecsa.co.za)

Applications for inclusion must reach Rina Marais by not later than 11 February 2005 – (rina@ecsa.co.za) – fax 011 622-9295.

Council and Committee Members are requested to peruse the list and to request organizations whose names do not appear on the list to apply for inclusion on the list.

**APPLICATION FORM
FOR PLACEMENT ON NOMINATOR'S LIST:
NOMINATING BODIES**

Name of Organisation:		Acronym:
Contact person:		
Title:	Initials:	Surname:
Designation of contact person (President, CEO, etc.):		
Postal Address:		Physical Address:
Tel No:		Fax No:
Cell No:		Website:
E-mail:		
Profile and Motivation		

Should you wish to submit more detailed documentation, attach documents to e-mail or fax.

Please return to Rina Marais by no later than 11 February 2005 at

Fax: 011 622 9295

E-mail: rina@ecsa.co.za

ACRONYM	NOMINATING BODIES
AMEU	Association of Municipal Electricity Undertakings (SA)
CoM	Chamber of Mines
COSATU	Congress of South African Trade Unions
CSIR	Council for Scientific and Industrial Research
CTCP	Committee of Technical College Principals
CTP	Committee of Technikon Principals
DBSA	Development Bank of South Africa
ESKOM	Electricity Supply Commission
FEDSET	Federation of Scientific Engineering and Technological Societies and Allied Professions
SAASTA	South African Agency for Science and Technology Advancement (formally FEST)
ISCOR	Iron and Steel Corporation
LEASA	Lift Engineering Association of South Africa
MBSA	Master Builders South Africa
MQA	Mining Qualifications Authority
NHBRC	National Home Builders Registration Council
NSTF	National Science and Technology Forum
PROCSA	Property Owners Council of SA
RCA	Refractories Contractors Association
SAACE	South African Association of Consulting Engineers
SABC	South African Broadcasting Corporation
SABS	South African Buro of Standards
SACOB	South African Chamber of Business
SAFA	South African Flameproof Association
SAFCEC	South African Federation of Civil Engineering Contractors
SANCO	South African National Civic Organizations
SANRAL	South African National Roads Agency Ltd
SAQA	South African Qualifications Authority
SAUVCA	South African University Vice-Chancellors' Association
SEIFSA	Steel and Engineering Industries Federation of South Africa
SENTECH	SENTECH
STE	Society of Telkom Engineers
TECHWAF	Techwaf
TELKOM	Telkom SA Ltd
TRANSNET	Transnet Ltd
SETAS	
CETA	Construction Education and Training Authority
CHIETA	Chemical Industries Education and Training Authority
DIDTETA	Diplomacy, Intelligence, Defense and Trade Education and Training Authority
ESETA	Energy Sector Education and Training Authority
ETDP SETA	Education, Training & Development Practices Sector Education & Tr. Authority
FIETA	Forest Industries Education and Training Authority
FOODBEV SETA	Food & Beverages Manufacturing Industry Sector Education & Tr. Authority

ISETT SETA	Information Systems, Electronics & Telecommunications Technologies SETA
LGWSETA	Local Government, Water and related Services Sector Education & Tr. Authority
MERSETA	Manufacturing, Engineering and Related Services Sector Education & Tr. Authority
TETA	Transport Education and Training Authority
TEXTILES SETA	Clothing, Textiles, Footwear and Leather Sector Education & Training Authority

... P 1. President

Membership fees in arrears are still a headache as well as the nameless electronic deposits of membership fees with no reference or name. A large part of Rika's time is spent linking these nameless deposits to the right members. Members are requested to help us with this issue. A word of thanks to members who reacted before 28 February 2005 on this request from the previous News Bulletin.

The book on the living history of SAIAE is progressing well, with a word of thanks to members who contributed and in particular to Mr. J Veenstra as author.

In the next issue the new council's strategic plans will be discussed.

Kind SAIAE regards

Louis

----- Urgent message -----

**Please send your e-mail address to the SAIAE office at e-mail:
ReindersR@arc.agric.za**