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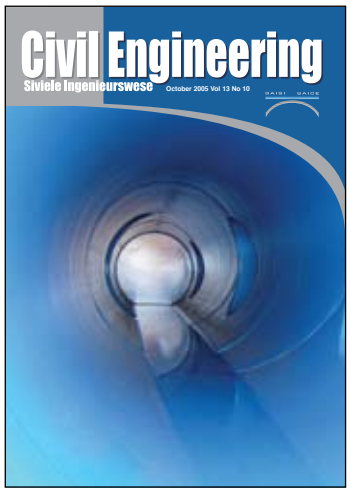

ON THE COVER

'Outlets and dead-ends' by Brad Astrup of WRP. The photograph was taken on the Sebokeng/Evaton Leakage Reduction project (see 'Winners of 2005 awards announced' on page 45)

Right: Allyson Lawless presenting her book to Minister Mosibudi Mangena

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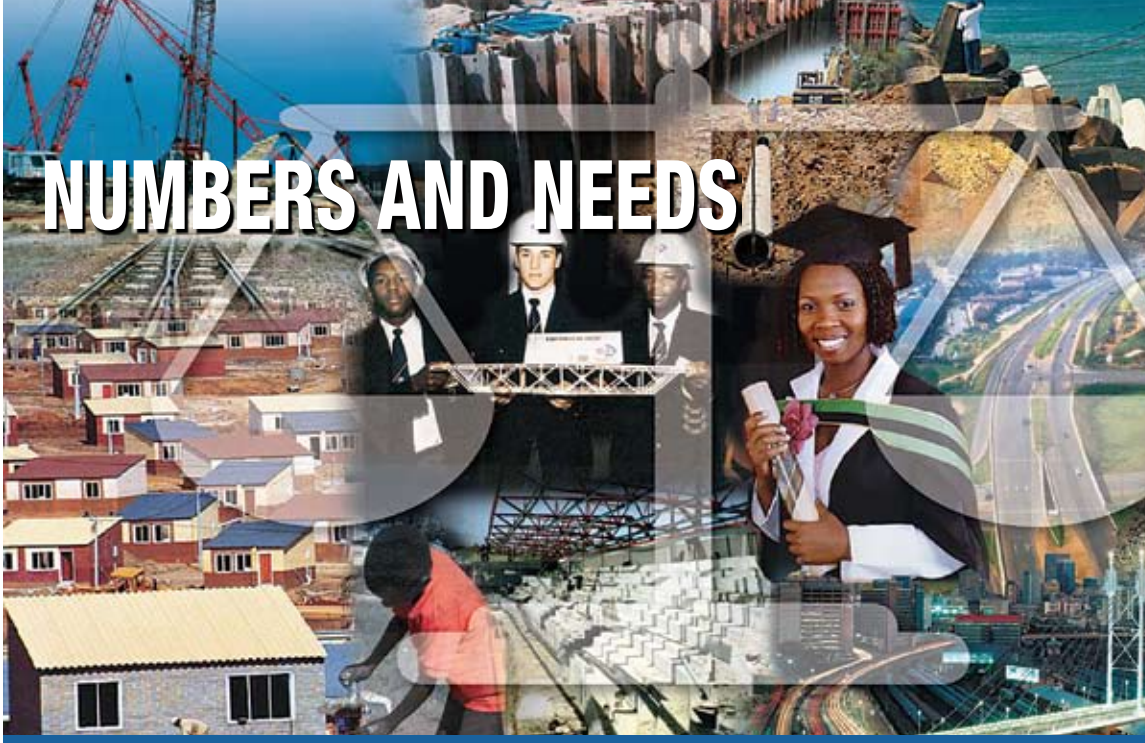

A wake up call to address the capacity crisis in SA civil engineering **40**

URBAN AND RURAL DEVELOPMENT

INFRASTRUCTURE

IN BRIEF 21

Construction conference a resounding success ■ Vaal Pipeline agreements officially ratified by government ■ Coast-to-Coast link becomes a reality ■ Renewed focus on research and innovation ■ Gautrain draft preliminary design report published ■ Army engineers have pumped New Orleans dry ■ Team to study levee failures in New Orleans ■ US researchers make bendable concrete ■ GMBA scheme produces first qualified artisans ■ Translucent concrete developed in Europe ■ Phokeng to Sun City road to be reconstructed for 2010 World Cup soccer ■ Thuthuka designs unique plant for China project ■ Distance education from SCT ■ SSI establishes environmental sector ■ Costs of Gautrain to exceed R20 billion ■ Protekon's key role in port planning ■ Water treatment system for nitrate removal ■ Major awards for Freedom Park landscaping ■ New concrete pole from Infraset thwarts cable thieves ■ Cement capacity expansion project announced

FORUM 34

SAICE AND PROFESSIONAL NEWS

Text Kevin Wall
CSIR Knowledge Services

Managing municipal infrastructure assets

SINCE THE 1994 ELECTIONS, municipalities have been focusing on the delivery of basic services, that is, roads, drainage, water, sanitation, electricity and health services. The Development Bank of Southern Africa (DBSA), the Department of Water Affairs and Forestry (DWAF), the Department of Provincial and Local Government (DPLG) and the Infrastructure Finance Corporation (INCA) alone between 1994 and 2004 funded at least R37 billion investment in engineering infrastructure new works, upgrading and rehabilitation, the bulk of it to water services. In addition, a significant proportion of the R29,5 billion spent by the Department of Housing has gone to engineering infrastructure.

Thus an immense amount of money has been invested in engineering services infrastructure that has become or soon will become the responsibility of municipalities to operate and maintain.

The evidence is overwhelming of the cost savings in the long term which result from the management of infrastructure. If for example infrastructure is maintained when it should be, then the long-term total cost of service delivery is significantly reduced. Thus, over a period of years, infrastructure management results directly in the 'freeing up' of funds for new infrastructure and for support of social programmes such as free basic services

A significant proportion of the South African population does not enjoy basic services (for example safe water and/or acceptable sanitation) and it is the stated intention of national government to fund the rolling out of the engineering services infrastructure to address this. This represents a huge responsibility for the construction of new infrastructure and, after its construction, its operation and maintenance.

The replacement cost of services infrastructure constructed prior to 1994 and still in service (or that ought to be in service, but needs repair or rehabilitation) is thought to be of an even larger order of magnitude than the replacement cost of that constructed since 1994.

INFRASTRUCTURE TO DETERIORATE

There is strong evidence, however, that insufficient attention has been paid by the majority of municipalities to the on-going commitments that they have incurred to operate and maintain their infrastructure. The effect will be that this infrastructure will deteriorate well before the end of its designed life. Depending on the infrastructure concerned, it could be that the riding quality of roads deteriorates and wear and tear on vehicles increases, water pressures drop, water supplies are interrupted, treated water that has been purchased by the municipality leaks from pipes and fittings, watercourses are polluted – and other similar results will ensue. In due course, the communities will be completely deprived of the services. If the budgets at that time permit, infrastructure will have to be rebuilt at much higher cost than if the original infrastructure had only been properly operated and maintained since it had been constructed. And, until the infrastructure is rebuilt and back in service, there will be the cost to the community and the local economy of being deprived of the services – and/or in some instances in having to make expensive alternative arrangements.

Legislation requires municipalities to provide operational strategies that 'align the municipality's resources for the realisation of its development objectives ...' (Local Government: Municipal Systems Act, 1998) and must include a medium-term financial plan setting out 'how the capital and operational expenditure ... is matched by its revenue raising strategy'.

If due regard is to be paid, in a manner that conforms with the requirements of the Municipal Systems Act, to the sustainability of the infrastructure created by development plans, municipalities should simultaneously plan and provide for the long-term management of all their infrastructure assets.

'Delivery' of services does not end with the commissioning of the infrastructure. Once the infrastructure has been commissioned, the activities necessary to ensure that it continues to perform are very often not carried out – such as the necessary staff are not appointed, or the necessary budgets are not approved.

In this context, the CSIR has identified that there is a need for a structured approach to and methodology of infrastructure management ('management' in this sense includes operations and maintenance) that addresses the needs of South African municipalities.

THE STATE OF SERVICEABILITY OF INFRASTRUCTURE IN SOUTH AFRICA

Overviews of the state of serviceability of infrastructure nationwide are invariably based on (sometimes limited) sample surveys. Even many individual municipalities and utilities are hard pressed to describe serviceability of the infrastructure for which they are responsible. They are able to describe sectors of their responsibility (many

municipalities can tell you about their roads serviceability, because they have a pavement management system), but they are not able to describe the entire range of their responsibility. There are of course outstanding exceptions – there is no shortage of South African good practice examples against which owners of infrastructure could benchmark themselves if they wished.

Nonetheless there is a growing recognition that measuring the state of serviceability is an essential precursor to the correct targeting of infrastructure management. For example, at least two provinces have processes under way to measure, on the basis of fairly extensive samples, the state of serviceability of municipal roads infrastructure in their provinces.

THE STATE OF SERVICES INFRASTRUCTURE MANAGEMENT IN SOUTH AFRICA

Recent surveys and investigations have found strong evidence that insufficient attention is being paid by the majority of municipalities to the ongoing commitments that they have incurred to operate and maintain the services that they have the responsibility to deliver. In addition, many authorities have, due to years of neglect, built up a backlog of maintenance needs. The competing demands that are made on limited operational budgets (and on staff and other resources) severely constrain the proper management of existing and new infrastructure and facilities assets.

'Delivery' needs to be understood as embracing not just the construction of infrastructure and buildings, but the management of that infrastructure or that building throughout its intended life

The 2002 IMESA survey

In 2002, the Institution of Municipal Engineering of Southern Africa (IMESA), assisted by the CSIR and others, undertook a survey of infrastructure management in seven of the larger authorities (five municipalities and two water utilities) in order to determine their appreciation and application of infrastructure management. The pertinent findings of the survey can be summarised as follows:

- In respect of many of the aspects of infrastructure management surveyed (such as knowledge of assets, asset utilisation and asset operation and maintenance), the South African authorities compare well with the chosen benchmark (New Zealand authorities).
- However, in respect of other aspects (in particular asset accounting, and making financial provision for improvement of infrastructure), the South African authorities compare very unfavourably with the benchmark.

It is highly relevant to note that in New Zealand these kinds of provisions are required by national legislation.

However, a less in-depth questionnaire survey by the IMESA team of a much wider sample of municipalities (and thus capturing generally less-resourced municipalities than did the first survey) indicated a far lower level of infrastructure management capability. Furthermore, although a high percentage indicated that they prepared the integrated development plans (IDPs) and water services development plans (WSDPs) required by national government, anecdotal evidence and the general level of capability identified by the questionnaire survey suggested that these plans were not supported by sound analysis of infrastructure needs or definition of service levels.

The 2003/2004 CSIR survey

Building on the IMESA survey, the CSIR investigated selected municipalities in more depth, drawing in part on several reports and studies commissioned by various authorities to investigate the state of municipal infrastructure assets and their management. The pertinent findings can be summarised as follows:

- A few municipalities have world-class practice in respect of many of the aspects of infrastructure management (such as knowledge of assets, demand analysis, asset creation and disposal, asset utilisation and operation and maintenance), although they might not be at as high a level in respect of other aspects such as strategic planning, asset accounting, and planning for and making financial provision for renewal and upgrading of infrastructure.
- On the other hand, many municipalities do not even have the basics in place, and gross shortfalls in management policies and practice exist in many municipalities.
- The entire range of capacity and competence can be found in municipalities between these two extremes.

Much encouraging practice was found. For example:

- Good rapport between councillors and officials in respect of infrastructure management.
- Asset registers that held information really useful to infrastructure asset management.
- The making of improved financial provision for renewal of infrastructure. And, although budgets remained inadequate, instances were found (for example) of understanding that appropriate expenditure on infrastructure management can, by reducing water losses, save other expenditure many times over, and can also reduce the risk of system failure.
- The attempt being made before purchasing infrastructure to project the operations and maintenance requirements into the foreseeable future – and in some instances changing new works infrastructure plans in the light of these projections.
- Understanding that it is necessary to improve infrastructure management across all parts of a system – for example that it is no good just looking after assets in the form of physical infrastructure, if equivalent attention is not paid to personnel (the 'intellectual assets'), for example by career path planning and succession planning.

Sadly, some current practices were discovered that can only be described as blindness to the long-term view, with actions dictated by short-term gain. (An example is one large municipality's decision to extend free basic services, to 'go easy' on a property rates increase, and to halt retrenchment, while at the same time cutting budgets for infrastructure refurbishment and renewal.)

In between were examples of municipalities for the first time realising that it is all very well to enjoy good infrastructure management practice in individual sectors of their organisations, but that a comprehensive infrastructure management approach, with adequate budgets, is now necessary. In part this change of heart is dictated by the improving statutory and regulatory environment towards infrastructure management. In part also it is in response to pressure from their constituencies (such as consumers expressing dissatisfaction with service, and especially dissatisfaction with perceived or real declining reliability of service). However, encouragingly, this change of heart is also due to greater understanding, not confined to engineers, of all of the following and more:

- How great the backlog in maintenance and refurbishment has become, and how close key facilities are to failure.
- How demand has grown faster than has the provision of new infrastructure (especially bulk infrastructure), and thus how little spare capacity there now is in some key facilities. And how this manifests itself – for example in that it may have become impossible to close some infrastructure elements down for their routine maintenance because, if they were to be closed down even for the period of maintenance, acceptable limits of customer service would be breached.
- How targeted investment in specific facilities or areas can significantly reduce risk and/or can produce spectacular financial rates of return.

It is becoming more and more apparent that the loss of intellectual assets is a very major threat to effective infrastructure management in many municipalities. The loss of key technical staff, and their non-replacement, or replacement by others less qualified, is inhibiting infrastructure management and in many cases can be identified as the main reason for breakdown of an element of a service. Specific issues identified are:

- High turnover of staff
- The loss of skills and of institutional memory consequent upon the departure of experienced staff
- Little or no career path planning and succession planning
- The loss of mentors consequent upon the departure of experienced staff
- The loss not just of the most highly trained staff, but of the middle order – in particular of those who had originally qualified as artisans, and who had worked their way up through the ranks to supervisor positions
- The appointment of non-technical personnel to management positions requiring technical experience

In addition, the quantum and geographical extent of infrastructure that many technical departments are responsible for has greatly increased, sometimes by orders of magnitude, but without concomitant increase in the technical staff establishment.

Behind the threats to infrastructure management is often grossly insufficient understanding by local authority politicians of the importance of operations and maintenance. This insufficient understanding is crucially manifested in the under-resourcing of the operations and maintenance budget – sometimes exacerbated during the course of a financial year by reallocation of some of this budget to other purposes.

DWAF earlier this year appointed an external team to undertake a national 'water services infrastructure asset management strategy study'. The terms of reference in the request for proposals read in part as follows: 'The Strategic Framework for Water Services requires water services authorities to maintain a register of water services assets and put in place a system to manage these assets in terms of a maintenance and rehabilitation plan. This plan must be based on the principle of preventative maintenance and must be part of the water services development plan. Assets must be rehabilitated and/or replaced before the end of their economic life and the necessary capital funds must be allocated for this purpose. Unfortunately in practice this does not happen' (DWAF, May 2005)

THE NEED FOR AN ENVIRONMENT MORE ENABLING OF INFRASTRUCTURE MANAGEMENT

Some research work has already been done in the area of public sector infrastructure asset management in South Africa, and there have been a number of initiatives aimed at addressing specific aspects, or the needs of specific owners of infrastructure assets. Consultants offer a variety of skills and services including infrastructure management manuals and (IT and other) systems.

The CSIR identified that, whereas these manuals and systems are very useful to the better-resourced municipalities, they are much less useful to the great majority of municipalities. Also, it would appear that a great deal more than manuals and systems is needed, if infrastructure management is to be adequate – inter alia a suitable legislative framework; convincing those responsible for budgetary allocation (without the political will to allocate adequate budgets, the beneficial impact of any consultants' services or of manuals or systems will be limited); skills training, skills retention, and mentorship; the buy-in by national government and other big spenders on or funders of public infrastructure; alternative delivery models and delivery agents for infrastructure management; and the determination of norms, standards, levels of service, and key performance indicators.

