


SAIAE News Bulletin

South African Institute of Agricultural Engineers December 2008

EDITOR'S NOTE

Welcome to the fourth and last edition of the SAIAE newsletter for 2008. This year did not pass without many changes for many of us – positively and negatively.

In this issue, we introduce you to our new Business Manager, Luther Siebert. He has been in our service since July and its full steam ahead for him.

Our President is wishing us all a very blessed Christmas and also discusses the Eskom question, which is still the actual subject of the day.

Christo Theron of Floppy Sprinklers tells us about a dream came true. Praktiseer forms part of the Tswelopele Irrigation Scheme and was revitalised by means of the RESIS Programme.

Read about the six interesting projects of the Agricultural engineering student of UKZN. Prof Smithers and Louis Lagrange explain more about it.

Erik van der Berg presented an interesting presentation on the Jan Dissels River catchment area. The article explains the various processes.

Felix Reinders tells us about the research conducted in order to improve the irrigation water in South Africa. This will also lead to the 'Guidelines for Improving Irrigaton Water Efficiency'.

Branch News from Dave Clark contains the 2008 CPO event. The theme was Energy, Water and Agriculture. Prof Simalenga also gave a presentation about E-farming: The role of Engineering.

Warm wishes for the coming season from the editorial staff

Ed: DvdM

COUNCIL NEWS

Neels Bezuidenhout
President

SAIAE Business Manager

The SAIAE Council approved the appointment of a business manager to assist us in providing a better service to our members. Luther Siebert has been in our service since 1 July and I would like to introduce him to our members.

Luther, also known as Siebie, started his career as technician at the National Institute for Water Research at the CSIR in 1960. He obtained his diploma at the then Pretoria Technikon. He progressed over the years to Chief of Technical Support Services. During this period he was responsible for microbiologic and chemical analyses on drinking water, river water, waste water and anaerobic digesters.

Luther was also appointed as project leader in analytical services at the Water Technology division of the CSIR, where he was mainly involved in the accreditation of a laboratory according to ISO 45001.

After Luther was appointed as laboratory Manager at Waterlab, it didn't take him long to progress to Managing Director of Waterlab, before his retirement in 2007.

Luther's functions will basically be a supportive function for the strategic objectives of SAIAE and he will work closely with the SAIAE Council members and secretary. These functions include, among others, the following: ***P3***

SEASON'S GREETINGS - 2008

Neels Bezuidenhout
President

The past year has yielded various matters of interest. The growth in the South African economy just started picking up speed when Eskom suddenly and inevitably had to apply load shedding to protect its network against total collapse. It would have taken Eskom 14 days to get the networks to operate normally again.

Needless to say, it has an influence on the growth of the economy and businesses and agriculture was forced to make adaptations in terms of acquisition of standby units, adjustment of working hours and even moving some high energy consumer processes to outside the Eskom peak hours. Some businesses had such great losses that they had to close down. Changes even had to be made in peoples' private lives. A great demand for alternative energy, energy saving equipment and the use of standby units was created. It was heartening to see that e.g. irrigation farmers started showing an interest in more accurate methods of water scheduling.

As a result of the cooperation of the mines to save at least 10% electricity and Eskom's campaign to make the public aware of the importance of saving 10% electricity on the national network, load shedding was partially prevented. Since Eskom's turbines are currently working almost at full capacity, a stage is foreseen when they will have to be serviced and it may occur that load shedding will have to be applied again during these periods.

To top it all, the fuel price has sky-rocketed and at the same time the inflation rate and increase in interest. Just when we thought the fuel price was going to drop, the Rand lost its value and Japan declared a recession. The reduction in fuel prices and rumours that the inflation rate is dropping and that interest rates will possibly reduce in 2009, lets us see a light at the end of the tunnel again.

This is however part of the macro-climate over which we have no control. We do however have an influence on the micro-climate. This is where the agricultural engineer can play a great role to show initiative and continuously think innovatively to create designs and processes that are as effective as possible and to develop as many possible solutions for alternative energies.

