

State infrastructure spending helps firms in tough times

Government's decision to maintain large-scale infrastructure investment despite the current tough global economic climate is a life saver for many firms in the consulting engineering industry.

According to Consulting Engineers South Africa (CESA) President Felix Fongoqa, consulting engineers should appreciate government's infrastructure development programme as it will keep the industry on track during present tough times. "CESA welcomes the budget news that spend on infrastructure will reach close to R800-billion over the next three years and finds it encouraging that government has prioritised Eskom, housing, water and sanitation and the Expanded Public Works Programme," said Fongoqa.



CESA President Felix Fongoqa with CE Graham Pirie

CESA plans to partner with government in ensuring that their investment objectives are realised. Fongoqa states: "Engineers are innovators that can rise to the challenge of ensuring that their designs allow for maximum use of labour during construction and that the ideal of sustainable development is achieved."

He is, however, concerned about the negative consequences of not focusing on the maintenance of existing infrastructure, particularly in the local government sphere, which has resulted in some municipal water and wastewater treatment works malfunctioning.

Test strip kits offer easy testing for algal toxins

International company Abraxis has released a much-needed addition to the tests available for cyanobacterial toxins.

Two new 'test-strip' products, these being the immunochromatographic strip tests for the detection of microcystins and nodularins in raw potable and recreation waters, with detection limits of up to, respectively 1 ppb and 10 ppb. The recreational kits are provided as sets of five or 20 tests. Kits are packaged in easy and read-to-use format for field application.

Local evaluations to underpin the validity of these products for South African use were successfully undertaken by the Nelson Mandela Metropolitan University in Port Elizabeth. The strips were tested at 14 dams.

Of the 14 dams sampled, three had significant cyanobacterial biomass. Two of these were positive for microcystin using test strips.

The university reports that the sensitivity and accuracy of the test strips were excellent. "We accordingly consider this product extremely valuable and support its use for general testing of potable and recreational waters where conventional methods are not available," the university said in a statement.

The availability of these tests now provides the ability to rapidly undertake toxin tests across a wide range of potentially-impacted water types – and precludes the often-lengthy delays between sample collection and the results of laboratory analysis. Additionally, veterinary officers and agricultural advisors are now able to conduct 'on the spot' testing in rural and farm environments.

The test strips are not available from local suppliers at present. For more information, visit: www.abraxiskits.com

Dry toilet system provides safe sanitation to thousands

More than 48 000 Enviro Loo on-site dry toilet systems have been installed since 1993.

According to manufacturer Enviro Options, while the award-winning toilet system was developed in South Africa and is still predominantly manufactured locally, it is now produced in other countries and distributed to 39 states. It is installed in urban and rural areas, schools, clinics, ecologically sensitive areas, camp sites and national parks.

The toilet requires only wind and radiant heat to function and works by separating liquid and solid waste as it enters the container via the custom-

by the ventilation extraction unit positioned on top of the outlet vent pipe with air being drawn into the container via the inlet pipes and toilet bowl.

The negative pressure within the container prevents the escape of any odour through the toilet bowl or through the air inlet pipes. The odour is vented into the atmosphere via the wind-driven extractor. The human waste is converted, via the stimulated bacterial and biological activity, into an inoffensive dry stabilised material. At this point it is reduced to roughly 5% of its original volume.

designed ceramic toilet bowl. Liquid waste drains to the bottom of the container while solid waste remains on the drying plate. Both the liquid and the solid waste are exposed to a continuous flow of air that is driven through the unit by the forced aeration ventilation system. The movement of air is assisted



**Report No: TT 366/08*****Membrane-related Water Research Impact Assessment (Frost & Sullivan)***

Water-related membrane research in South Africa has, to a large extent, been driven through funding made available by the WRC. This research has resulted in increased awareness, utilisation and a better understanding of the applications for membranes in South African conditions. The aim of this document is to highlight the impact of these membrane-related research activities and their benefit to South Africa. These benefits are broadly classified according to the economic, social, health and environmental impacts that the research has had upon the South African population.

Report No: 1079/1/08***Research on an Investigation into Sulphur Chemistry with Specific Application to Biological Sulphate Removal Processes (RE Loewenthal; B Morgan; O Lahav and G Hearne)***

The principal aims of this project were to investigate and model a sulphide chemistry on both aqueous and gaseous phases; to investigate and model the recovery of elemental sulphur through chemical oxidation of sulphide; and to investigate and model the precipitation and recovery of metals. With regard to sulphide chemistry, this is complex and governed by both weak acid and redox reactions.