The above need to be identified, and then tied together in some way yet to be determined, in a more proactive and enabling framework. This framework would:

- Outline how infrastructure management must be incorporated into: agendas of programmes and plans such as the WSDPs; the culture of organisations such as the South African Local Government Association (SALGA); the lending practices of major funders; and the budgeting practices of all municipalities, and national and provincial departments with major infrastructure assets
- Outline the legislation, IT systems, budgets, incentives, guidelines and norms, etc, necessary to ensure that this incorporation takes place □

Sanitation issues in the spotlight

THERE ARE 1,2 BILLION PEOPLE in the world today without access to safe drinking water, while 2,6 billion people do not have access to proper sanitation. In addition, 50 % of solid wastes remain uncollected. The development of appropriate technical options and implementation methods to address these concerns were discussed earlier this year at the Third International Conference on Ecological Sanitation (EcoSan) in Durban and refocused attention on not only all aspects of ecological sanitation, but also how sustainable development approaches can be used to achieve the Millennium Development Goals (MDGs).

Delegates from 27 countries attended the conference, which was organised by the CSIR under the auspices of the Department of Water Affairs and Forestry with the cooperation of the Water Research Commission, the South African Institution of Civil Engineering, Rand Water, Umgeni Water, eThekwini Municipality (Durban), the Water institute of South Africa and Mvula Trust.

THE SOUTH AFRICAN SITUATION

Water quality is deteriorating all over the world because of pollution. Some cities in the developing world treat only about 10 % of their sewage. Even in South Africa, reports have indicated that an alarming proportion of sewage waste in many towns and cities across the country does not reach treatment plants, but flows untreated into the rivers. This is regarded as one of the most pressing water quality problems in the country. In many cases, even when sewage reaches the treatment plant, poor operation or malfunction of systems means that partially treated effluent is discharged into rivers. Litter and other pollutants from poorly serviced areas have also impacted the natural functioning of river ecosystems to such an extent that many rivers near urban areas have lost their ability to assimilate pollutants.

THE ECOSAN APPROACH

EcoSan can be viewed as a three-step process: *containment*, *sanitation* and *recycling* of human excreta. The objective is to protect human health and the environment while reducing the use of water in sanitation systems and recycling nutrients to help reduce the need for artificial fertilisers in agriculture. EcoSan represents a conceptual shift in the relationship between people and the environment, and is built on the necessary link between people and soil.

The EcoSan approach to sanitation promotes a cycle, or 'closed' system, where human excreta are treated as a resource. Excreta are processed on site and then, if necessary, further processed off site until they are completely free of disease organisms. The nutrients contained in the excreta are then recycled by using them as fertiliser in agriculture.

Ecological sanitation is being used by vast numbers of people across the world. The ecological sanitation philosophy encompasses an alternative approach to sanitation that is aimed at protecting the environment. In Sweden and Germany great strides have been made in the implementation of ecological sanitation. In countries such as Zimbabwe, Ethiopia, Mexico, El Salvador and China, hundreds of thousands of people are serviced by ecological sanitation systems at very little cost to the environment. ◻

Text prepared for the UN World Summit,
14 September 2005, New York
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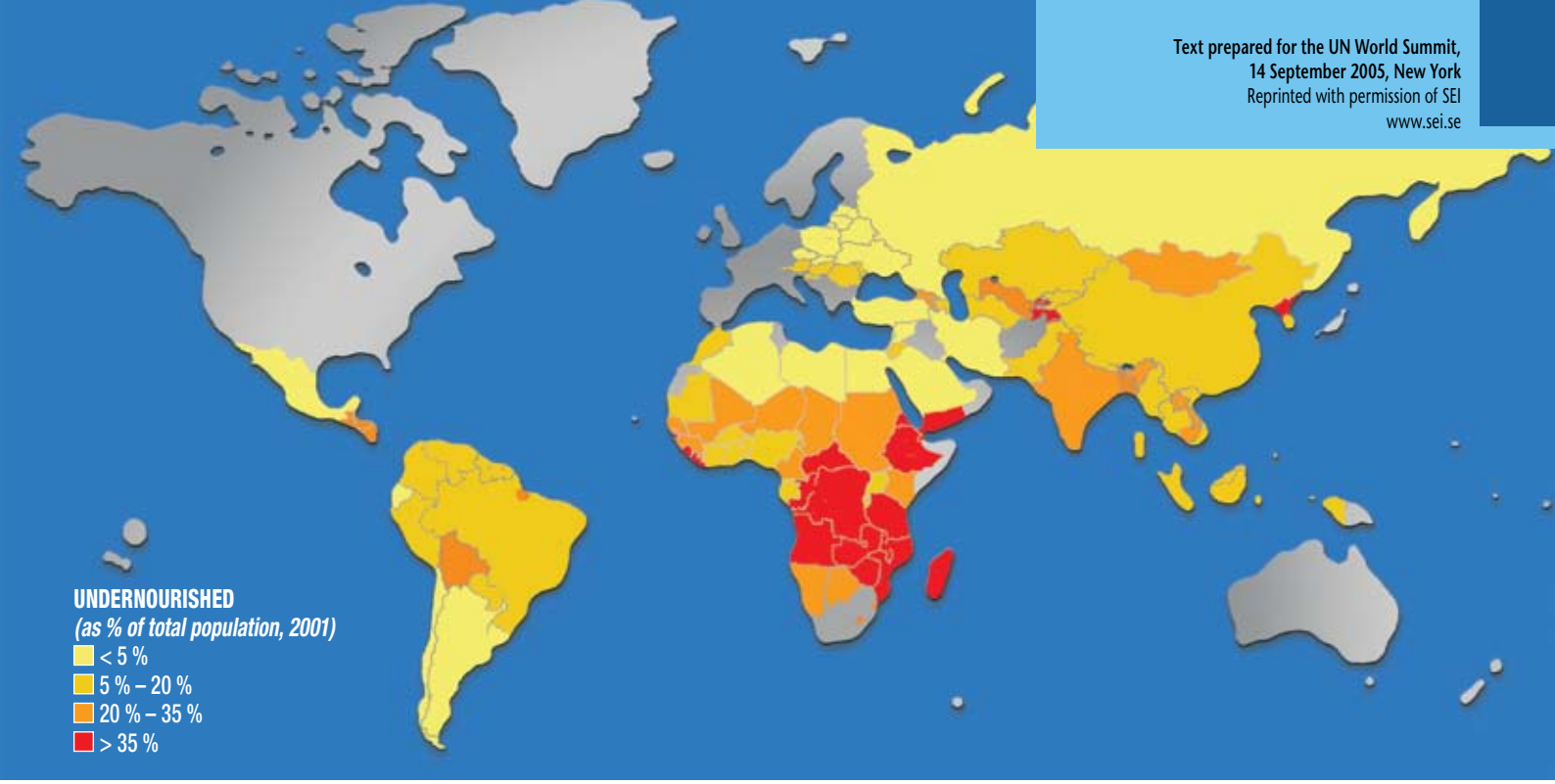


Sustainable pathways to attain

the Millennium Development Goals

Assessing the role of water, energy and sanitation

PRIOR TO THE 2005 UN World Summit, the Stockholm Environment Institute (SEI) was tasked by the government of Sweden to shed some light on the question of how the Millennium Development Goals (MDGs) could be met using sustainable development approaches.

The objective was to clarify the major environmental investments required to attain the MDGs and to identify sustainable solutions where synergies between the environment and development can be achieved for more rapid MDG achievement and to secure long-term sustainability, also beyond 2015.

The report the SEI team produced highlights the importance of the environment in achieving all MDGs. It focuses on three core aspects of goal fulfilment, namely:

- Freshwater to eradicate hunger and sustain ecosystems
- Sanitation for poverty alleviation, health improvements and environmental sustainability and
- Energy for poverty alleviation

FOOD AND WATER

SITUATION TODAY

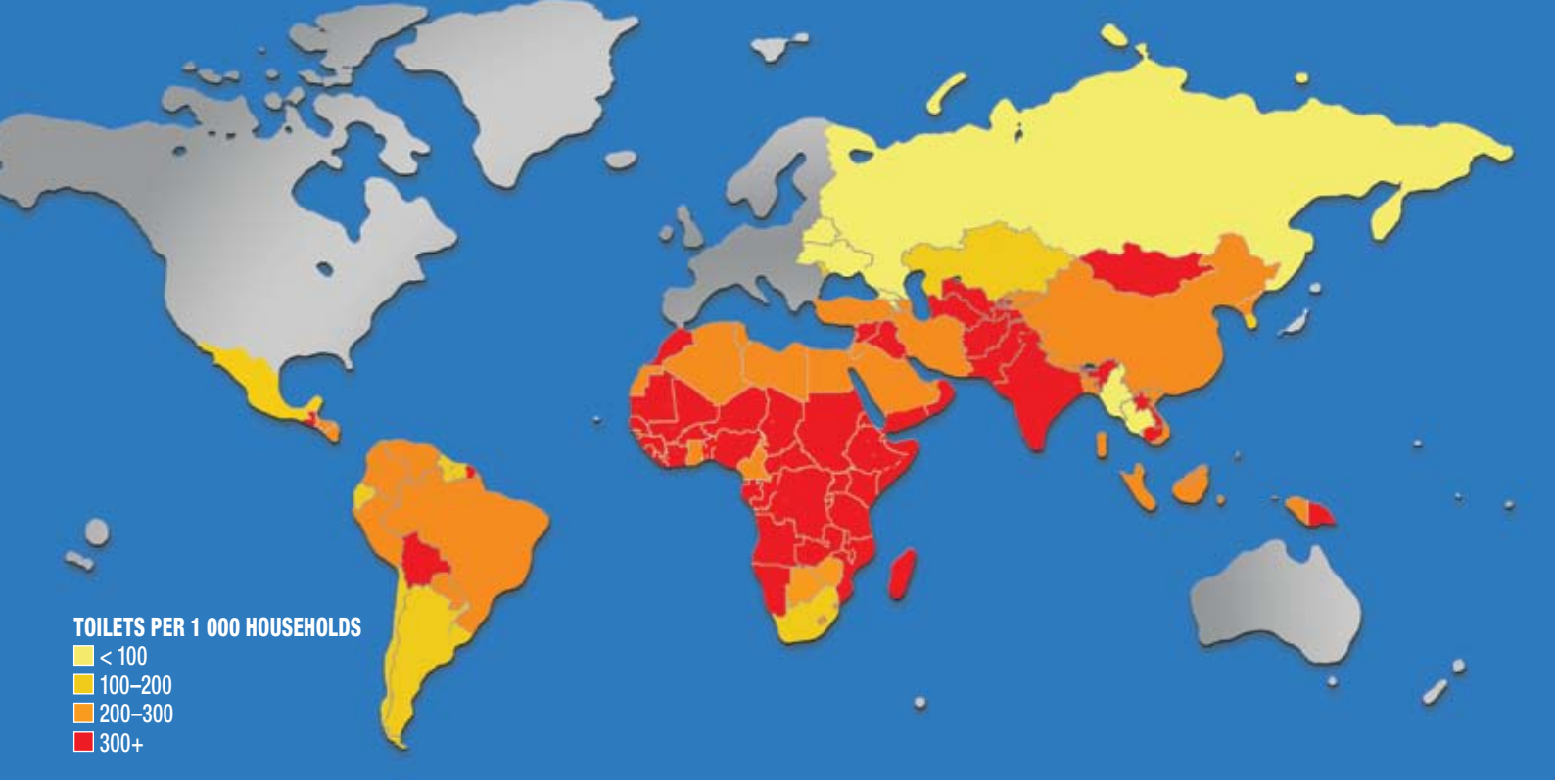
800 million undernourished

THE MDG TARGET FOR 2015

The target is to halve the prevalence in 1990 of undernourished in developing countries by 2015. Large quantities of

Map above: *The majority of hunger-prone countries are in the arid savanna zone which faces considerable water challenges in agriculture. Using improved rainfed agriculture, a huge potential for additional food production can be realised*

In developing countries a 50 % increase in freshwater use will be required over the coming decade to reach the MDG target. This water requirement, 2 200 km³/year, is larger than the present global water use in irrigation



Map above: Number of toilets per thousand households to be installed through to 2015 to meet the MDGs.

Ecological sanitation has three main features: the containment of human excreta, its sanitisation and recycling back to the soil (closing the loop on both nutrients and water). This represents a paradigm shift in the entire approach to sanitation

additional food are needed to upgrade the diet of 190 million undernourished and another 890 million people following the current population increase.

WATER REQUIREMENTS FOR FOOD

Producing food is the most water-consuming activity of all, with 4 000 ℓ of freshwater needed per day for each of us to produce an adequate diet, or 1 300 m^3/person/year. In developing countries a 50 % increase in freshwater use will be required over the coming decade to reach the MDG target. This water requirement, 2 200 km^3/year, is larger than the present global water use in irrigation.

OPTIONS

'Crop per drop' improvements with investments in integrated land, water and crop management in current agriculture can reduce the water requirements. The remaining 40 % increase by 2015 can only partially be met through increased irrigation and the major part (85 %) will have to come from rainfed agriculture. On present rainfed lands more rainwater can be captured locally through investments in existing and innovative management systems appropriate to local rural communities.

The remaining growth must come from expansion of agricultural land by 1,2 million km^2, or an increase of 4 %.

IMPACTS AND TRADE-OFFS

To reach the MDG 2015 target on hunger, environmental trade-offs with terrestrial and aquatic ecosystems are unavoidable. Agricultural expansion is one of the key drivers behind degradation of ecosystem services. This study advises that expansion into terrestrial ecosystems can be restricted to a still challenging 1,2 million km^2. Innovative management of present rainfed lands is necessary. Increased irrigation will have impacts on downstream needs of water for fish, wetlands and cities.

In developing countries a 50 % increase in freshwater use will be required over the coming decade to reach the MDG target

CONCLUSIONS

Freshwater is a key prerequisite to attain the MDG on hunger. Considerable and so far underestimated new freshwater allocations are required to attain the 2015 target. New investments are needed in smallholder rainfed farming, which will have to bare the heaviest burden in achieving the hunger target. Environmental trade-offs with terrestrial and aquatic ecosystems are unavoidable. To reach the 2015 target is only a first step and huge freshwater quantities must be appropriated in agriculture the coming decades to eradicate undernourishment and to keep pace with population growth.

SUSTAINABLE SANITATION

SITUATION TODAY

- 2,6 billion people lack sanitation
- 1,8 million deaths per year due to diarrhoeal disease (90 % of those are children under 5 years of age)

MDG TARGET FOR 2015

- 1,75 billion people (50:50 urban:rural)
- 450 million households (hh) (60:40 urban:rural)

REGIONAL DIFFERENCES IN TARGET SIZE

In total 95 000 household installations per day are required between 2003 and 2015 to meet the MDGs.

INTRODUCING SUSTAINABLE SANITATION

Ecological sanitation has three main features: the containment of human excreta, its sanitisation and recycling back to the soil (closing the loop on both nutrients and water). This represents a paradigm shift in the entire approach to sanitation. Humans produce on the average only 50 ℓ of faeces and 500 ℓ of urine per year. A normal flush toilet uses an additional 15 000 ℓ of drinking water per person per year. The greywater from kitchens and bathrooms

The MDG Energy Vision foresees improved access to modern energy to about 1,5 billion people. Contrary to what might be expected in light of this challenge, the amount of commercial energy needed is negligible compared to the world's total commercial energy consumption. Reaching the poor with basic modern energy services as envisioned in the MDG Energy Vision would increase global commercial energy consumption by about 900 TWh per year, which is less than 1 % of global energy demand

adds an additional 35 000 ℓ per person per year depending on the location. This makes waterborne sanitation a very costly item and an impossibility for the cities in most developing countries. By making use of source separation, innovative solutions become available whereby the various products can be treated and returned to agriculture. These include soil composting shallow pit toilets instead of pit latrines, dry toilets with urine diversion for both rural and urban settings, toilets connected to biogas systems, etc. These are less costly than conventional systems and protect human health and the environment much more effectively. In particular EcoSan can be applied in both rural and urban communities, both rich and poor, for young or old, woman or man.

THE FINANCIAL ADVANTAGES

Sanitation in general pays for itself by reducing the occurrence of diarrhoea by allowing people to be more productive and by reducing morbidity and mortality due to contaminated drinking water. EcoSan – if applied as a central MDG – would cost about 0,2 % of the GDP for the target regions. which is about a 50th of what health costs are today. Also the recycled nutrients can substitute costly chemical fertilisers (for Sub-Saharan Africa this could replace the entire amount used today).