One of the highlights of the year was the multi-day CPO event that was presented by our KZN-branch in September in Howick. It was a great success and almost 150 SAIAE members came to listen to the interesting relevant presentations and exchanged ideas. We appointed a business manager for SAIAE in July to assist us with our website, improve communication with the members, to help with the general arrangements of the CPO events and marketing to increase our student and member numbers in this way.

We also developed a general pamphlet on agricultural engineering in cooperation with At van Coller and his Department. This pamphlet will be distributed at schools to recruit students, as well as at farmers' days and shows, in order to promote the work of the agricultural engineer and so create opportunities for our members. A DVD to support this pamphlet should be available by the middle of 2009.

We look forward to the challenges that 2009 will offer and may you all have a blessed Christmas and a prosperous 2009. Drive safely wherever you may venture.

Praktiseer – Turning Dreams into Reality

Christo Theron – Floppy Sprinklers

Praktiseer forms part of the Tswelopele Irrigation Scheme in Limpopo Province. It was initiated and implemented by the Limpopo Department of Agriculture as part of their "Revitalisation of Smallholder Irrigation Schemes" (RESIS) programme.

Through this programme the Limpopo Department of Agriculture re–vitalizes old irrigation projects throughout the province in order to uplift impoverished communities by creating jobs, income and downstream small business opportunities. A key requirement of the RESIS programme is modern water saving irrigation technology.

This requirement made the Floppy Sprinkler overhead cable system the preferred irrigation technology for the local beneficiary farmers. Other advantages of the Floppy Sprinkler overhead cable system include:

- Any size or shape field can be irrigated, without fall-out corners and is ideally suited for broad acre crops.
- An unlimited variety of crops can be planted under the system.
- Free passage of large agricultural implements.
- Accurate, effective and efficient fertigation, chemigation and foliar feeding as it is a solid set system with a regulated flow controller.

One of the key advantages is that the local community members could be involved in the actual installation of this project.

Mr. Arthur Creighton is the strategic partner of the Tswelopele community and planted 310 hectares of potatoes during the first season of operation with outstanding results.

350 ha Potato crop at Praktiseer

The Floppy system is highly effective and saves water as well as electricity. It lends itself to precision farming. The system at Praktiseer is fully automated. For the coming year another potato crop will be planted, crop production and systems operations training and skills transfer will be continued and enhanced. It is envisaged that the local farmers be trained to a level where they will eventually be able to make all their own decisions without the assistance of a commercial farmer.

As the MEC Me Dikiledi Magadzi Magadzi said during the handover ceremony of the Tswelopele Irrigation Scheme "The farmers have just begun their journey of economic freedom...."

This project is a true reflection of transformation, with it comes the opportunity and responsibility for a community to become self sustainable and economically independent.

For more information, contact Floppy Sprinkler at 013 752 4252, or visit their website at www.floppysprinkler.com.

Luther Siebert

- Marketing of Agricultural Engineering by coordinating and collecting of information for our web page, articles for magazines and our newsletter, radio talks and advertisements.
- Obtaining of sponsors for SAIAE and bursaries for the students.
- Support and coordinating of CPD events.
- Collection of arrear membership fees.
- Administrative support

Welcome to SAIAE Siebert. We look forward to having you as part of our team and to help SAIAE reach new heights.

Design Projects by Final Year Agricultural Engineering Students in the School of Bioresources Engineering at the University of KwaZulu-Natal

Prof JC Smithers and Mr LF Lagrange

Six design projects were undertaken by the 2008 final year Agricultural Engineering students in the School of Bioresources Engineering at the University of KwaZulu-Natal.

The first project, undertaken by Frank Maidi, Sfundo Nkomo and Raishan Naidu designed, installed and evaluated the use of a heat pump for heating and cooling a chicken broiler house in order to provide optimum conditions for growth. The schematic layout of the hydronic heating and cooling system is shown in Figure 1 and the heat pump and storage tank is shown in Figure 2.