In acid mine drainage, this is further complicated by the co-existence of both the carbonate, hydroxide and base systems. The only reasonable approach to understanding is via equilibrium chemistry. This is

effected here in a clear and didactic fashion, using graphical approaches effected in so-called equilibrium diagrams.

Report No: 1774/1/08***Scoping Study to Determine the Potential Impact of Agricultural Chemical Substances (Pesticides) with Endocrine Disruptor Properties on the Water Resources of South Africa (A Burger and A Nel)***

Some pesticides used in agricultural practice have endocrine disruptive (ED) properties which may contaminate South African water resources. Concern has been expressed that some of these pesticides may enter and pollute the rivers and dams and cause ED effects in animals and humans that use the water for drinking and recreational purposes. It is, however, not clear what the impact of these chemicals or their breakdown-products is on the water resource. The main objective of this study is to gather information to determine whether a larger study is justified to establish the impact of pesticides with ED properties in water systems of the country.

Report No: 1441/1/08***Membrane Fouling and Visualisation Studies (FJ Reinecke; DS McLachlan; MB Mbanjwa; J Ali and RD Sanderson)***

UTDR is a relatively recent and versatile in-situ, non-invasive measurement technique in real-time, which offers the possibility of monitoring the growth of a fouling layer online. The main aim of this research project was to apply the UTDR technique to describe membrane fouling that occurs in water purification plants. The basic goals were to obtain an improved method by which to visualise the initial growth of the fouling layer in-situ and to develop a technique that could be used to avoid, or at least reduce, membrane fouling, while monitoring the efficiency of such a technique by means of a non-invasive visualisation technique. It was envisaged that if fouling could be slowed down in the early stages then it could be reversible.

Report No: 1461/1/08***Assessment of the Interaction between Cage Aquaculture and Water Quality in Irrigation Storage Dams and Canal***

New from the WRC

Systems (K Salie; D Resoort; D du Plessis and M Maleri)

The aim of this study was to evaluate the potential use of open water systems, storage dams and canal systems, in particular, for cage aquaculture development. The addition of aquaculture into existing water structures can increase the production output per litre dam water, but only if aquaculture does not jeopardise the primary uses of these water bodies.

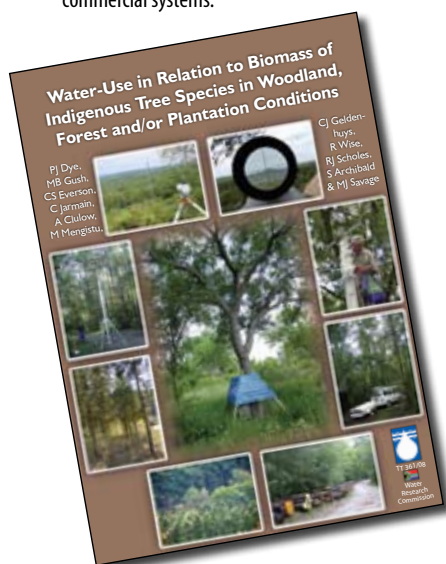
**Report No: TT 363/08 & 1301/1/08*****Improvements to the ACRU Salinity Model and Upgrading of the Berg River Water Quality Information System and Technical Instruments to Support Water Quality Use Allocation (JN Rossouw; W Kamish; F Clark; and AHM Görgens)***

The National Water Act prescribes the minimum components of a catchment management strategy and prime among these are the formulation of water allocation principles and a water allocation plan for each water management area. This project was proposed to focus on a very particular part of the water allocation challenge, namely the allocation of water quality use. An objective of the project was to effect a process of 'learning-by-doing' by applying the framework in a stressed catchment with water quality concerns. For this purpose the ACRU Salinity models were applied to the Berg River catchment.

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Report No: 1369/1/08***Development of a Membrane Pack for Immersed Membrane Bioreactors (VL Pillay & EP Jacobs)***

An immersed membrane bioreactor (IMBR) incorporates membrane filtration technology in a bioreactor to provide a single unit for biological treatment and high-quality effluent production. IMBRs offer various advantages over the conventional activated sludge process for wastewater treatment as it is a compact process with a small footprint; operates at an elevated biomass, has increased sludge age and reduced sludge production, among others. This project concerned the development of an inexpensive MBR technology for smaller scale applications that could fill the economic void left by the current commercial systems.