ENERGY

SCALE OF THE CHALLENGE

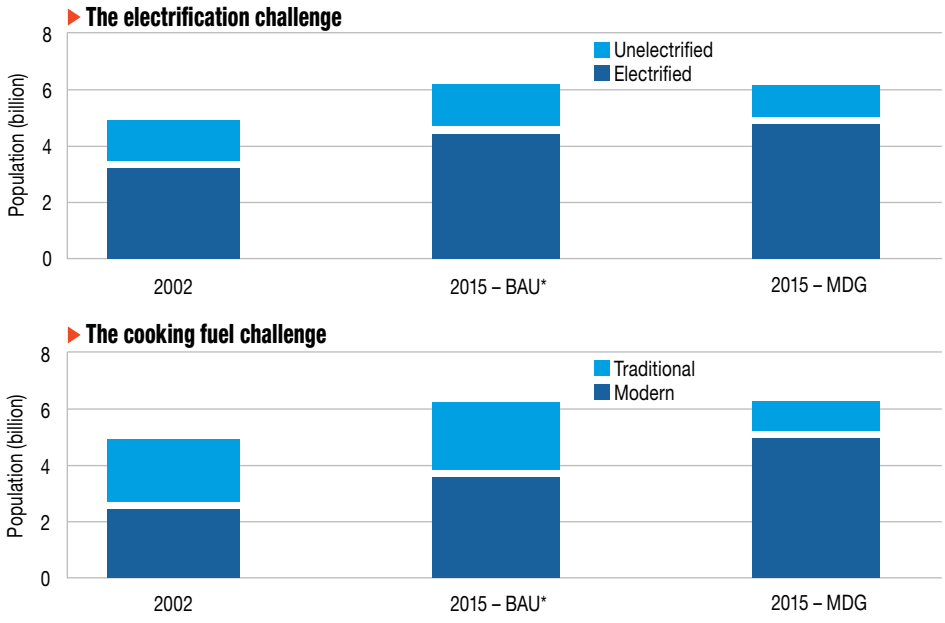
The study indicates that in order to meet the MDGs a substantial improvement in the types of energy services that the poor have access to is required. Unless concerted actions with more emphasis on providing the poor with basic modern energy services are taken, 1,6 billion people will still be without electricity access and 2,5 billion people will still rely on traditional biomass for cooking by 2015.

A prerequisite for meeting the MDGs is to reduce the population without access to basic levels of electricity and the population reliant on traditional solid fuels for cooking to no more than around 1 billion people by 2015. The MDG Energy Vision foresees improved access to modern energy to about 1,5 billion people.

Contrary to what might be expected in light of this challenge, the amount of commercial energy needed is negligible compared to the world's total commercial energy consumption. Reaching the poor with basic modern energy services as envisioned in the MDG Energy Vision would increase global commercial energy consumption by about 900 TWh per year, which is less than 1 % of global energy demand.

CONCLUSIONS

- Meeting the MDGs will have positive environmental impacts at the local, regional and global levels.
- The primary commercial energy requirements for implementing the MDG Energy Vision are small.
- In order not to jeopardise the achievement of the MDGs, it is necessary that the non-poor of this world reduce greenhouse gas emissions significantly.
- Finding ways to accelerate progress for new technologies – including research and development, demonstration deployment and scaling-up – is a responsibility which lies heavily on developed countries. □



***BAU = Business-as-usual senario**

Source: SEI based on data from UN, FAO, and IEA

FACT FILE

Situation today

Presently about 2,4 billion people lack access to clean fuels for cooking and approximately 1,6 billion people lack access to electricity. By 2015 the situation will not look much different unless concerted actions are taken to at least bring basic levels of energy services to the world's poor.

The targets of the MDG Energy Vision are that by 2015

- 100 % of the world's urban populations and 50 % of the world's rural population use modern liquid and gaseous fuels for cooking
- 50 % of the world's rural population use improved biomass stoves
- 100 % of the biomass used for cooking is produced in a sustainable way
- 100 % of the world's urban populations have a basic electricity supply to meet lighting and communication needs
- 100 % of the world's health facilities and schools have electricity supply and use modern liquid and gaseous fuels to meet cooking and heating needs
- 100 % of all communities have access to mechanical power

Text Niel Meyer
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Municipal training course on control valves

THE NEED FOR capacity building within municipalities is clearly becoming a major issue in South Africa and the lack of expertise in many parts of the country has been highlighted as a critical factor that will hinder future development.

One of the aspects where most municipalities lack capacity is in the maintenance of automatic control valves in water reticulation systems. Control valves are an essential component of most water reticulation systems and include amongst others: pressure reducing valves, pressure relief valves and reservoir level control valves.

WRP Consulting Engineers in collaboration with Valvomatic CC recently presented a three-day training course on control valves to delegates from Klerksdorp City Council. The course focused mainly on the practical aspects of control valves and included:

- Basic operation of control valves
- Valve assembly
- Various types of hydraulic control
- Various makes of valves
- Setting and maintenance of control valves
- General trouble shooting

During the various practical sessions each delegate had the opportunity to disassemble a control valve and to build a hydraulic control circuit. The valves and hydraulic controls were supplied courtesy of the following valve suppliers: DFC (Cla-Val Valves), Macsteel (Bermad Valves) and Floquip (Baker Valves).

Delegates assembling a control valve

In order to simulate actual site conditions, a test bench was constructed that enabled the attendees to set and change the control valves under real flow conditions. Typical on-site problems were simulated and the attendees had to identify and correct these problems. This approach proved to be very successful and all attendees agreed after the training sessions that they had gained tremendous practical experience.

The response from the delegates of Klerksdorp City Council was positive and it seems that the training course provided valuable and much-needed skills. These skills can now be used to undertake the maintenance and servicing of control valves in their water supply system.

This was the first of three new hands-on courses that have been developed by WRP to assist municipalities with the management of their water distribution network. The other two courses involve logging and leak location respectively. Each course is presented over a three-day period with a maximum of ten attendees to ensure that everyone has the opportunity to get their hands dirty by undertaking the actual work.

The test bench that was used to train delegates on setting of control valves under real flow conditions

The logging course involves training the attendees on how to log flows and pressures in a water distribution system. The course also explains how to process the logging results and provides many useful utility programs that can be used to assist in the presentation and interpretation of logging results.

Trainer downloading a logger that is connected to a water meter

The final three-day course is on leak location. Attendees receive practical hands-on training on how to find leaks in a water distribution system. Basic sounding techniques (including amplified sounding) are used during the course to identify actual leaks. The course presenters will also use any leak location equipment owned by the utility to find real leaks in the utility's own water distribution system. Several sets of leak locators will be used during the course and each attendee will be taught how to use the equipment as well as the various tips and traps associated with leak detection.

The courses are complementary to each other and will help to capacitate municipalities in three basic areas of water supply which are currently not being addressed in most municipalities throughout South Africa. The courses are all presented by specialists in the field and several of the presenters have been enlisted from different organisations to ensure that the advice and training provided is beyond reproach. ◻

Main road in rural area receives upgrade

Berkley Street before

Work in progress

Berkley Sreet after

Lang Street before

Work in progress

Lang Sreet after

A FEW MONTHS AGO, the rural town of Uniondale was completely different from the one that we know today. This fundamental change is largely due to the upgrade of various main roads that began in earnest in November 2004. This much-needed venture has since been completed with a total project cost of ±R2,2 million.

The project, which was identified by Eden District Municipality, was aimed at uplifting the low income area of Lyonville and entailed the upgrade of Berkley Street as well as a section of Long Street. The road was upgraded from a gravel surface to a cement block-paving road in order to improve the access route to and from the Lyonville residential area in Uniondale.

According to Gerhard Otto, Project Manager, Uniondale Area, the construction project was largely executed through labour-intensive construction methods. 'The venture entailed 6 600 m^2 of paved road and 1,92 km of kerbing. In addition, the construction required approximately 333 000 concrete paving blocks and approximately 100 m of stormwater pipes. The assignment has secured work for about 44 local residents who have also been empowered with a skill that will equip them to become pavers and kerb layers.'

The job creation initiative worked extremely well and many workers received a certificate of competency based on their level of expertise. In addition, workers were managed in designated clusters by skilled professionals and many of them were able to source employment because the venture had resulted in a skills transfer. The team also found the community to be particularly supportive,m as they understood what the road upgrade would mean in terms of improving the living conditions and job creation opportunities in the area.

The project was completed with the use of interactive software design package Civil Designer. 'This program was used with great success and it saved us much time. It was great to know that we could rely on such a powerful package to help us achieve our objectives. I found this project to be particularly rewarding because the team of engineers and the contractor could give something back to the community,' says Gerhard.

Workers were selected from the community based on a list of criteria. The area ward councillor was responsible for maintaining a database of unemployed workers from a previously disadvantaged background. These people were then chosen to work on a two weekly rotational basis. Workers consist of men, women and unemployed youth and worked very well in their respective teams to get the job done.

The Uniondale project required the following:

- The excavation of road material
- The compaction of the in situ layer
- The construction of the new road base layer
- The establishment of a dust free surface by means concrete paving blocks
- The construction of sidewalks
- The partial improvement of the storm water drainage systems
- The building of culverts, stormwater inlets and head walls

According to the engineer, this type of project will not only improve the mobility of residents, but will also serve to improve the quality of life for people in the district. □

Text Roger Allport
Director of MRT Planning, Halcrow

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Operating risk

The Achilles' heel of major infrastructure

Table 1 Record of financial success for major urban rail (metro/LRT) projects

Year	Source	Location	Parameter	Out-turn compared with forecast
1973	Merewitz[2]	Europe/North America	Capital cost	Average > +50%
1986	Wachs[3]	US	Capital cost	Average > +50%
1990	Halcrow Fox[4]	Developing cities	Capital cost Ridership	Half +50% to +500% Half –50% to –90%
1990	Pickrell/UMTA[5]	US	Capital cost Ridership	+17% to +156% –28% to –85%
1996	Skamris/Flyvbjerg[6]	Worldwide	Capital cost Ridership	–15% to +500% +30% to –90%
1998	Halcrow Fox[7]	Worldwide – private	Capital cost Ridership	No improvement over public sector
1998	Mackett/Edwards[8]	UK, US	Ridership	Two out of 13 'successful'
2000	Halcrow[9]	Asia – private	Capital cost Ridership	No improvement over public sector
2000	Skamris[10]	Worldwide	Capital cost Ridership	–46% to +200%, av. +46% –96% to +1%, av. –51%
2000	Babalik[11]	North America, UK	Ridership	–82% to +89% (8 selected systems)
2004	Allport[12]	Asia, UK private/public	Capital cost Ridership	5 of 6 on budget, 1 +100% All between 1/3 and 2/3 low

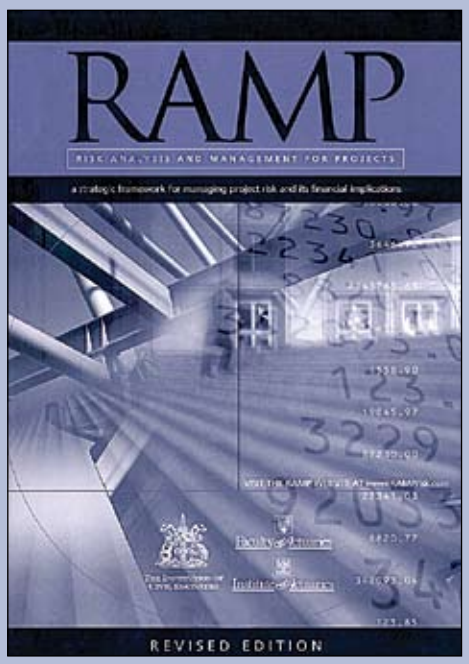
The civil engineering profession has significantly improved its ability to deliver major infrastructure projects on time and within budget. However, the operating performance of such projects leaves more to be desired. This paper examines the nature and scale of operating risks and sets out to explain why operating performance seldom matches expectations. It looks in particular at new-build urban rail schemes, where operating outcomes are found to differ significantly and systemically from expectations, usually for the worse. It concludes that a radical change in approach for such schemes is needed

IF THE SUCCESS of major infrastructure projects is measured by their out-turn performance compared with the forecasts used to justify them, then performance is seldom good. Much attention has focused on implementing projects to time and budget.

Poor construction and cost performance has increasingly been targeted and there has been a step-change in performance under some procurement regimes – such that this aspect of performance is now often good. The major problem today is with operations, where performance is still often poor – a fact that arouses surprisingly little interest despite its obvious importance.

The genesis of this paper is the Risk Analysis and Management for Projects (RAMP) joint working party of the Institution of Civil Engineers and actuarial profession (figure 1).[1] RAMP is a generic approach to risk management, in principle applicable to all projects. It defines success as the achievement of forecast benefits for the forecast cost. To date its focus had been upon the management of capital cost risk, while recognising that operating risks may be important. RAMP is extending its focus to operating risk and this paper introduces the subject as a basis for formally addressing the management of operating risk.

projects



The UK National Audit Office has reported marked improvements in delivery to time and cost in central-government completed private finance initiative (PFI) projects, with a reduction in over-budget/late delivery from over 70 % of projects to just over 20 % ...

▶ ***Left:*** *Figure 1 Risk Analysis and Management for Projects (RAMP) is a generic approach to risk management published by the ICE and actuarial profession, which has been commended by HM Treasury for use in the public sector. Its scope is the management of all project risks. It is now addressing the issue of operating risk*

▶ ***Right:*** *Figure 2 Metro capital and operating costs are generally underestimated and revenues overestimated*

The paper is confined to infrastructure projects and to the financial risks during the project's operational phase. The surplus of revenues over operating costs is a critical financial parameter in appraisal – it is this surplus that repays debt, pays shareholders' dividends and provides for asset replacement. Infrastructure projects are long-lived assets and appraisal is typically for an economic life of 15 to 30 years; operating revenues and costs therefore need to be forecast over this period and may cumulatively exceed the initial capital cost.

PROBLEMS WITH EXISTING PRACTICE

Table 1 summarises experience concerning the financial success of new-build urban rail projects (figure 2).[13] Until recently the broad conclusion was that, with few exceptions, not only were capital costs underestimated (typically by 50–100 %), but operating costs were also routinely underestimated (by a factor of 2 to 3), while revenues were erestimated (typically by 100 %). Moreover this appeared to occur in all environments, under the range of then-prevailing procurement regimes, with no evidence of improvement.

Recent advances in procurement and risk management have resulted in marked improvements in the delivery of projects to time and cost. Five of the six urban rail projects described in Reference 13 were delivered to cost and within six months of time. The UK National Audit Office has reported marked improvements in delivery to time and cost in central-government completed private finance initiative (PFI) projects,[14] with a reduction in over-budget/late delivery from over 70 % of projects to just over 20 %. Whereas the predictability of contracted outcomes has materially improved under PFI, the report did not set out to examine the value for money of the projects, or assess the results of other procurement approaches. This achievement redirects the focus to the subject of this paper – operating risk, where at least in the

Table 2 Operating risk characteristics of infrastructure sectors

Sector		Project revenue source	Need for operating subsidy?	Operating costs important?	Exogenous factors important?[a]	Government action important?[b]	Competition issues	Tariff issues?[c]	Scale of operating risk[d]
Transport	Roads – expressways	Tolls	No	No	Yes	Yes	Modest	Yes	3
	Urban rail	Fares	Varies	Very	Yes	Very	Very	Yes	5
	High-speed rail	Fares	Varies	Very	Yes	Very	Very	Yes	5
	Airports	Landing fees, retail	No	Yes	Very	Yes	Modest	Yes	2–3
	Ports	Tariffs	No	Modest	Very	Modest	Varies	Varies	2
Water	Supply[e]/sanitation	User tariffs	No	Modest	Modest	No	No	Critical	2–3
Drainage/ flood control	Drainage	No	Yes	No[f]	No	No	NA	NA	1
	Flood defence	No	Yes		No	No	NA	NA	1
Power	Generating plants	Take-off contracts	No	Very (fuel)	Very	No	No	No	1–2
	Distribution	User tariffs	No	Modest	Yes	No	Varies	Yes	2–3
Health and education	Hospitals and schools	Varies[g]	Varies	Modest	Modest	No	Modest	Generally no	1
Public buildings		No	Yes	Modest	No	No	NA	No	0–1

Notes

a Macroeconomic, political, social, demographic factors
b In project identification, land acquisition and permissions, integrating the project
c The ability to raise tariffs periodically
d On a scale from 0 = unimportant to 5 = very important. This qualitative assessment follows from the previous columns in the table
e Includes water resources development
f Can be significant for pumped drainage
g Varies: either no user payment or availability payments under PFI

urban rail sector no such improvements appear to have taken place.

Urban rail projects are inherently more risky than most other transportation projects. Comparable information is not to hand for other sectors, except for capital cost; but for this the available data show that 'other types of project are at least as, if not more prone to, cost underestimation as are transportation infrastructure projects'.[15]

The *prima facie* conclusion is that operating risk is important, and can be more important than capital cost risk, depending upon the infrastructure project characteristics and the form of procurement.