*Figure 1 Schematic layout of syste*m

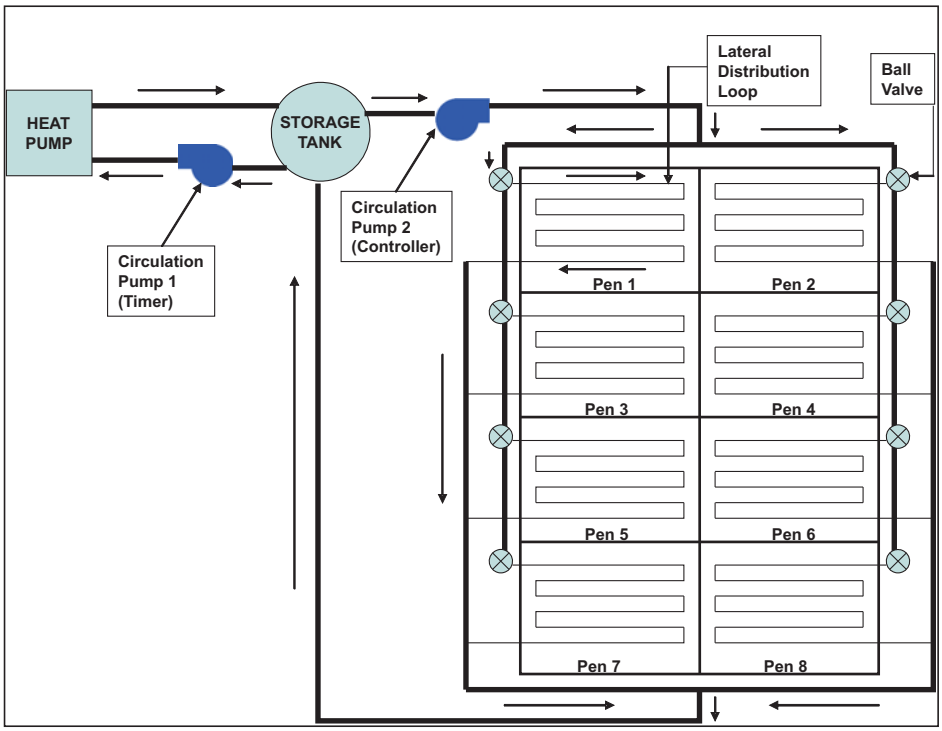

Figure 2 Heat pump and storage tank

The second project was undertaken by Bruce Fraser and Devon Neethling who designed, constructed and evaluated a manual planter to operate under no-till conditions. The planter is shown in Figure 3 and consists of a frame and handle, seed hopper, a precision seed metering mechanism, a seed delivery tube, a ground opening device and seed placement ability. The planter was evaluated by comparing the performance when planting using a conventional hoe or using the no-till jab planter and the improved performance of the jab planter is evident from the results shown in Figure 4. This project received awards for the best design project – well done Bruce and Devon!