**Report No: TT 361/08*****Water Use in Relation to Biomass of Indigenous Tree Species in Woodland, Forest and/or Plantation Conditions (PJ Dye; MB Gush; CS Everson; C Jarman; A Clulow; M Mengistu; CJ Geldenhuys; R Wise; RJ Scholes; S Archibald and MJ Savage)***

Large areas of commercial forest plantations occur in the wetter regions of South Africa. While they contribute considerably to the economy and employment, the evapotranspiration from these plantations is substantially higher than from the original grasslands or fynbos that were replaced by afforestation. Thus, forest plantations have reduced catchment water yields in most areas. There is a widespread perception within South Africa that indigenous tree species, in contrast to the exotic pines, gums and wattle, are water-wise and deserve to be planted more widely in view of their more efficient use of

water. The overall aim of this project, which was co-funded by Working for Water, was to investigate rates of growth and water use by a wide selection of indigenous tree production systems and to make economic and hydrological comparisons to present commercial forestry systems.

Report No: 1542/1/08***The Removal of Reactive Dyes from Dye Liquor using Activated Carbon for the Reuse of Salt, Water & Energy (Z Mbolekwa and CA Buckley)***

The textile industry is characterised by high water consumption and is one of the largest industrial producers of wastewaters. Textile effluents from cotton dyeing represent severe environmental problems as they contain highly coloured and high conductivity wastewater resulting from dye baths and dye rinse waters, which contain unfixed dyes. The aims of this project were to establish the process parameters governing the recovery of water and chemicals for reuse from reactive dye baths using activated carbon and develop an economically viable process using activated carbon for recovering water and chemicals from reactive dyeing.

Report No: 1594/1/08***The Generation of Design Parameters for the Use of the Limestone Teeter Bed Reactor for Potable Water Stabilisation and the Treatment of Cape Coloured Waters (RG Batson)***

The main aims of this project were to demonstrate the use of the limestone teeter bed reactor in the treatment of Cape coloured waters and the stabilisation of soft, corrosive surface waters. The project also focused on developing design parameters for the construction of full-size plants based upon the application of limestone teeter bed technology.

Report No: 1581/2/08***An Intermediate Ecological Reserve Determination Study of the East Kleinemonde Estuary (L van Niekerk; GC Bate and AK Whitfield)***

The East Kleinemonde Estuary is situated about 15 km northeast of Port Alfred, in the Eastern Cape. The report features the findings of the East Kleinemonde Intermediate Ecological Reserve Determination Study. The study was undertaken for the Resource Directed Measures Chief Directorate of the Department of Water Affairs & Forestry as part of the WRC project on temporarily open/closed estuaries in the Eastern and Western Cape.

WATER BY NUMBERS

2 000 – The number of women engineers registered with the Engineering Council of South Africa. The figure has doubled since 2006.

98% – The percentage of bucket toilets eradicated in the Eastern Cape, according to Premier Mbulelo Sogoni. In his state-of-the-province address in February he said the province was working closely with the Department of Water Affairs & Forestry (DWAF) to eliminate the remaining 2%, constituting 1 400 bucket toilets in Tarkastad and Indwe.

88% – The percentage of households who had access to potable water in 2008, up from 62% in 1996, according to the South African government. Access to sanitation has increased in the same period from 52% to 73%.

1,4-billion – The number of people who live in river basins where their use of water exceeds minimum recharge levels, leading to desiccation of rivers and the depletion of groundwater, according to the United Nations.

258 555 – The number of households still lacking access to safe water services in Mpumalanga.

12 332 – The number of bucket toilets eradicated in Gauteng. According to Gauteng Local Government MEC Qedani Dorothy Mahlangu, the province is on track to meet the 2010 sanitation and 2012 electricity targets.

1 890 g – The grams per ton of gold found in the incinerated sludge ash at a wastewater treatment facility in Japan. An official in Nagano prefecture, northwest of Tokyo, said the elevated levels were probably due to the many precision equipment manufacturers in the area that use gold in their systems.

£125 000 – The fine handed down to Thames Water in the UK for a pollution incident in which a large quantity of high-strength chlorine spilled into the river from the company's Beddington wastewater treatment works in September 2007, killing nearly all of the fish and other creatures in the Wandle River. The spillage undid 20 years of restoration work on the river.