INFRASTRUCTURE PROJECT FEATURES

Table 2 summarises the characteristics of typical infrastructure projects. It considers the revenue source and scale of operating costs that together determine the characteristics of the revenue surplus/deficit. It considers the risk characteristics of the revenue stream and qualitatively defines the scale of operating risk for each sub-sector.

Table 2 demonstrates the variation between the infrastructure sectors. Urban rail new-build projects are at one extreme – success requiring many factors to go right and being readily undermined by a single poor decision. They always have an uncertain operating surplus/deficit, are dependent upon strong government support and are subject to strong competition and regulatory risk. At the other extreme, social infrastructure (hospitals, schools and public buildings) is increasingly contracted on the basis of availability, with little or capped revenue risk (figure 3).

OPERATING RISKS OF URBAN RAIL

Taking the example of urban rail, the main financial risks concern the project's operating costs, its revenues and the asset replacement costs. There are other important risks; for example, safety incidents may have a major impact, both directly on finances and corporately via reputational risk and financing costs. Urban rail projects have the following risk characteristics.

- **Operating costs** – defined as the cost of operations, maintenance and administration – are often considered to be substantially under the operator's control. But many costs on day 1 have already been fixed by past decisions. Also, understanding of some costs is poor, and the extent to which costs can be held down in the face of increasing and uncertain factor (labour and power) costs through continuous productivity improvements is not well understood. These risks are often greater than appreciated.
- **Revenues** – are usually predominantly from passenger fares, which depend on attracting traffic from other modes of transport (buses in particular) and from charging market-based fares. Until day 1 of operations there is usually a misplaced optimism that traffic levels will be as forecast. Then, when traffic is found to be low, only modest improvement is possible – and over time governments often

▶ ***Top:*** *Figure 3 Operating revenues for social infrastructure projects such as hospitals are subject to less risk (courtesy NHS Estates)*
▶ ***Bottom:*** *Figure 4 Railway equipment is expensive to replace (courtesy CTRL)*

exert a downward pressure on real fares. Revenues have proved to be much riskier than expected.

- **Operating surplus** – because operating costs and revenues are large, often of similar magnitude and uncertain, the critical operating surplus is very uncertain. This poses a major financing and procurement challenge that needs to be, but often is not, planned for.
- **Obsolescence** – the rail equipment assets become obsolescent, technically or commercially (figure 4). Their replacement costs are high and have tended to increase as a result of technological advances, rising consumer demands for better service and increasing regulation. Asset replacement costs have proved riskier than expected and have often placed a major funding burden on the railway. In summary the cost and revenue structure of a new-build urban rail project poses risks and funding challenges that are often greater than appreciated.

COMPLEX REASONS FOR RISK

Operating risk appears to occur for complex reasons. The scale and nature of the risk is, as noted previously, not always appreciated. While there is little literature on how project capital cost out-turns compare with forecasts, that for operating risk is particularly sparse. The importance of the subject appears to be widely unrecognised, perhaps because the focus is predominantly upon the huge task of project implementation. There is an almost complete failure by all stakeholders to focus upon the operational phase of a project while the public announcement, the contract and the physical assets become the centre of attention.

Moreover, this appears to be the case for private-sector concessions as well as publicly procured projects, raising questions about the long-term perspective of key players. However, the primary focus of project development should be the operating project and the core project development objective should be to create a sustainable operating business.

Government is necessarily involved with major infrastructure projects. It sets the 'playing field' for project development – the policies, guidelines and incentive structures that fundamentally affect the behaviour of other stakeholders, and it has essential planning and coordination functions to perform. Weaknesses here underlie many of the problems. Sometimes government is torn between delivery and ensuring prudent use of public funds; sometimes it fails in its planning and coordination function, undermining revenues and/or increasing operating costs; sometimes it specifies inputs rather than focusing on performance requirements; and sometimes its regulatory role proves problematic.

We have noted that forecasts are often poor indicators of out-turn operating results. The forecasting process – particularly for revenues – is often complex and inherently uncertain, and yet the uncertainties are rarely addressed with rigour. The role, motivation and competence of forecasters have all been questioned. The result is that a so-called robust business case proves to be anything but robust, and forecasts have been used to justify rather than inform strategically important decisions, sometimes with costly consequences.

There has recently been much experimentation in procurement under PFI or public-private partnerships and other regimes. After go-ahead, the dominant focus during the lengthy implementation period, when key decisions shape the operating project is on engineering completion to time and budget. Yet decisions during this period cumulatively affect operations, but tend not to be informed by the necessary analysis. Operations depend partly upon the performance of the operator. Rarely is the importance of the operator recognised. He should be regarded as a major asset, and care is required to establish his role institutionally and contractually. Moreover, the operator's role needs to be nourished if a sustainable operating business is to endure. It is not unusual to find a lack of many of these requirements.

A NEED FOR CHANGE

The sectors differ in their characteristics. In some (social infrastructure for example), there is probably not a serious problem with existing practice – existing approaches are effective. But in others, and notably in the transport sector, there is little doubt that the often-poor performance of projects in achieving operating success requires a radical change in approach. In these cases, and rail is the extreme example, it is difficult to see that (just) 'trying harder', building upon existing approaches, will deliver the scale of improvement that is necessary.

It is not the purpose of this paper to suggest how these issues should be addressed; this is the subject of ongoing work. It is, however, clear that a major change in focus is required for

- establishing a clear government 'playing field'
- the project development process
- better aligning stakeholder interests with the contract and authority objectives
- the forecasting task
- the operator's function

This is a challenging agenda. Tackled with purpose, the objective is to manage operating risks to match more closely the encouraging advances in capital-cost risk management that have recently been observed.

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CONSTRUCTION CONFERENCE A RESOUNDING SUCCESS

THE CONSTRUCTION INDUSTRY held an industry-wide conference at Sun City From 9 to 11 October. The conference was attended by more than 450 delegates, representing private contracting firms both small and large, consulting engineers, architects, quantity surveyors and valuers. Attendance included substantial representation of black business in this sector, with a number of black contracting and consulting firms, as well as black business associations, being represented.

The theme of the conference was 'A celebration of the construction industry – opportunity for growth and development'.

The sectoral approach to the conference proved to be a resounding success, providing many networking opportunities and demonstrating clearly that through the process of negotiation around the development of the Construction Charter, the sector has indeed attained greater unity of purpose and a level of agreement between the various parties never before seen in this sector, which has been largely fragmented for years.

This could not come at a better time – with the industry set to benefit substantially from the building boom and positive economic climate currently being experienced by the industry.

Says Graham Pirie, CEO of the SA Association of Consulting Engineers (SAACE), which was one of the participating organisations: 'This is the most conducive economic climate seen by the industry in more than 20 years and the unity of purpose and approach as developed through the Charter will ensure that we all work together as a team to ensure that our sector is both effective and efficient in its delivery of the infrastructure requirements for the next ten years.

'But more importantly, in doing so we as a sector will take cognisance of the fact that black business and participation needs to grow and benefit from this boom as well.'

Draft 4 of the Construction Charter, which has been submitted to the Minister of Public Works for comment, was the cornerstone of the conference. It outlines the sector's agreements on how to proceed with the transformation of the industry and promote responsible business behaviour in the sector.

Various speakers addressed the contents of the Charter and its impacts on the various constituents represented at the conference. The draft is expected to be finalised in the next few months and is likely to be legislated early next year.

VAAL PIPELINE AGREEMENTS OFFICIALLY RATIFIED BY GOVERNMENT

MINISTER OF WATER AFFAIRS and Forestry Buyelwa Sonjica, Sasol, Eskom and TCTA on 11 October signed the project agreements for the R2,5 billion Vaal River Eastern Sub-system Augmentation Project (Vaal Pipeline project).

This high-priority project – a government initiative aimed at supporting sustainable economic growth and development in South Africa – is designed to support the industrial needs of Sasol and Eskom in Mpumalanga through the transfer of water from the Vaal River system.

The signing of water supply and payment agreements between Eskom and Sasol – the major project beneficiaries – with the Department of Water Affairs and Forestry (DWAF), together with the signing of an implementation agreement between TCTA and DWAF, has paved the way for the off-budget, long-term project financing of the project.

The Minister hailed the signing of the agreements as a further milestone in terms of rolling out the National Water Resource Strategy. According to Leslie Maasdorp, chairperson of

TCTA, TCTA's role in the project meant that the organisation would be able to further leverage its expertise in the liability management of bulk raw water and project implementation in the interests of contributing to the broader economic objectives of the country.

The 115 km pipeline will transfer 160 million cubic metres of water per year to a distribution structure at Knoppiesfontein, near Secunda, and is expected to be completed by the third quarter of 2007. The pipeline supply and installation contract (valued at approximately R1,6 billion) and the contract for civil structures, mechanical, electrical and instrumentation (valued at approximately R600 million) are expected to be awarded in October and November this year. Construction will commence in November 2005 for the supply and installation contract and in December for the civil structures, mechanical, electrical and instrumentation contracts.

The construction of the project is expected to generate about 750 job opportunities, while the project will create 20 permanent jobs in its operational phase. As in the case of the Berg Water Project, TCTA will follow its procurement requirements in setting a minimum black ownership target of 25 % for service providers and contractors. TCTA also encourages the use of SMMEs in the implementation of its projects by setting procurement targets for its contractors in this sector.

Although the Vaal Pipeline is a government initiative, the project is being funded through the private sector and all debt will be repaid over 20 years through the revenue stream generated by the sale of bulk water to Eskom and Sasol.

COAST-TO-COAST LINK BECOMES A REALITY

THE MINISTER OF TRANSPORT, Mr Jeff Radebe, recently launched the Coast-to-Coast road transport link from Maputo in the east to Walvis Bay in the west.

'Our vision for SADC is to integrate the economies of the respective countries by implementing seamless movement of people and goods. It is closely linked to the Millennium Development Goals and the vision for Africa as a whole,' said the Minister.

The N1-N4 Bakwena Platinum Highway runs on the N1 from Bela-Bela in Limpopo via Pretoria North (Gauteng) and west along the N4 to Skilpadhek in North West Province at the Botswana border.

The N1-N4 Bakwena Platinum Highway completes the link with the N4 Toll Route, which is the central transport road network of the Maputo Corridor Spatial Development Initiative, which starts east of Pretoria, passes through Mpumalanga and ends at Maputo harbour. This finally links the Port of Maputo to the Trans Kalahari Route through Botswana, ending at Walvis Bay in Namibia.

'Cross-border parks and the provision of roads infrastructure, in particular the Maputo Development Corridor, has partly realised the vision. The challenge, however, remains to solve the disorder at border posts,' commented the Minister.

The N1-N4 Bakwena Platinum Highway and the N4 Toll Route form part of the South African national road network, which falls under the responsibility of the South African National Roads Agency (Sanral). Both routes are run as separate concessions, with Bakwena being responsible for the N1-N4 Bakwena Platinum Highway and Trans African Concessions (TRAC) responsible for the N4 Toll Route.

'This coast-to-coast link is essential as a transport network that meets the needs of mining, agriculture, forestry, agro-processing, manufacturing and related economic activities. Its aim is to trigger economic growth throughout the SADC region by enhancing the competitiveness of exporters, as well as saving time, costs and maintenance over the long term,' said Nazir Alli, CEO of Sanral.

These public private partnerships (PPPs) have provided Sanral with the means to negotiate investments to improve and maintain the country's road infrastructure assets for years to come.

Construction on the R3 billion N1-N4 Bakwena Platinum Highway, covering a distance of 290 km, started in August 2001 and was completed in December 2004. Bakwena also introduced electronic toll collection (ETC) to the South African toll road industry, which has proven highly successful in alleviating congestion at toll plazas, particularly in the urban areas of Pretoria. The system used on this project will be implemented on all new and existing toll roads in the years to come.

This holistic view to infrastructure development, shows the complementary role of different transport modes in relation to each other in creating wealth and economic growth, which is so needed in the region,' said Leo Röhrig, CEO of Bakwena.

RENEWED FOCUS ON RESEARCH AND INNOVATION

WEDNESDAY 5 OCTOBER 2005 marked the 60th anniversary of South Africa's Council for Scientific and Industrial Research (CSIR). 'We are launching a reshaped and revitalised CSIR to respond with agility and resilience to changing environments, unpredictable expectations and emerging opportunities,' said Dr Sibusiso Sibisi, CSIR president and CEO.

'Building on the solid foundation of the past 60 years, the CSIR is entering an era of regeneration in science and technology (S&T) to create a national research and innovation icon that will make a visible difference in our country. Key factors for socio-economic success in a country are a strong national S&T base, notably highly skilled people, and an edge in research and innovation,' commented Sibisi.

The CSIR started with a major repositioning process in 2004 to ensure that the organisation delivers on its dual-focused mandate – to foster industrial and scientific development and to contribute to the improved quality of life of the people of South Africa.

'The aim of the reconfiguration has been to strengthen our S&T base; build and transform our human capital; and ensure that we address national challenges and development objectives. The renewed CSIR will perform relevant, directed research and transfer the knowledge that is generated through technology and skilled people,' said Sibisi.

Research and development (R&D), as well as R&D outcomes as integral parts of the research and innovation value chain, remain the focus of the CSIR. Knowledge generation and application reside at the core of the CSIR, with three groupings dedicated to this:

- **Emerging research areas** New areas of science that the CSIR wishes to pursue. Such areas could be unique to local circumstances or be successful internationally and need to be established for local competitiveness.
- **The R&D core** Operating units that draw together skills from research fields and scientific disciplines to address national S&T needs. The new CSIR operating units are Biosciences; The Built Environment; Defence, Peace, Safety and Security; Materials Science and Manufacturing; and Natural Resources and the Environment.
- **National research centres** Facilities of strategic importance for African science over at least the next two decades. These currently include the Meraka Institute (African advanced institute for information and communications technology); National Laser Centre; National Metrology Laboratory; and Satellite Applications Centre.

The CSIR Knowledge Services group will manage routine specialised and differentiated services. Since a different operating culture is required to sustain these commercially driven operations, the Knowledge Services group will be managed separately within the CSIR.

GAUTRAIN DRAFT PRELIMINARY DESIGN REPORT PUBLISHED

THE GAUTENG DEPARTMENT of Public Transport, Roads and Works has published a draft preliminary design report for the Gautrain Rapid Rail

Link on 14 October 2005. The objective is to obtain public comments to inform the later approval decision of the report to be made by the MEC for Public Transport, Roads and Works, Ignatius Jacobs. After publication of the draft report the public will have 30 days to submit comments.

Route determination

Before construction of Gautrain can begin, three processes have to be complied with in terms of the Gauteng Transport Infrastructure Act (the GTIA), namely route determination, preliminary design, and proclamation/expropriation.

The route determination phase has been completed with the official approval by the MEC for Public Transport, Roads and Work of the route on 1 August 2005. Publications regarding this approval appeared in the *Provincial Gazette* and local newspapers on 5 August 2005.

Amendments

On determination of the route, the Gautrain preliminary design had to be finalised taking into account the proposals made by the preferred bidder, the Bombela Consortium. The draft preliminary design being published now does not cover the whole route of the train, since Bombela have indicated that they would prefer to amend certain sections of the route to provide for a more efficient system. Before the draft preliminary design for these amended sections can be finalised, environmental impact assessments (EIAs) have to be completed through consultation with interested and affected parties.

More detailed information on the amendments and the public consultation processes will be communicated to the public in due course. The affected route sections include:

- A changed alignment between Mushroom Farm Park in Sandton and the M1
- An altered vertical alignment from the Marlboro tunnel portal across the Jukskei River valley and the N3
- An altered vertical alignment in Centurion between the N1 / John Vorster interchange and the Jean Avenue interchange with the Ben Schoeman Highway
- A changed alignment on the approach to Pretoria Station in the area around Salvokop
- A changed and refined alignment between Pretoria and Hatfield stations
- An altered alignment for the Rhodesfield Station and the line into and station at Johannesburg International Airport

The final process involves the proclamation and expropriation of the rail reserve. This involves notifications in advance and negotiations with affected property owners on the impact and associated compensation for their properties. Compensation will be determined based on the provisions in the Gauteng Transport Infrastructure Act that includes market value related valuations.

Draft preliminary design report

Where the route determination phase was concerned with the establishment of a centre line for the railway line, the preliminary design phase is concerned with the technical design of the vertical and horizontal alignment of the railway line with the aim to determine the boundaries of the rail reserve in terms of co-ordinates and in relation to cadastral boundaries and data. Thus, the preliminary design defines the impacts on affected property owners, service providers and municipalities.