Figure 3 No-till jab planter

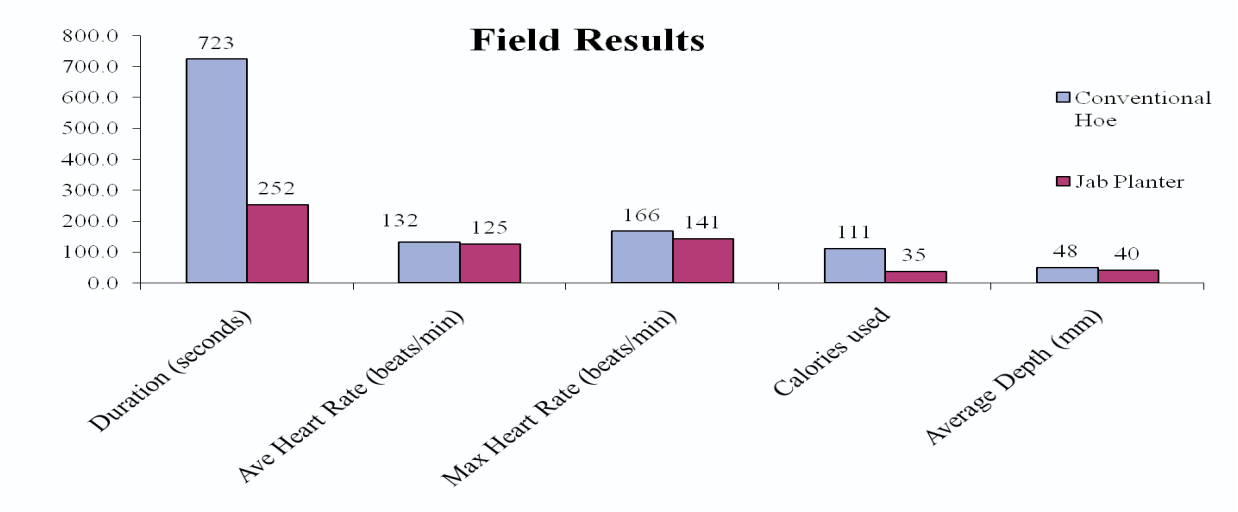

Figure 4 Performance of maize planting using a conventional hoe and jab planter

The oil produced by algae has the potential to be converted into biodiesel and much interest is being shown internationally in this source of energy. The project team for the third design project was Mamashege Lebotsa, Mahlatse Mamabolo and Mkhanyiseni Zimu who designed, constructed and evaluated an experimental micro-algae production system with a control system for varying the growing conditions of micro-algae and included a harvesting and drying system. The schematic layout of the system is shown in Figure 5 and the constructed system is shown in Figure 6.

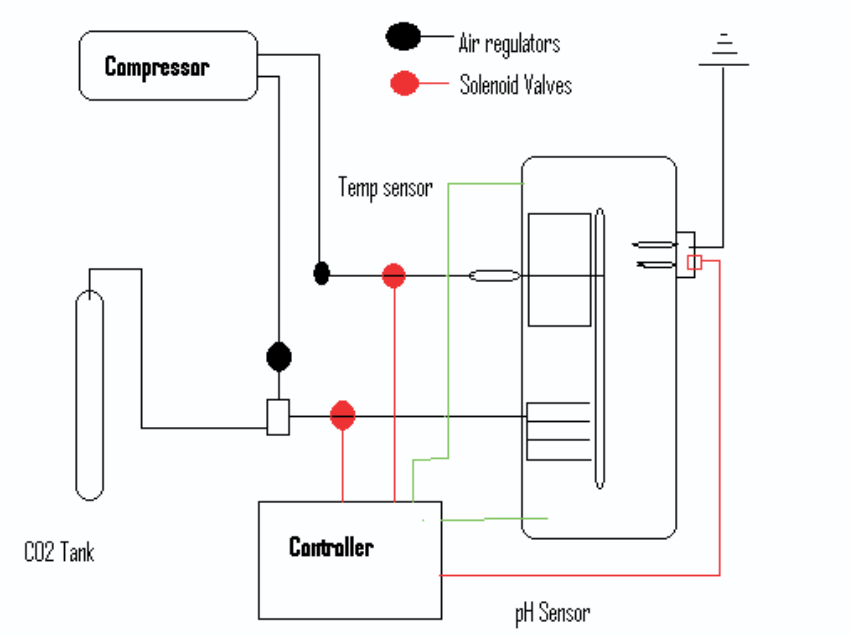

Figure 5 Schematic layout of micro-algae production system

Figure 6 Experimental micro-algae production system

The fourth design team consisting of Nkosinathi Ziqubu and Buyisiwe Thwala designed a small scale pyrolysis device for charcoal production in rural areas. Buyisiwe completed the construction of the device, as shown in Figure 7, and performed the evaluation.

Figure 7 Pyrolysis device for charcoal production

The fifth design team consisting of Thandeka Meyiwa and Keamogetsoe Maroo designed, constructed and evaluated a multifunctional biomass cooking and heating device, as shown in Figure 8. The performance of the stove was compared to commercially available stoves, which have less functionality, and recommendations for improvements in the design were made.

Figure 8 Biomass cooking and heating device

The sixth design project was undertaken by Phalane Lebotsa and Lungisani Dladla who designed, constructed and tested a manually powered honey extractor, as shown in Figure 9. A solar heating device to prevent breakage of the combs in cold conditions was included in the project.

Figure 9 Human powered honey extractor and heating system

Projects 3, 5 and 6 were sponsored by the Institute of Agricultural Engineering at the Agricultural Research Council and Prof Timothy Simalanga and colleagues at the ARC are gratefully acknowledged for their funding and contributions to the projects.

Mr Richard Robertson from MBB Consulting Engineers and the KZN-SAIAE branch are thanked for making available awards for the best design project. Figure 10 shows mr Mark Zartmann of MBB presenting the prize for the best final year project to Devon Neetling (left) and Bruce Frazer (right)

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Figure 10: Mark Zartmann of MBB presenting the prize for the best final year project to Devon Neetling (left) and Bruce Frazer (right)

Gedore Tools (SA) has also strengthened its ties with UKZN by providing a prize to the student with the best workshop practice and which was awarded to Bruce Fraser.

Figure 11 show Mr Vincent Cikes, National Sales Manager for Gedore presenting a set of high quality Gedore tools to Bruce Frazer.

Figure 12 shows SAIAE president, Neels Bezuidenhout, presenting the SAIAE shield for the best design project to Devon Neetling and Bruce Frazer.

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The food and drink at the KZN-SAIAE branch meeting, where the students presented their projects, was sponsored by LRI and Mr James Brodie is thanked for this generous contribution.

COMPULSORY LICENSING IN THE JAN DISSELS RIVER CATCHMENT

E. van der Berg[1]

Equitable access to water, and its benefits, is critical to eradicating poverty and promoting growth in South Africa. In the midst of increasing social and political pressure, the Department of Water Affairs and Forestry (the DWAF) need to authorise water use that will lead to improved livelihoods for the poor and will significantly contribute towards Water Allocation Reform (WAR). Within this context, the DWAF is implementing the structured consultative Compulsory Licensing (CL) process in prioritised areas, of which the Jan Dissels River catchment is one.

WHAT IS WATER ALLOCATION REFORM?

WAR is the Department's key programme for redressing inequities in access to water for productive purposes. There are many routes by which WAR could potentially be attained, of which CL is but one.

VERIFICATION AND THE COMPULSORY LICENSING PROCESS

Verification is a process to check the volume of water registered by existing users and its lawfulness under previous legislation, so as to certify the extent of existing lawful use (ELU). CL is the primary mechanism by which the NWA allows the DWAF to review all water use in a catchment and to reallocate water if necessary. The CL process entails:

a. Verification;
b. Determining opportunities for use;
c. Empowerment process;
d. Identify curtailments needed;
e. Developing a framework for water allocation;
f. Call for licences;
g. Proposed allocation schedule (60+ days);
h. Preparation of a Preliminary Allocation Schedule (60+ days);
i. Preparation of a Final Allocation Schedule (60+ days);
j. Issuing of licences.

THE JAN DISSELS COMPULSORY LICENSING STUDY

Study Objectives

This study was one of three national pilot studies. The objective is to identify issues and to develop and test approaches and to learn lessons for future application, or not, of compulsory licensing.

Main Study Findings

- Determination of 'Existing Legal Use' was done to establish current water entitlements. Larger water users used the local attorney and in 90% of the cases these issues were resolved. Smaller water users were generally not very cooperative.
- Specific opportunities for the further productive use of water, with particular emphasis on HDIs and communities, were determined. There are three groups within the local community: the Masekhane farmers, the Clanwilliam Beginner Boer (Emerging Farmers) and various farm worker groups.
- An initial range of potential opportunities was assessed against a standard set of criteria for identifying viable opportunities and assessing the enabling environment.
- "Good practice" irrigation water requirements of specified crops for the Jan Dissels River catchment were estimated to increase the accuracy of the system modelling and to establish defendable application rates which can be used in the formulation of the Water

Allocation Plan

- The amount of both surface and groundwater that is available for allocation, after having made provision for ecological riverine requirements, was determined.

Empowerment Programme

An empowerment programme was undertaken to enable HDIs to meaningfully participate in the process of developing the Water Allocation Plan and to assist them to make productive use of any water that is allocated under compulsory licensing.

Water Allocation Plan

The Water Allocation Plan reconciles the water requirements with the water resources available for allocation in the Jan Dissels River catchments. The focus of the Water Allocation Plan is on the period of water stress. There is already over-abstraction under existing water use patterns. Because of the fragile balance between existing water use and the economic vulnerability of the predominantly agricultural users, the most suitable reform approach will be adaptive management, to allow for adaptation and gradual managed reforms in water use.