To view the report

The draft preliminary design report may be inspected at www.gautrain.co.za and at various addresses to be communicated in the press. Interested and affected parties are invited to submit written comments on the draft preliminary design report within 30 days from the date of publication.

ARMY ENGINEERS HAVE PUMPED NEW ORLEANS DRY

NEW ORLEANS is dry, US Army engineers said on 13 October after pumping almost a quarter of a trillion litres of water from the storm-soaked city.

Pumping stations that normally work to keep water out of New Orleans, which is a few feet below sea level, were operating to drain remaining pockets of water, according to the corps 'Task Force Un-watering Team'.

It took 43 days of around-the-clock work to patch broken levees and pump out flood water left by hurricanes Katrina and Rita, the corps reported.

Flood walls around the city have been raised to ten feet and the corps is still facing the job of fortifying the levee system. The next steps are all the things that pertain to bringing the levees back to pre-Katrina strength.

Independent Online

TEAM TO STUDY LEVEE FAILURES IN NEW ORLEANS

A RENSSELAER Polytechnic Institute engineer is headed to New Orleans as part of an expert team investigating levee failures in the aftermath of Hurricane Katrina. The researchers, who are funded by a special exploratory grant from the US National Science Foundation (NSF), plan to take lessons from the disaster and apply them to the design of levee systems across the US.

Rensselaer's Tom Zimmie was recruited for the project by Ray Seed, professor of civil engineering at the University of California, Berkeley. Seed has brought together a group of nationally recognised experts with extensive experience in the field of natural disasters. The team will be collaborating with the US Army Corps of Engineers and the American Society of Civil Engineers.

'Civil engineers have been warning of the possibility that a hurricane might breech the levees in New Orleans for years, with the potential for catastrophic flooding,' Zimmie says. 'There are hundreds of miles of similar levees across the United States, and we need a better understanding of how to design these systems to protect people from future disasters.'

In the coming weeks the team will investigate a number of aspects of the New Orleans levees, including the damage caused by wind-driven waves and overtopping, the effectiveness of emergency 'patches' put in place by responders, and the decision process behind the levee configuration. Some levees did not fail, and these provide a further opportunity to gain insight into the design of current and future levee systems.

'The most critical time for embankments and levees is during flood conditions,' Zimmie says. 'The Mississippi River floods every spring near New Orleans and the city is obviously not evacuated. Just imagine if there was a terrorist attack during that time.'

Newswise

US RESEARCHERS MAKE BENDABLE CONCRETE

A NEW TYPE of fibre-reinforced bendable concrete was used for the first time in Michigan this summer – and University of Michigan (U-M) scientists hope that their new material will find widespread use across the country.

The new concrete looks like regular concrete, but is 500 times more resistant to cracking and 40 % lighter. Tiny fibres that comprise about 2 % of the mixture's volume partly account for its performance. Also, the materials in the concrete itself are designed for maximum flexibility. Because of its long life, the engineered cement composites (ECC) are expected to cost less in the long run as well.

ECC technology has been used already on projects in Japan, Korea, Switzerland and Australia, but has had relatively slow adoption in the US, said engineering professor Victor Li, whose team is developing the engineered cement composites. That is despite traditional concrete's many problems: lack of durability and sustainability; failure under severe loading; and the resulting expenses of repair.

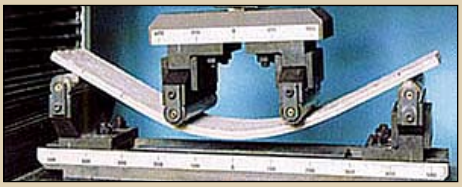
Li believes ECC addresses most of those problems.

The ductile, or bendable, concrete is made mainly of the same ingredients in regular concrete, minus the coarse aggregate, Li said. It looks exactly like regular concrete, but under excessive strain, the

ECC concrete gives because the specially coated network of fibres veining the cement is allowed to slide within the cement, thus avoiding the inflexibility that causes brittleness and breakage.

Fibre-reinforced concrete is not new, but Li believes that U-M's ECC – under development for the past ten years – is vastly superior to other fibre-reinforced concretes in development today. The key is that ECC is engineered, Li said, which means that in addition to reinforcing the concrete with microscale fibres that act as ligaments to bond the concrete more tightly, scientists design the ingredients in the concrete itself to make it more flexible.

'The broad field of micromechanics has tried to understand how composite materials behave,' Li said. 'We went one step further and used the understanding as a material design approach in the development of ECC.'



Some applications

In Ypsilanti, Michigan, the Michigan Department of Transportation used the ECC to retrofit a section of the Grove Street bridge deck over I-94. An ECC slab replaced the expansion joint and linked the adjacent concrete slabs to form a continuous deck. An expansion joint is a section with interlocking steel teeth that lets the concrete deck move as a result of temperature variations, but major problems occur when joints jam frequently, and scientists expect significant savings by using ECC.

The newly constructed Mihara Bridge in Hokkaido, Japan, has a 5 cm ultra-thin deck of ECC. The bridge is 40 % lighter than traditional concrete and has an expected service life of 100 years, Li said.

While long-term studies are still needed, comparison studies by the School of Natural Resources and Environment's Center for Sustainable Systems, in conjunction with Li's group, show that over 60 years of service on a bridge deck, the ECC is 37 % less expensive, consumes 40 % less energy, and produces 39 % less carbon dioxide (a major cause of global warming) than regular concrete. The study notes that the findings are based on the assumption that ECC lasts twice as long as regular concrete – a reasonable assumption given the known information, but it must be confirmed through further study.

GMBA SCHEME PRODUCES FIRST QUALIFIED ARTISANS

ON 11 OCTOBER the Gauteng Master Builders Association handed out the first 13 qualification certificates to trainees under its Building Industries Learner Training (BILT) scheme.

Speaking at the function in Midrand, Colin de Kock, executive director of the GMBA, described the event as a milestone for the building industry. 'Since the mid-90s there has been hardly any artisan training. South Africa is not short of site management skills but desperately needs more artisans. Hopefully, the BILT scheme will go from strength to strength and be instituted throughout South Africa by other Master Builder bodies.'

De Kock said the critical shortage of artisans had been caused by a reluctance to train by the building sector. 'In times of prosperity, employers cite a lack of time for training. In bad times, they say there are no jobs for artisans. Yet advancing age and Aids are systematically eroding South Africa's site skills and artisans who leave the industry are simply not being replaced.

'The GMBA realised – after I had completed a fact-finding study tour of Australia a few years ago – that group training, such as that offered by BILT, would provide a new source of qualified artisans. We hope that the first 13 qualifiers recognised today will be only the start of a steady stream of new artisan skills,' he added.

Eunice Forbes, president of the GMBA, said the BILT scheme would make it easier for qualified artisans to find employment – and eventually become entrepreneurs in their own right. 'This is indeed a milestone occasion for the building industry,' she said.

BILT is a S21 company that operates as a non-profitmaking organisation, with operational costs sourced from CETA. The scheme involves the recruitment of potential learner artisans; training at registered training providers; procured on-site training and employment; and eventual qualification. All training costs – including allowances to the learners – are carried by BILT.

Learners are able to enter the BILT scheme at any time and are not limited to commencement at the beginning of any year. The training period is, on average, three to six months at the service providers and eight to 16 months on-site training leading to qualification.

TRANSLUCENT CONCRETE DEVELOPED IN EUROPE

LITRACON, A FORM Of translucent concrete, has been developed by a Hungarian architect, Aron Losonczi.

Losonczi embedded thousands of optical glass fibres to form a matrix, running parallel to each other between the two main surfaces of a concrete block. The fibres blended into the concrete to become a component of the material – rather like small pieces of ballast.

The presence of the glass fibres makes it possible to see images of the outside world through the concrete, like the silhouette of a tree, for example. Shadows on the lighter side appear with sharp outlines on the darker side of the concrete. Even the colours remain the same. This special effect tends to make the thickness and weight of a concrete wall disappear.

Translucent concrete offers a variety of interesting design possibilities

The concept of translucent concrete is now finding increasing favour in many parts of Europe, in particular, after commercial production started.

For example, LiTraCon blocks were used as paving for a public plaza in Stockholm. Lights below the blocks illuminate and form a underground pattern at night. Also in Stockholm, a church constructed with translucent concrete walls displays the permanently moving shadows of trees outside in a symbolic presentation of light transcending the boundaries of heavy stone.

But perhaps the most impressive LiTraCon installation so far is Europe Gate, a 4 m high LiTraCon sculpture erected last year to celebrate Hungary's membership of the European Union (EU). Europe Gate features 3,5 m² of LiTraCon blocks.

LiTraCon translucent concrete recently won the respected German Red Dot 2005 Design Award for 'highest design qualities'.

In the home, the material can be used for applications such as countertops lit from below, walls, flooring, and stairwells that need natural lighting. In restaurants and hotels, the blocks could be attractive design features. Translucent concrete can also be used to create see-through barriers to shield government buildings from car bombs. And LiTraCon indoor fire escapes – with light filtering through even in a power failure – have been described as potential life-savers.

PHOKENG TO SUN CITY ROAD TO BE RECONSTRUCTED FOR 2010 WORLD CUP SOCCER

THE PHOKENG TO SUN CITY road – Road P115/1, the provincial road between the N4 and Road P51/1 – will be the major access road between Sun City and the Phokeng stadium for the 2010

World Cup Soccer. The National Department of Transport identified the road to be upgraded for 2010.

In 2002 Vela VKE Consulting Engineers were appointed by the Department of Transport and Roads to design the upgrading of the P115/1 from Phokeng to Ledig. This project is a joint venture or partnership between the North West provincial government and the Royal Bafokeng Nation (RBN), whereby each will contribute 50 % to the costs of the project.

The scope of the project, as decided by the department and the RBN, is to upgrade the 30 km stretch of road to a high standard single carriageway road that will be one lane of a future dual carriageway road.

Two main criteria were set as non-negotiable planning issues which must be complied with: road safety and the environment.

The road is 30 km long and for planning purposes was divided into four phases: phase 1 from Phokeng to Boshoek, phase 2 through or past Boshoek, phase 3 from Boshoek to Ledig, and phase 4 from Ledig to Sun City.

The detail design and EIA of phase 1 is nearly complete and it is expected that construction will begin in March 2006.

Planning on phase 2 commenced some time ago and the EIA process started in April 2005.

The project will include improvement of drainage structures, including the bridge over the Elands River. Expected total project costs are between R115 million and R120 million.

The School of Concrete Technology ... presenting education globally through correspondence

DISTANCE EDUCATION FROM SCT

SOUTH AFRICAN COMPANIES can again have their staff trained through correspondence by the Cement & Concrete Institute's School of Concrete Technology while working outside the country.

The School's Education Programme for 2006 says the correspondence courses are presented under the auspices of City & Guilds International, which examines and certifies the courses. 'City & Guilds certificates are internationally benchmarked and recognised,' states Dr Rod Rankine, C&CI education and training manager.

He says the school offers parts 1 and 2 of the City & Guilds International Course 6290. These will be presented by the SCT as SCT 41: General Principles (over nine months) and SCT 42: Practical Applications (also over nine months). These courses may be studied simultaneously by suitably experienced students.

Examinations for the courses can be written in Midrand, Cape Town, Port Elizabeth and Durban, or in other countries by arrangement with local British Council offices.

▶ **Free copy of the programme**

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THUTHUKA DESIGNS UNIQUE PLANT FOR CHINA PROJECT

IN THE FACE OF international competition, local engineering firm Thuthuka Project Managers has been awarded the contract to design, build and maintain a hazardous waste treatment and disposal facility in China's Fujian Province. The $15,5 million project is a joint venture between three companies: Thuthuka Project Managers, Sino SA Venture Capital Pty Ltd, and Fujian Solid Waste Disposal Company Ltd, a wholly owned subsidiary of the Chinese government's Environmental Protection Bureau. All three parties are shareholders in the Fujian Zhongnan Environmental Development Company Ltd, which owns the hazardous waste plant.

The project is situated in the Fujian Province on China's eastern seaboard. The South African contingent – Thuthuka Project Managers and Sino SA Venture Capital – is funding some $10 million while the Chinese partner will fund the remaining $5,5 million. The South African component of the project is being funded by the Industrial Development Corporation (IDC). One of the factors that sets this project apart from others, is that this is the first time that a project in China is being underwritten by the Export Credit Insurance Corporation. Financial services company Decillion assisted the South African team in structuring the financial package that made the project possible.

Thuthuka, a multi-disciplinary engineering firm with wide experience in managing water and waste treatment projects in southern Africa, is responsible for all of the engineering work on the hazardous waste management plant, while Chinese firms will carry out all of the construction work. As a shareholder, Thuthuka will operate the plant together with its Chinese partner. Thuthuka has been awarded a 25-year concession to operate and maintain the plant and has appointed a project and financial manager who will be based on-site in China.

The hazardous waste treatment and disposal plant will process a number of hazardous waste streams emanating from various industries in the Fujian Province. Thuthuka was faced with the challenge of designing a plant that was capable of treating five different streams of hazardous materials: medical and photosensitive waste; acid and alkaline waste; surface treatment waste and chromium; waste mineral oil; and waste emulsion. The result, a single plant that includes a wide variety of processes that allow five different streams of waste to be treated in parallel, emerging together at the tail end of the process for cementation and landfilling.

Thuthuka Project Manager's managing director Bill Pullen says: 'This is a very prestig-

ious project for us, firstly because of the size of the project, and secondly because we won the contract on an international tender basis against tenders from Japan, Taiwan, France and Greece.'

The company that won the tender was expected to put together its own funding package. Pullen comments: 'The biggest challenge in getting this project under way was not the technology required, but rather securing the funding. South African financial institutions are very risk-averse, which makes it very difficult for smaller South African companies to do business overseas. Naturally, language, time and cultural differences between South Africa and China also played a role, but the funding was the real challenge.'

The hazardous waste treatment plant is to be commissioned in 2006.

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SSI ESTABLISHES ENVIRONMENTAL SECTOR

STEWART SCOTT International (SSI) has announced the establishment of a fully fledged Environmental Sector, to increase to four the number of sectors in which it operates. There is considerable scope for growth in this sector across the continent and the new sector will be used as a platform to expand SSI's range of services. SSI's other sectors are Water, Industrial and Transport.

Graham Moon, appointed to lead the new sector, is upbeat about its prospects. 'Environmental issues are becoming increasingly important in the wider marketplace, and I'm confident that this new sector has the potential for solid growth. We're starting on a sound footing and have already secured a project at the Airport in Dar es Salaam, Tanzania,' said Moon.

SSI is also pleased that the new sector has been established in line with the requirements of the BEE sector charter. The acquisition of a majority share in Bohlweki, recently concluded with Rufus Maruma, chairman of Bohlweki, presented SSI with a timely opportunity to supplement its growth strategy. This strategy is strongly supported by SSI's international partner, DHV, which has already established a strong presence in the environmental arena. Bohlweki has enjoyed exceptional growth in the past few years and it brings on board high quality projects that will immediately add value to SSI.

Vic Prins, CEO of SSI, is excited at the addition of this new sector to the company's offerings: 'I strongly believe that the addition of the Environmental Sector reflects our own commitment to an environmentally responsible, sustainable approach to infrastructure development. SSI has always regarded sustainable development that promotes the interests of the community as the cornerstone of its services.'

'The addition of the Environmental Sector allows SSI to consolidate its position as one of the leading providers of consulting engineering services in South Africa, and it provides a solid platform to grow our business throughout Africa,' concludes Prins.

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COSTS OF GAUTRAIN TO EXCEED R20 BILLION

MINISTER TREVOR MANUEL announced in Parliament that the overall cost to the fiscus of Gautrain will exceed R20 billion over the next five years. This is the expected total exposure of Gautrain as expressed in nominal value.