Water Balance Scenario Evaluation

A number of management options are available to improve the catchment water balance situation:

- Reduce water user entitlements (curtail allocations) to a best-practice level of benchmarked efficiency for each crop;
- Switch municipal water use from the Jan Dissels River to the Clanwilliam Dam during the dry season;
- Switch water use by the lower section irrigators from the Jan Dissels River to the Clanwilliam Canal or the Olifants River;
- Use alternative water sources such as groundwater; and
- Store excess water from the wet season in off-channel storage.

CONSIDERATIONS

The current water use in the Jan Dissels catchment is both highly inequitable and severely detrimental to the environment. The NWA and the CL process provide an opportunity to catalyse redress and water reform, and to concurrently improve both efficiency and equity in water use, and focus management attention on an increasingly scarce resource. All processes will however have to be carefully facilitated, and developed over time.

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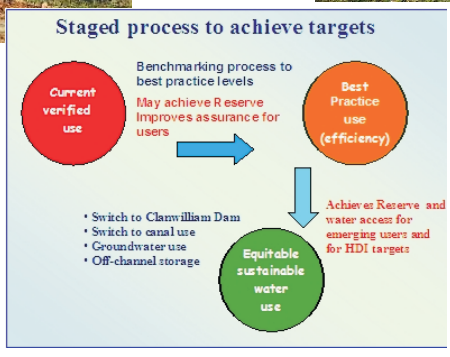
Jan Dissels River valley

Agricultural college with Clanwilliam and the Jan Dissels River in the background



Process to reach a water balance

Research to improve the efficiency of irrigation water use in South Africa

Felix Reinders Pr Eng, FSAIAE
ARC-IAE

The evaluation of one of the 75 irrigation systems

South Africa's water resources are limited and scarce. The situation is worsened by the occurrence of droughts and the increasing demand associated with population growth and a developing economy. As a country, we are approaching the full utilization of our available resources.

Irrigated agriculture is the single largest user of water in South Africa. Around 60% of supplied water in the country is used for irrigated agriculture. With expansion of domestic and industrial water use, competition for the existing lawful use in irrigation will increase. The question one must ask is, is this irrigation water being used optimally? Farmers are often blamed for misusing water but using water for irrigation is part of a farmers' livelihood and results in the food and fibre that they provide to our country. Vitally important research is therefore taking place that is aimed at helping farmers better utilize this water – an outcome that is in the interests of the entire country.

It is to this end that the Water Research Commission is funding a research project, titled "**Standards and Guidelines for Improved Efficiency of Irrigation Water Use from Dam Wall Release to Root Zone Application"**. The research is aimed at improvement of the overall irrigation water use efficiencies for the benefit of all.

The research is carried out by a team of experts from a consortium of institutions (research bodies, universities and private consultants) with the ARC-Institute for Agricultural Engineering as the leading agency.

The objective of this project is to evaluate appropriate measurement tools, propose best management practices and formulate guidelines to improve conveyance, distribution, on-farm surface storage, field application, soil storage and return-flow efficiencies of irrigation water use.

The project focuses on acquiring, synthesizing and transferring of contemporary knowledge on irrigation water use efficiency in South Africa. It will include efficiencies from dam wall release to root zone application on selected irrigation schemes. From the investigation, practically achievable best management practices (BMPs) will be proposed based on potential efficiency levels/standards/benchmarks.

The data obtained from the selected locations will be used to determine typical efficiency levels for the selected schemes on an engineering, soil science, agronomic and economic basis. These efficiency levels will be expressed as achievable benchmarks.

*The research will result in **Guidelines for improving irrigation water use efficiency**.*

SAIAE National CPD Event 2008
Dave Clark

The KwaZulu-Natal branch of the South African Institute of Agricultural Engineers organised a two day national Continuous Professional Development (CPD) event which was held on 22 and 23 September 2008 at Fern Hill Hotel on the Midlands Meander near Howick in the beautiful KwaZulu-Natal Midlands.

The main theme for the CPD event was ***Energy, Water and Agriculture***. The keynote speaker was Mr Andrew Etzinger from Eskom who updated us on global energy trends, the energy situation in South Africa and what is happening at Eskom.

During the two days of the event 35 speakers shared their knowledge and experience with us in a selection of presentations divided into 4 focus areas: *Energy and Agriculture; Water and Agriculture; Small-Scale Agriculture;* and *Bulk Transport Optimisation*.

The speaker at the dinner was Professor Timothy Simalenga from the ARC and in his speech titled "*E-Farming: The Role of Engineering*" he not only entertained us but urged us as engineers to think innovatively.

There was an encouragingly large turnout of 150 delegates, which includes the 35 speakers, and there seemed to be a lot of networking taking place outside on the lawn during tea breaks. Fern Hill Hotel looked after us well with a pleasant venue and delicious food for teas and lunches and at the event dinner.

Snippets

The XVII CIGR World Congress 2010

Québec, Canada, 13 – 17 June 2010
http://www.bioeng.ca/Events/CIGR/index.htm

The XVIIth World Congress of CIGR will be held in Quebec City, Canada, 13 – 16 June 2010. The Congress will be hosted by the Canadian Society for Bioengineering / Société canadienne de génie agroalimentaire et de bioingénierie (CSBE / SCGAB), which will jointly organize its 52nd Annual Conference.

At the present time, three other groups have confirmed that they will join the Congress. The American Society of Agricultural and Biological Engineers will hold its IXth International Drainage Symposium during the Congress. The American Ecological Engineering Society will organize its annual meeting in Quebec City within the CIGR Congress. The World Conference on Computers in Agriculture will also hold its annual meeting jointly. The presence of these groups will enhance the potential for scientific exchanges.

The website for CIGR 2010 is already available for those who plan to be a part of this international conference on agricultural and food engineering (www.cigr2010.ca). The website will be continuously updated in the coming months, with a call for papers in Spring 2009, abstracts are expected in Fall 2009 and full papers in February 2010.
We hope to see several of you at this meeting.
Dr. Philippe Savoie
Chair of the Scientific Program Committee of CIGR 2010
philippe.savoie@fsaa.ulaval.ca

Building Act withdrawn for now

Role players may suggest alternatives

Heléne Cilliers: Beeld 28 November 2008

It is a great relief for the Engineering Council of South Africa (ECSA) that the contentious suggested draft bill on professions in the building environment has been withdrawn for now.

The planned bill of the department of public works would have had the effect that the council for the building environment (CBE) that was established in 2000, would have to be changed into a “super council”, namely the South African council for the building environment (SAbce).

While the CBE has no executive function, all the councils of the different professions in the building environment would have lost their executive powers with the establishment of a super council. The councils would actually have disappeared and the minister of the works department would receive powers that was previously that of the councils, says Mr Bob Pullen, an engineer of BKS consulting engineers that serves in both ECSA and the CBE.

According to Pullen, the purpose of one super council I still there, but ECSA is concerned over how it would be done.

“It is now back to the planning phase. But more important still, ECSA will participate in the formulating of the way ahead to reach acceptable preambles for the professions and the public.”

“This means that we must create alternative models for consideration”

He says ECSA is now looking forward to the opportunities for real consultation, because there has not been real consultation thus far.

The problem that ECSA foresaw with the proposed super council is that every professional council in the building environment would lose its constitutional status and independence. The councils would have had no executive powers to register professional persons, set standards and apply discipline in the interest of safety and health of the public.

Pullen says that the greatest question regarding the draft bill is to reach transformation within the accepted criteria, but without reducing the current standards for training, registration and the safety and health of the public.

Another objection against the draft bill is that it would have done away with critical aspects of peer reviewing. This would mean that professional persons would no longer be evaluated according to specific standards.

Pullen says ECSA is “temporarily” relieved that the debate would e restructured since none of the professional councils could see such a super council functioning.

“My personal view is that significant improvement can be reached by alteration of existing acts and in this way empowering smaller professions to be financially supported so that they can eventually develop into sustainable professionals.”