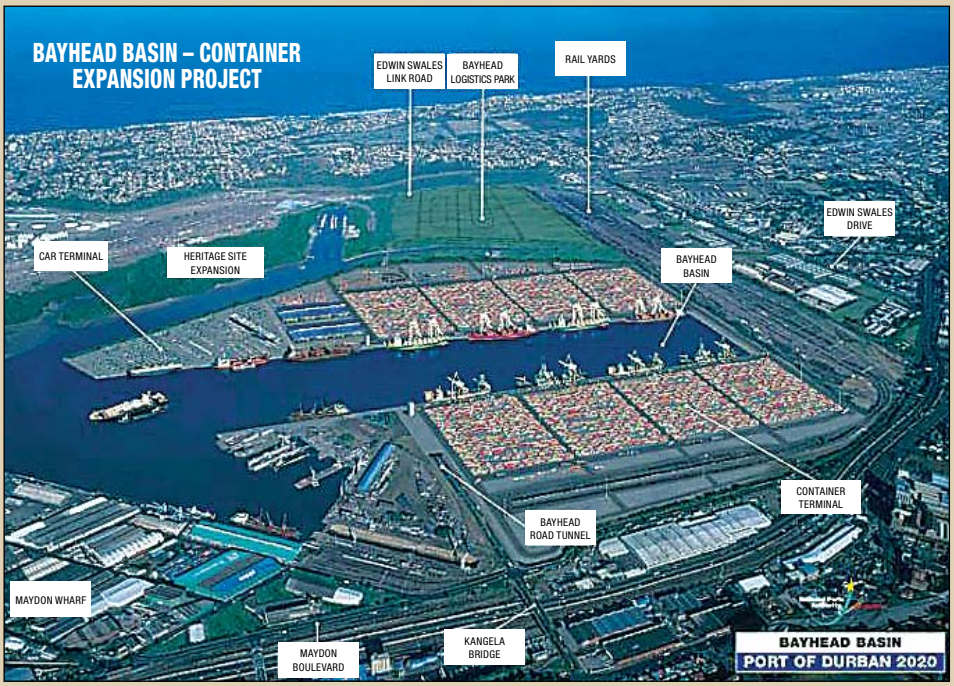
The project cost that is generally quoted is R7 billion. This is a February 2002 number and is expressed as a nett present value (NPV). Since

the 2002 cost estimates there were cost increases which increased the R7 billion to OVER R12 billion (an increase of just over 70 %).

Main reasons for the increase of cost are:

- Additions due to the environmental impact assessment (changes to the route alignment and introduction of mitigation measures)
- Net effect of higher ridership and the consequent increase in the size of the system due to opening date moving from 2007 to 2010 and the recent high increases in land costs impacting on the acquisition of land needed for the construction of the project
- Reviewed risk values due to the fact that in a PPP project all risks need to be priced and incorporated.
- VAT on the construction elements that was originally not included in the 2002 costing
- Reviewed contingencies as a consequence of the above factors

A few minor reasons that have contributed to the increased cost are additional tunnel lining due to geotechnical conditions, relocations of bulk services and reviewed insurance premiums.



An aerial view of the Port of Durban's Bayhead basin showing proposed development

PROTEKON'S KEY ROLE IN PORT PLANNING

TRANSNET SUBSIDIARY PROTEKON is part of the high-level multi-disciplinary team masterplanning the future of South Africa's eight commercial ports for the National Ports Authority (NPA).

The planning follows government's approval of a R37 billion port infrastructure plan to strengthen Transnet's position to provide clients with a seamless inter-modal freight transport service. 'The aim is to improve the ports' capacities and to upgrade port facilities to meet the growing demands of the economy and help lower the costs of doing business in South Africa,' Dave Stromberg, Protekon's Manager (Project Development), stated.

The multi-disciplinary project team expects to have completed the masterplans by the end of the year for input by the various role players and stakeholders.

Stromberg says the team is using a conventional approach to port masterplanning, but adapting it to the South African context. 'The first stage involves stakeholder consultation and status quo investigations. The role of a particular port is defined in terms of its position within the system, and then a detailed forecast of cargoes is undertaken. This forecast informs the planners as to the type of cargo, the size of the consignments, the characteristics of the vessels carrying it, and the frequency of ship calls.

'An engineering assessment is then undertaken of the existing capacity of the port, and the additional capacity required to handle the anticipated growth, or decline, in cargo categories. This identifies the waterside infrastructure such as entrance channels, berths, turning basins; landside infrastructure such as quaywalls, operational and stacking areas, buildings, sheds; as well as inland transport infrastructure such as roads, rails and pipelines that will need to be provided in future.

'The final stage of the process is the grouping of the projects needed to develop this new port infrastructure into a robust but flexible future port scenario. This is the "masterplan" which will guide future spatial development and operations within the port, and will show the cost and timing of investment needed by NPA.'

Stromberg says port solutions are never easy and there are a myriad of points to consider. 'For example, will the proposed 111 m high Nelson Mandela statue, planned for the breakwater of Port Elizabeth harbour, interfere with ship navigation and safety? Will port leading lights have to be fixed to the statue's knees?

'A tidal sandbank blocks navigation in the Bay of Durban. Can a channel be dredged through this sandbank, and open up the Bayhead area

WATER TREATMENT SYSTEM FOR NITRATE REMOVAL

ROHM AND HAAS, a global speciality chemical company, manufactures a wide range of commercially available products for the removal of contaminants from potable water.

The company has recently developed a new water treatment system for nitrate removal – the Advanced Amberpack system. By combining a nitrate-selective resin with fractal technology, Rohm and Haas has created a simple, modular system that has a small footprint and an exceptionally low volume waste stream.

'All potable water supplies should be disinfected in order to protect public health. Ion exchange is an important technology for selective contaminant removal from potable water and minimising waste is critical to making these ion exchange processes sustainable and economical,' says Peter Cable, sales and marketing manager for the Rohm and Haas Ion Exchange Resins division. 'Borehole, well and surface waters used in potable water applications can become contaminated with nitrate and while this substance is not toxic for adults, it can be linked to some serious conditions in infants.'

The Advanced Amberpack system is designed to overcome the traditional problems of removing nitrates from potable water, including disposal of high volume waste streams, high capital and operating costs associated with other nitrate reduction plant designs and the low water yields of alternate electrolyte processes.

Patented fractal technology from Amalgamated Research Inc has enabled the Advanced Amberpack system to become one of the lowest waste ion exchange systems available for the treatment of potable water. Brine waste volumes can be minimised to less than 1 % of the total water produced, generating more than 99 % yield.

Other features that contribute to the low waste performance of this system include a flat head design that practically eliminates excess water retained in typical dished head pressure vessels and the recovery and recycling of rinse waters.

The low profile and small footprint of this system allow for placement onto small well sites in a manner that is unobtrusive to the local community. This can save on land and building costs for new well sites. The entire process is automated and controlled with a touchscreen programmable logic controller (PLC).

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for future container terminal expansion? The environmentalists say "no – the unique intertidal marine life must be preserved – even if it means that the Port of Durban can no longer be expanded". What is the implication for the growth of Durban's economy, and where will future cargoes be handled – Ngqura, Richards Bay, Maputo?

'And can the new port of Ngqura be operationalised without taking existing cargo away from Port Elizabeth and East London? Should the Port of PE become a huge waterfront development?'

Stromberg says the port host cities want their ports to develop in a way that benefits their communities and region while environmentalists want to ensure that infrastructural developments are environmentally appropriate and sustainable. Private sector players in ports and shipping also have their own partisan interests.

'The planning project has been a wonderful experience for the Protekon participants, who have assisted the team with project management, scenario development, engineering studies, and graphic services. Undoubtedly, Protekon will be heavily involved in the design and execution of new terminals, expansion of existing infrastructure, and the introduction of modern technology to replace ageing equipment and facilities once the plans have been approved,' he added.

MAJOR AWARDS FOR FREEDOM PARK LANDSCAPING

A SPECIAL SURFACE RETARDER provided by Chryso South Africa played a major role in creating the exposed aggregate finishes which form an integral part of the award-winning landscaping of Freedom Park, now under construction on Salvokop, at the southern entrance to Pretoria.

The implementation of the landscaping won a Gold Award for Countryline Africa from the South African Landscaping Institute (SALI), and the design of Freedom Park's landscaping won an Award of Merit as well as the Presidential Award for the architects, Newtown Landscaping Architects (NLA).It is only the third time in the last five award ceremonies that a Presidential Award has been bestowed by the Institute of Landscape Architects.

Jiri Pechous, Countryline Africa's Contract Manager for the Freedom Park landscaping project, said the 4 000 m^2 paving contract was challenging as – after commencement in December last year – it had to be completed for the opening of the first phase on Freedom Day, 27 April 2005.

'The design called for exposed aggregate to complement the totally unspoilt environment on Salvokop and the spiritual atmosphere Freedom Park will radiate. Our work also called for the preservation of indigenous vegetation and the removal of any alien plants on site,' Pechous said. 'A major challenge was limited access to the site, while heavy rains in December posed alarming early delays, calling for weekend shifts.

'Holcim provided the ready mix concrete, Chryso the surface retarder, and the special quarry stones also came from Holcim. The combined input of the team helped overcome some initial shrinkage cracks and in the end we are delighted to have received the prestigious SALI award,' he added.

Eddie Correia, Chryso SA's General Manager: Technical Services, said the surface retarder, Deco

Freedom Park, where exposed aggregate finishes played an important part in the award-winning landscaping

Lav P, is operator and environmentally friendly, which made its application ideal for Freedom Park. 'The positive surface retarder slows the hydration of cement on exposed concrete surfaces. After the treated surface is cleaned, the aggregate in the concrete is exposed. No solvents are used in the formulation of the product, which usually makes protection of the surrounding areas unnecessary.'

Correia said the surface retarder had been widely used all over the world for exposed aggregate finishes in pedestrian precincts, ground slabs, cladding with visible aggregates, highway crash barriers in deactivated concrete, and other urban structures.

Concrete is generally an important role in the construction of Freedom Park, scheduled for completion in early 2009. Apart from the building structures, rocks brought in from ten historical sites all over South Africa were placed in concrete to form the sacred stone circle in Isivivane, the Garden of Remembrance (where visitors are asked to remove their shoes before entering.) There is also a concrete washbowl for washing hands as a cleansing ritual before entering Isivivane.

Freedom Park, for which WBHO and Rainbow Construction are the JV main contractors, has been positioned opposite the Voortrekker Monument to juxtapose the past with the new South Africa's processes of moving forward. The location of the park is also visually connected to other historically significant places in Pretoria such as the Union Buildings, Fort Skanskop, Fort Klapperkop and Church Square.

NEW CONCRETE POLE FROM INFRASET THWARTS CABLE THIEVES

INFRASET INFRASTRUCTURE Products has manufactured a new type of street lighting pole to help local authorities stamp out cable theft and a concomitant disruption to street lighting. The first batch, comprising 100 poles, was supplied to the Ekurhuleni Municipality for an installation in Knights, Germiston.

One of the new Infraset concrete poles at Knights in Germiston. The poles were installed as a countermeasure to the cable theft which had been prevalent in the area

Prior to the sinking of the new poles, the area had experienced several incidents of cable theft. This resulted in disruptions to street lighting and a general rise in crime levels.

The new poles offer the advantage of being cast with internal conduits, thereby enabling electric cabling to reside in the middle rather than being clamped to the exterior surfaces of the poles. This means that the cabling is not only supported by the poles but protected as well. Anyone trying to get at the cable will first have to destroy the poles, which are made of reinforced concrete.

'The introduction of these poles is a huge deterrent to cable thieves and should they attempt to steel cabling from one or more of the new poles the process will be so protracted they are liable to either give up or be caught red handed. Furthermore, concrete poles are resistant to vandalism and theft because they have no resale or scrap value; nor can they be used as firewood or building material,' says Sizwe Mkhize, product manager of Infraset's Concrete Pole Division.

The poles, which have a single taper, have been manufactured to the following specifications:

Pole length	13 m
Planting depth	2,0 m
Ultimate load transverse	10 kN
Working load transverse	4 kN
Transverse working moment at ground level	42 kNm
Load point from tip	400 mm
Safety factor	2,5

'The high strength-to-weight ratio of prestressed poles differentiates them from poles made from other materials. Moreover, the properties of prestressed concrete ensure that poles are thin and functional yet relatively light and convenient for contractors to handle. They are also maintenance free and, unlike other materials, suffer no loss of strength over the years, being resistant to insects, fire, rot and corrosion,' concludes Mkhize.

CEMENT CAPACITY EXPANSION PROJECT ANNOUNCED

PRETORIA PORTLAND CEMENT Company Ltd (PPC) recently announced the details of its R1,36 billion Batsweledi cement capacity expansion project. The board of the company has approved the investment of R1,36 billion to increase the company's inland cement capacity in South Africa by just over one million tons per annum. The additional capacity will supply both future demand growth in the South African cement market and the eventual replacement of capacity from older production facilities which will be retired when market conditions allow.

The announcement follows a year of detailed feasibility studies following an initial public statement in August 2004 which said that 'in the light of recent and future anticipated cement demand growth, and the planned future retirement of older PPC production lines, the PPC Board has resolved to commence with the planning for and broad approval in principle of, a 1 million ton per annum cement capacity expansion project for the inland region of South Africa'.

The final project plan announced has two components: R1,23 billion will be invested in the installation of a new kiln line and related infrastructure at PPC's existing Dwaalboom cement factory, which is situated in Limpopo Province on the border with North West Province. A further R130 million will be spent recommissioning and upgrading the existing cement milling facility at the Jupiter factory in Johannesburg. (All figures are quoted in escalated terms.)

The new capacity is expected to come on line in the second calendar quarter of 2008 and the capital expenditure, which will be financed by a combination of operating cashflow and borrowings, will be spread over the three financial years from 2006, with peak expenditure in 2007.

This project follows an announcement in May this year to invest R50 million to re-commission the 550 000 ton-a-year Jupiter factory in Germiston, south of Johannesburg. Work on that project is well advanced and the factory will come back on stream during March/April 2006. It will provide the market with additional security of supply over the two and a half year construction and commissioning period of the Batsweledi project.

An environmental impact assessment (EIA) has been completed for the new facilities at Dwaalboom and the necessary approvals to proceed with the project have been obtained from the authorities. By replacing old technology plant with state of the art technology, greenhouse gas emissions will be significantly reduced. There will also be a reduction in fossil fuel consumption per ton of cement produced. Work is expected to commence on site early in the first calendar quarter of 2006.

Batsweledi is a Sotho word meaning 'growing into the future' and was the winning suggestion from a competition among PPC's employees to name the project.

www.ppc.co.za

OPERATING RISK – THE ACHILLES' HEEL OF MAJOR INFRASTRUCTURE PROJECTS

AMIDST THE APPARENTLY universal acclaim accorded the forthcoming Gautrain Project by the built-environment professions [*Civil Engineering*, September 2005], perhaps we should pause a while to consider – aside from the issue of over-stretched technical resources, a worry raised by a few commentators – that awkward little question of economic viability. I am prompted to voice this (party pooping? sour grapes? – take your pick) concern by the simultaneous publication by the Institution of Civil Engineers (UK), in their August 2005 issue of *Civil Engineering*, of a paper entitled 'Operating Risk – the Achilles Heel of Major Infrastructure Projects'. [▶ *See p 16 for the full text of this article – Ed.*]

The background to the paper – by Roger Allport, Director of MRT Planning at Halcrows, UK – is the contents of the RAMP report issued recently by ICE (UK) in association with the actuarial professions (Risk Analysis and Management for Projects: A Generic Approach).

Allport reproduces several tables and other excerpts from this report that are germane to the question of estimating the financial viability of, inter alia, major urban rail projects. Table 1, 'Record of Financial Success for Metro/LRT Projects', analyses pre-commissioning (capex) cost over-runs and post-commissioning operating viability for numerous international urban transport projects over the last ten years or so. Allport notes that table 1 highlights the fact that 'metro capital and operating costs are generally underestimated and revenues overestimated'. He goes on to observe that the RAMP analysis shows that whilst engineers by and large appear to have got to grips with project cost over-runs (apparently they have come down from a typical 50–100 % in the past to a more manageable 10–20 % currently), by contrast, the abysmal record of unreasonably optimistic 'outcome' costing – that is, just how much of the capex will be able to be serviced by revenue from passenger ticket sales – has shown little change over the years.

(Here it is surprising that Allport does not call up the Channel Tunnel, which is teetering on the edge of bankruptcy, originally because of large cost over-runs (primarily on rolling stock and associated access and egress, by the way, not on tunnelling) and latterly because of cut-throat competition from budget airlines such as EasyJet and Ryanair and from the cross-channel ferry operators. One of Baroness (Margaret) Thatcher's less well applauded economic achievements was to tell the UK Channel Tunnel lobby in the 'eighties that the UK government would not fund that rail project – 'go and find your own private sector investors'. What prescience!)

The vastly greater uncertainty relating to the forecasting of 'outcome' parameters (mainly passenger usage) compared to that of capital works factors can be readily understood. But as Allport observes, the historical record shows that such uncertainties are commonly given inadequate weight – and one does not to have to be a cynic to understand why, bearing in mind the plethora of vested interests surrounding big capital projects.

As a taxpaying engineer – though not of the transportation variety, I freely concede – I can only hope that in our case the Gautrain 'owning & operating costs vs revenue' sums were done with due weight being given to the statistical uncertainty surrounding 'outcomes' and that Gautrain can therefore beat the RAMP odds, thus not haemorrhaging the fiscus (and hence our collective pockets) for the foreseeable future. Clearly the incipient traffic gridlock on the Reef has to be addressed – though I do seem to remember that alternative above-ground solutions were mooted some years back but, as I recall, shot down. But that's a story for someone else to take up.

James Metcalf, PrEng

RESPONSE FROM JACK VAN DER MERWE

SEVERAL STUDIES have been done on the feasibility of the project, including value for money and risk transfer. As this is a PPP project, these studies are required in terms of the PFMA regulations by National Treasury. Take into account that much of the risk is taken by the concessionaire. Owing to the greenfields nature of the project, a capped patronage guarantee has been built into the project in case expected passenger numbers are not realised. All capital and operational costs are built into the fixed price concession. We therefore know the extent of our possible exposure. We trust, however, that we will have excellent patronage support.

Jack van der Merwe, Project Leader, Gautrain

COMMENTS ON SEVERAL ARTICLES IN *CIVIL ENGINEERING*, SEPTEMBER 2005

As clear as mud …

Dawie Botha is quite correct in criticising the road signage, as this appears to be installed by people who have little if any knowledge of the requirements.

As a UK-registered civil and highways and transportation engineer who has designed urban roads, I dare point out that the designs of the vast majority of intersections leave much to be desired. This goes from the housing area intersections to the type of intersection highlighted in your article.

It should be realised that the intersections discussed by Dawie Botha are only the tip of the proverbial iceberg, as the majority of intersections are poorly designed in respect of safety sight-line requirements, etc. In addition, road marking is very poorly carried out and, worst of all, the Metro Police, who allegedly control the traffic, etc, appear to believe that a different set of traffic laws apply to their driving habits.

The current problems in regard to road design is caused by the fact that a vast number of registered qualified civil and transportation engineers have left South Africa to earn considerably better

salaries in other countries and to have a life with their families virtually free from violent crime. In addition of course is the fact that once their children are educated in their new country, only their qualifications and work ability will determine their ability to obtain work in their chosen field – ethnic grouping does not enter into the equation.

In most countries of the world there are laws against discrimination that are applied in an unbiased manner in obtaining work and in the workplace. It is unbelievable that those same laws are apparently entrenched in the South African constitution but appear to be purposely ignored by the government.

Potential impact of the Gautrain Project on civil engineering

It is a well-known fact in the building and civil engineering industries that there is an acute shortage of registered professional engineers in South Africa. This includes all qualified groups that register to practise their profession.

This article makes the shortage clear but does not complete the picture in regard to possibly the main reasons for that shortage in South Africa. A great majority of the shortage is directly due to three factors, namely the high incidence of violent crime in South Africa, the higher salaries and better working conditions provided in overseas countries where the majority have moved to, and the third factor, affirmative action, where the younger civil engineers, with young families, see no future for either themselves, or their families in South Africa owing to affirmative action as applied in South Africa.

It would now appear from this article that expatriate civil engineers are being sought to handle the Gautrain Project. As a British and South African retired civil engineer I would consider that to be a travesty of justice in that the problem has arisen because of illogical and incorrect planning and political manipulation of the qualified labour resources of South Africa. This has to become an extremely expensive exercise when the worldwide shortage of qualified and registered civil engineers is taken into account. Perhaps the government should reconsider its position in regard to affirmative action and not even consider this project until they have their own civil engineers available. If expatriate civil engineers are used, the taxpayer will have to pay huge premiums for the engineering skills required. Is it intended to pay the South African civil engineers' salary packages on a par with those paid to expatriate civil engineers, who may possibly be lured to South Africa for this project by not advising them of the violent crime problem? Should we just refer this entire matter to the media so that the public are fully aware of the additional costs of expatriate civil engineers and the reasons they are required for?

I can give a current example of the problem. A registered professional South African civil engineer, age 56 years, who is currently working in Botswana but has now almost completed his contract, did consider returning to South Africa. He was advised that he would have to employ local South African staff, to which he is not averse. However, when he made it clear that for him to be able to employ local staff he would require some guarantee of work, he was advised that he would only be considered for work – that is contracts – if he first employed local staff. The outcome of course is that

this particular South African civil engineer is almost certainly going to Britain, where he will obtain work with ease, in better conditions, and also be with one of his sons who already works in the industry in England.

CPD for civil engineering professionals becoming a reality

This is a very interesting topic, particularly when it has already been stated in this magazine that there is an extreme shortage of registered qualified civil engineers in this country. Where do ECSA and SAICE consider that the very limited number of civil engineers, who are already overworked and grossly underpaid, are going to get the time to gain those required credits?

In addition it is noted that the majority of the required activities, such as 'mentoring' and 'lecturing', all appear to be on a voluntary basis, which I consider to mean 'freebees'. In real life nothing is free, so be certain that although there is currently an extreme shortage of registered qualified civil engineers in South Africa, this current shortage will grow as ECSA and SAICE try to promote what appears to be 'freebees' or else your registration is not renewed. No professional worth his or her salt will ever react kindly to threats, particularly when the grass is vastly greener elsewhere.

Having dealt unsuccessfully with both SAICE and ECSA in regard to certain practices of certain 'registered professional civil engineers' that I considered to be totally unprofessional, I can only suggest that they themselves get their houses in order prior to trying to 'punish' the extremely limited professionally registered civil engineering resource that is currently available today in South Africa, as it will almost certainly diminish even more under the of threats of not renewing registrations.

Can it be assumed that membership of SAICE for 24 years, since 1980, therefore gives me 24 credits. As I first registered with ECSA in 1975 it would appear that I would require 5 credits to renew my registration. Fortunately I am a retired registered professional civil engineer, registered also in Europe and Britain, and will not provide 'freebees'. I have had to work extremely hard to have what I have achieved, and those achievements are, apart from actual qualifications, experience, experience, and experience, and nobody can teach experience – that can only be gained over time by working with appropriately qualified persons.

General

The foregoing observations and comments raise certain questions that require answers on an urgent basis.

EurIng George N Gray BScEng PrEng CEng MICE MIHT MSAICE (Ret)

SHORTAGE OF ENGINEERS

I REFER TO YOUR ARTICLE regarding the shortage of engineers in the public sector in South Africa. Let me give a bit of background to

my interest in your article.

I am a civil engineer. I graduated from university in 1992 and worked for a consulting firm for about ten years. I then applied for a position in a local municipality out of curiosity and was rather surprised when I was in fact offered the position, as I really was rather happy working in the private sector. I had heard quite a few rumours regarding the instability of local authorities in relation to inability to pay staff salaries, bureaucratic red tape and inefficiencies to deliver to the public at large. After careful consideration, I finally accepted the position and was determined to make a difference in the workplace in a local authority.

Initially I was pleasantly surprised by the job satisfaction and the goings on behind the scenes, although I did find a number of the existing council staff that were rather institutionalised and followed a very mundane work ethic that tomorrow was always another day. I refused to let this get me down and was determined to lead by example to both deliver and answer to the public. I was time and again reminded of procedures, and this slowly but surely started to frustrate and remove any initiative in every form. For example, temporary staff's contracts were allowed to expire before consideration was given to renew them. These staff were key in keeping plant and machines in operation. When plant went out of service due to mechanical breakdowns, the whole working gang were unproductive. No one up the chain seemed to care that gangs of staff were unproductive. Temporary contracts were only considered at the next council meeting, when in fact it should have been a formality in order to maximise how far the public funds could be stretched.

Soon the local elections came and new councillors were appointed. When they introduced themselves to the Engineering Department, we were told that there were too many 'pointy nosed' engineers in the department and that this would be addressed. This was the final straw as a few months before we were also told that performance-based contracts were going to be introduced for all senior positions. The catch was that after your contract expired, you would have to reapply for your position. This was one way of introducing affirmative action. I was not sure if performance would in fact be considered at all. With bonds and loans to be paid, I really did not think that I would like to be in a position where I could be out of a job with no income to address affirmative action numbers within the organisation.

I really think that there are many other positive ways of addressing the imbalances of the past, but did not really want to find out if my performance was sufficient to secure a renewal of my contract or whether the politicians were only really playing a numbers game. When an opportunity came for an engineering position overseas in a more stable environment, I jumped at it. I must be very honest and say that I found my work in the council at times very rewarding, especially in delivering services and infrastructure to the rural homelands, which were in serious neglect. The look on the people's faces touched me and I was wondering if I was in fact making the right decision to leave South Africa, but the future and stability of my family were far more important.

I really think that if the councils and municipalities are really serious about drawing engineers back to South Africa, they need to seriously look at the basic rules and procedures they use and operate on. The local authorities need to be run on similar grounds as private sector firms in increasing throughput and reducing bureaucratic red tape. Rewards should be given when initiative is taken. Time is money and the public are paying dearly in taxes spent badly. If ordinary companies can keep staff and produce the goods, I really can't see why this attitude can not be reflected in government organisations. All it takes is the right leadership with the right attitude to filter from the top down. If the leadership don't give a damn, then how on earth can those at the bottom look up and be inspired to make a difference in their so-called mundane routine job? A true leader is one that is prepared to set the example and roll up their sleeves and show how it should be done. My experience is that this is truly lacking in government organisations that can't even process payments on time to consultants trying to do the work for councils because those in government seem to be mostly on power trips. I believe that the local authority that I worked for has since lost almost all their white engineers due to attitude. When will we learn that to address the wrongs of the past is not to continually look back but to look forward and work together as a team whilst drawing on each person's talents? Nkosi sikelel'iAfrica – God Bless Africa.

Ian Swartz PrEng

AND SO TO LTORAS

I DON'T WANT TO BE all stuffy and it is not for me to preach but the current debate being waged in *Civil Engineering* in respect of LTORAS and the desirability thereof is irritating – and neither that amusing, nor the way to go about things.

I was extremely privileged to be invited to be part of the SARTSM Traffic Signals Workgroup. LTORAS was debated there at length and as I recall, the workgroup could not arrive at compelling reasons for it to be retained as an option. Opinions differ and I personally don't have a particularly strong feeling about it – other than that (as I recall) it was removed rather than forbidden as an option because the potential disadvantages thereof outweighed the potential advantages and there were other, cheaper and less risk prone ways of achieving the same end. The weight of opinion of the workgroup was against retaining it and it was thus removed.

Be that as it may – the purpose of this is not to debate the merits of LTORAS but to object to the way the subject has been raised in the feature 'My View' or 'Sê my Sê' or 'Dawie-gaan-al-weer-gal-af' or whatever it is called. It is neither dignified nor professional to make use of editorial privilege in this way. Perhaps John Sampson's name was used lightly and without foreknowledge or consent (I certainly hope so because I have an enormous respect for him) and merely in an effort to encourage a debate, but this sideswipe is in my opinion insulting to the workgroup and steers perilously close to the ECSA Draft Code of Conduct 3(5)(b): '… may not, whether practising their profession or otherwise, knowingly injure the professional reputation or business of any other registered person'.

As one of the consultants to the workgroup and, given that the workgroup would need to be reconvened and would presumably make use of the same consultants, John has a vested financial interest in this issue's being revisited. Having his personal views aired in this manner also steers perilously close to the ECSA Draft Code of Conduct 3(2)(i): '… may neither personally nor through any other person, improperly seek to obtain work ...' read together with 3(5)(e): '… may not advertise their professional services in a self-laudatory manner that is derogatory to the dignity of the profession'.

H A D (Bert) Kirsten PrEng MSAICE

DAWIE'S REACTION

SJOE! IT IS GREAT to receive at least some feedback … Let's turn this into a productive debate to make progress in what seems to be a dead zone when it comes to innovative ways to make the traffic flow once more …

It is imperative that we need to know what goes on behind closed doors and AT NO TIME John should/would be implicated, but if the writer of the Opinion piece 'Gaan Alweer Gal Af' is told that a certain ONE person believed that there is NO Merit in LTOR,

questions should be asked, should they not? What makes such a 'decision' valid and was this actually communicated to our members, who by default and implication are critised on a daily and weekly basis in the press about the traffic problems in Gauteng? Why not come into the open and tell us about those safer and cheaper options and help our members and decision-makers to implement these options?

Secondly! Opinions and viewpoints or letters reflect the opinions of the author and DO NOT imply a policy or official standpoint.

En soos die Predikant sal sê: Ek en John is baie lank al kollegas en ek het vir hom BAIE respek. Hy het al inderwaarheid vir my gesê sy kop en ander vervoeringenieurs se koppe is so kaal omdat hulle hul hare uittrek oor die besluitnemers nie vir hulle wil luister nie!

Dawie Botha
SAICE Executive Director

JOHN'S REACTION

I AGREE WITH Dawie's view that the more these issues are raised and debated, the better the result, but I don't agree with fingers being pointed if this is indeed what has been done.

Regarding the issue of LTORAS, the primary reason for 'banning' Left Turn On Red After Stop is that extensive South African experience has shown that where implemented, motorists simply DO NOT STOP. LTORAS was abused, badly or not publicised, not enforced, wrongly used, confusing and overall was a total hazard. It was also felt that the South African motorist is generally aggressive and probably not ready for it. The committee (and not an individual) took all these issues into account and decided to remove provision from LTORAS from the Road Traffic Act and Regulations, effectively making it 'illegal' to use it.

It was and is my personal opinion that LTORAS has a place and is used successfully without accident increases in many countries, notably the USA. It is also my opinion that it should be a standard rule (as in the USA) and that you should be able to turn left at any red signal, after stopping, unless a sign says you can't. This is in line with my philosophy, backed by experience, that the more you overly and unnecessarily restrict motorists from doing things which their common sense tells them it is quite safe to do, the worse your compliance of the really important things will be. While it is true that the opposite appears to have been shown in the LTORAS case, my view is that (a) it must become law – and not be an experiment, (b) it must be widely publicised, (c) it must be extensively enforced, particularly the 'after stop', and particularly when initially introduced, and (d) it should be extensively researched before and after. That being said, under the circumstances and in the absence of (a) to (d), I was party to the decision and endorse the committee's decision and the reasons for banning it.

The comment that the decision was made 'behind closed doors' is totally misleading and incorrect. The decision was published in the *Government Gazette*, comment was and still is invited, and I for one have presented the large number of decisions re traffic signals made by the committee, including this one, to the South African Transport Convention and at other conferences.

Ja, Dawie, I enjoy these types of debate and I am still tearing my hair out at the stupid way some traffic signals, fourway stops and road markings are done. But the problem is more that the wrong people have to make the decisions and a lack of capacity, training and experience rather than deliberately obstructive officials. So beware the finger pointing, especially if it is wrongly pointed at our profession.

(Dr) John Sampson PrEng

WROTE DAWIE

A FRESH breeze blows!

We should really publish these comments in the magazine and refer to what research was done and where it could be accessed and what the 'cheaper options' that Bert talks about are. We have a huge lack of mentoring in the engineering skills department and if we promote solutions that are worthy of using, it could just serve a dual purpose: alleviating the increasing (sometimes unnecessary) congestion and helping our (younger?) members to push for appropriate solutions with clients when they are appointed to design towns, complexes, etc. I personally would venture to say our members are NOT really considering for example left slipways, which could be one solution.

Finger pointing serves no purpose, but debating and informing and waking up our colleagues are not only overdue but imperative.

REACTED BERT

AS I RECALL the brief of the signals workgroup was to review existing provisions.

This meant a spectrum of options would open – from adding completely new stuff to – in the case of existing ones – retaining them 'as is' at one end of the spectrum to 'dumping them completely' at the other.

In the case of LTORAS (again, as I recall – I don't have the old version handy) this was only allowed if the left-turning movement was accompanied by a physical island – in other words, a glorified but signalised sliplane. The consensus eventually reached was that not to signalise it but leaving it as a 'yield' condition would achieve the same end, be cheaper, and have less potential for confusion.

This left the only option for LTORAS: to revert to the configuration without the island. For the reasons stated in John's reply this was dropped.

If anyone needs to go take a look at how it doesn't work, then I could recommend a visit to a certain Mpumalanga town on the N11 between Piet Retief and Hendrina where practically every signalised intersection has LTORAS (sans islands – physical or painted) on all four approaches. OK, they don't seem to have too many accidents but that's maybe because they have also introduced a flashing green to warn when the signal is going to change to yellow, everyone – not only visitors – drives with extreme caution knowing that the Taxi Fraternity interprets LTORAS as Left Turn On Red At Speed and even during peak hours they don't seem to have enough traffic to even warrant signals in any event.

If John would confirm (or correct) my recollection I am prepared to write this up as a proper article for *Civil Engineering* with his help, unless someone else wants to do it ...

Bert Kirsten

RESPONDED JOHN

YES, ABSOLUTELY, these debates should be published and Bert, I welcome the offer to assist you in publishing a paper.

In the paper we must distinguish between:

- A slip road, which is treated as a separate intersection in law, hence can have a yield (or signal control) independently of the main signalised intersection, and
- LTORAS, which is a modification to the signal control at the main signalised intersection.

We must also knock on the head this horrible tendency to build sliproads and then signalise them. They must be yield controlled.

The Act I refer to is the National Road Traffic Act 93 of 1996 plus Regulations, as updated.

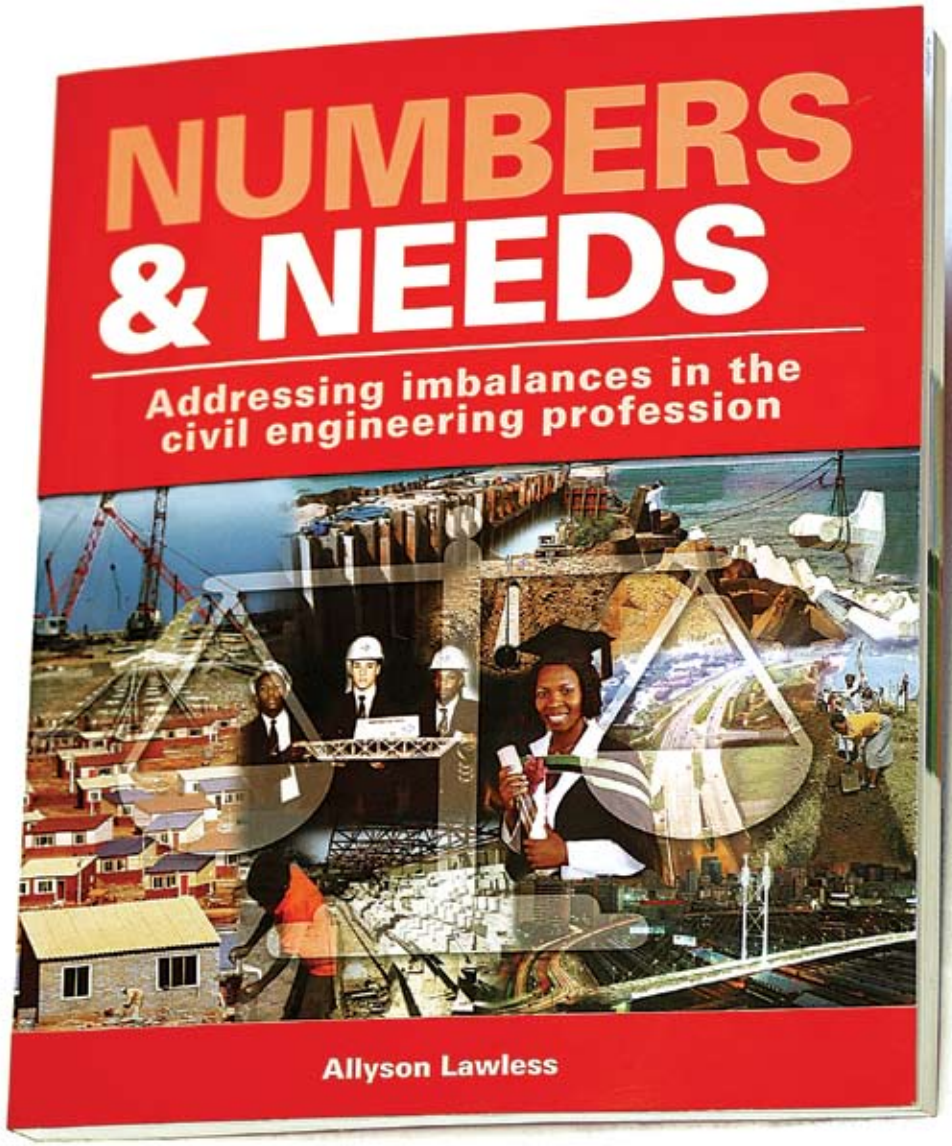
John Sampson

▶ *So, members, over to you – your opinion on all of these matters, please! – Ed.* □

A wake up call

to address the capacity crisis in SA civil

The nation's economy and the quality of life of its citizens depend heavily on the supply and efficient operation of infrastructure. Yet the civil engineering industry faces unprecedented challenges in attracting, recruiting and retaining the staff needed to design, manage and deliver this infrastructure. Allyson's book presents statistics and bottlenecks identified from 24 months of detailed research. It seeks to make practical recommendations in terms of education, learnerships, training, coaching and mentoring, as well as suggesting how to attract and retain professionals to develop sufficient civil engineering capacity to unblock bottlenecks. This is an excerpt from her groundbreaking report



DECLINING NUMBERS

There has been a slow decline in the number of civil engineering professionals (engineers, technologists and technicians) since the infrastructure development hey-days of the sixties and seventies. Factors such as reduced industry demand, reduced numbers of graduations, emigration, and low rewards have meant that personnel have left the market at a higher rate than those entering through tertiary institutions and immigration.

'Scarce skills' and 'skills gaps' are the current buzz words while the country

The SAICE publication **Numbers & Needs: Addressing Imbalances in the Civil Engineering Profession** by Allyson Lawless was launched in Midrand in October. The document covers a mega research project by Allyson and many other researchers into the capacity of the civil engineering profession and the factors that will define and drive civil engineering and infrastructure delivery in the next 10–15 years. The book is full of ideas and recommendations for individuals, companies, industry and government on how to tackle the skills shortage and as such should be compulsory reading for HR managers, politicians and practitioners, as well as management as a whole

engineering

grapples with capacity issues. The research indicates that many fundamental activities relating to the attraction, education and training of professionals are no longer in place or are inadequate. No long-term capacity planning has been carried out.

Unless the standard of education and training from kindergarten to retirement is adequate, competence in engineering and decision-making can never be achieved or maintained. Several aspects require attention, from English and mathematics in schools all the way through to tertiary education, graduate training, working conditions and continuing professional development.

THE STATUS QUO

Demand

Civil professionals are employed in many sectors (see figure 1). All sectors reported staff shortages, particularly of experienced mid-career professionals who are required to execute major projects and transfer knowledge to junior staff.

The private sector

The consulting sector reports that the current workload and continual reduction in staff has meant that capacity utilisation is now over 90 % on average and in excess of 100 % in many practices. Over 80 % of the consulting practices were seeking experienced engineers. In terms of equity goals, all were searching for black engineers, while 50 % were also looking for technicians and technologists.

The public sector

Shortages in all tiers of government are even more acute.

Local government has been particularly hard hit as a result of a number of factors, including budget constraints, restructuring, increased bureaucracy and pursuing equity targets.

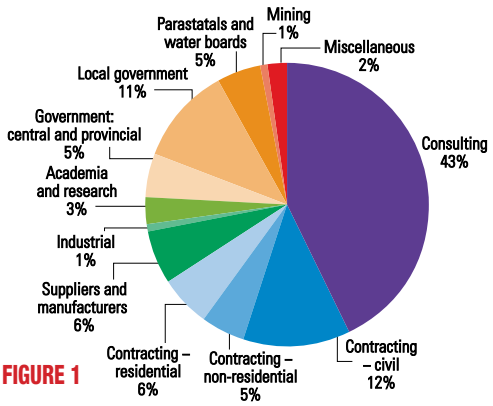


FIGURE 1

At least 800 to 1 200 more civil engineers, technologists and technicians required in local government alone

A census of all local and district municipalities and metros yielded the following statistics:

No civil professionals

- Of the 231 local municipalities 79 have no civil engineers, technologists or technicians
- Of the 47 district municipalities 4 have no civil engineers, technologists or technicians

Only one civil technician

- Of the 231 local municipalities 42 have only one civil technician
- Of the 47 district municipalities 4 have only one civil technician

Only young staff

- Of the 231 local municipalities 38 employ only technologists and technicians under the age of 35

Between 3 000 and 6 000 additional civil engineering professionals needed in the next few years

- Of the 47 district municipalities 6 employ only technologists and technicians under the age of 35

Only 70 with civil engineers

- Only 45 of the 231 local municipalities have any civil engineers
- Only 25 of the 47 district municipalities have any civil engineers

The vacancies that were identified mean that 800 to 1 200 more civil engineers, technologists and technicians are required in local government.

Shortages in **provincial and central government** are no less acute. Provincial structures reported posts that have been vacant for seven years and more.

Parastatals also reported significant vacancies. Transnet is particularly concerned about its capacity to deliver the new and upgraded infrastructure that is required. The total number of technical staff currently employed by Spoornet is less than half the number that was employed on the construction of the Witbank–Richards Bay Coal Line alone.

Growth and capacity

Given that R200 billion or more is to be spent on infrastructure in the next five to seven years, the view is that the civil engineering industry is entering a long-term growth phase. This growth will continue beyond 2010 because an expansion of infrastructure, upgrading of basic services and maintenance of the much extended network will be required.

However, if appropriate interventions

At the launch

Allyson presents a copy of her book to Dr Rob Adam, Director General, Department of Science and Technology, speaker at the launch

A bouquet of thanks to Marthelene Buckle. This was one of several that went to members of the team who made all this possible

Six thousand professionals have been lost to the industry through emigration, earlier retirement, or better prospects

are not made now, the projected growth will not be achieved and, worse still, continued vacancies in local government will mean that existing infrastructure will be rendered worthless.

Drivers

The current drivers on the demand side are Gautrain; the Soccer World Cup of 2010; the Eskom and Transnet expansions; the huge challenges of Nepad and the Millennium Development Goals; and private sector developments.

In total South Africa will need between 3 000 and 6 000 additional civil engineers, technologist and technicians, depending on whether projects are to run concurrently.

Supply

Around 15 000 civil engineering professionals are currently practising in South Africa. The profiles show three major trends, but the most important is probably the age distribution (see figure 2). The current profile shows a large group of experienced engineers in their late forties and older. This presents many problems, inter alia that there are insufficient mid-career staff to carry out production work and that a large percentage will be retiring in the next ten years, further reducing capacity in the industry.

The age profile problem is not unique to South Africa. However, elsewhere in the world retirement ages are being raised to retain the expertise, while increasing numbers of young people are being trained. By contrast, in South Africa this expert group is being retired early, for various reasons, including limited budgets and chasing equity targets.

THE CHALLENGES

Bottlenecks – capacity supply chain

Actions urgently need to be taken to ensure an adequate flow of entrants into the industry. Unfortunately there are bottlenecks at every step of the way.

- **Matric maths, science and English** Many professions, including civil engineering, require competence in these three subjects. To qualify for university entry, matriculants are expected to attain an A, B or C in higher grade maths. Few achieve this and competition for this select group is fierce from many other engineering disciplines as well as medicine, accounting and the natural sciences.
- **Tertiary education** Having achieved the results required for tertiary education, students still face many hurdles before graduating. The drop-out rate is very high – up to 70 % at some institutions.
- **Challenges facing graduates in the workplace** Having graduated, new entrants to the workplace face many more challenges before they can become technically competent and progress in their careers.
- **Retention in the workplace** The conditions of employment of professional staff have deteriorated over the years and have now reached a crisis situation. Staff retention has become a major problem. For example, senior staff in all organs of state continue to be offered early retirement packages in order to address budget constrain and the equity challenge. Since black students began to enter tertiary institutions in significant numbers only from the mid-nineties, there are few experienced black professionals to fill these posts. The posts remain empty, or are filled by inexperienced young graduates or non-technical staff who are unable to train juniors, or drive the roll-out of projects.

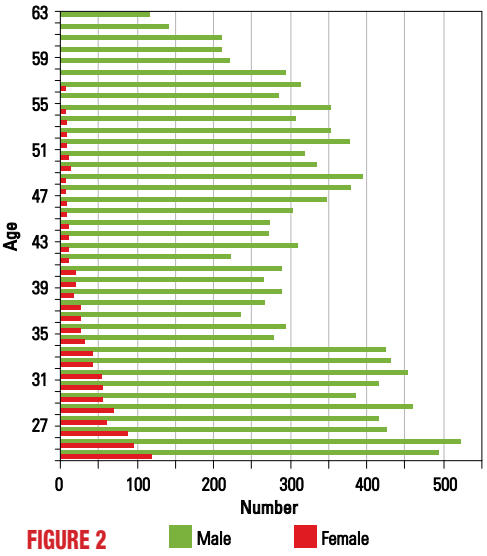


FIGURE 2

At least 6 000 educated and trained staff who have graduated since 1963 have been lost to the industry. A large percentage have emigrated, and the balance have taken early retirement, or moved into other, more lucrative sectors.

The construction industry employs some 400 000 people. In local government and water boards a further 125 000 or so are involved in civil engineering infrastructure. The ratio of civil engineers and technologists to the workforce is therefore roughly 1:60. For every civil engineer or technologist who leaves the industry, ultimately 60 jobs are lost.

Government has identified job creation in the construction industry as one of the saviours of the economy. But as long as the bleeding of civil engineering skills is allowed to continue, jobs will be lost. The opposite is also true. Increasing the number

of engineers and technologists will support the creation of more jobs.

Bottlenecks – infrastructure delivery

Although government has published many ambitious development plans and has assigned funds accordingly, they are not being spent. Infrastructure development is not taking place at the required rate as massive and ongoing restructuring within state organs, complex and extensive legislation and a lack of capacity give rise to bottlenecks that hamper these developments.

Bottlenecks – Black Economic Empowerment

The need to create opportunities for previously disadvantaged individuals (PDIs) has been addressed by affirmative procurement. This gave rise to fronting and little broad-based empowerment.

Numbers required

Civil engineering graduations in the past closely tracked civil spending. Since civil spending is on the increase once more, it is essential that there should be a commensurate increase in the number of graduates. Further, to compensate for the disproportionate number of retirements expected to take place in the next 5–10 years, additional graduates are required.

MAIN CONCLUSIONS

- There is a critical shortage of experienced civil professionals, particularly mid-career civil engineers responsible for production work.
- Loss of experience and knowledge must be reversed at senior levels.
- Training is an imperative. Significant effort must be put into education and training from kindergarten to retirement to ensure and maintain an adequate supply of high-calibre professionals.
- Retired professionals should be harnessed to assist with workplace training to develop the rapidly transforming pool of graduates.
- South Africans abroad or who have left the industry need to be encouraged to return to address the increasing shortages identified.

It was distressing to note that all the problems outlined have been raised over and over again, over many years, but little attention has been paid to the millions of rands' worth of reports that are simply gathering dust. It is encouraging to observe a new-found interest and will by leadership at the highest levels to address these issues.

What will happen if the interventions are not made and the status quo is perpetuated into the future?

- Delivery will not be possible and poverty will be endemic in South Africa.
- If adequate water and sanitation infrastructure services are not supplied, waterborne diseases will reach epidemic proportions.
- An increase in transportation gridlock and congestion in ports will hamper trade.
- Political instability will occur, because the growth rate of 6 % and job creation will be not be achievable.
- Engineering will become a career of last choice for adequately qualified matriculants.
- Continual loss of skilled capacity through early retirement, emigration, and moving to other sectors will require South Africa to become a nett importer of engineering skills to the detriment of the rand, investor confidence, the economy and the infrastructure since local knowledge and understanding is imperative in civil engineering.

ACTION REQUIRED

The much-debated skills shortage in terms of civil engineering professionals is real and requires immediate action! To succeed will require a collective effort involving political will and the cooperation of all tiers of government, the private sector, academic institutions and the civil engineering workforce.

▶ The report concludes with a logframe setting out the way forward and the actions required from all stakeholders. Use the order form below to secure your copy/copies of the detailed report NOW. This is a must-read for everybody in the industry!

SPECIAL OFFER FOR SAICE MEMBERS

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Text Marie Ashpole
SAICE

‘Civil engineering’s navigational star’

Front: Vanessa Bluen, Dawie Botha, Piliswe Twala-Tau; back: Henry Sambane, Johan Viljoen, Ismail Dockrat

HOW DO YOU DO JUSTICE to a multi-faceted person such as Dawie Botha when you are limited to a maximum of 700 words in reply to ten diverse questions about your boss? This daunting task formed the basis of our nomination of Dawie for the Boss of the Year competition organised by *Career Success* magazine and resulted in him being chosen as one of the 25 finalists. Needless to say, National Office was abuzz with excitement!

The next round, to determine the last six finalists, required 70-word elaborations on a set of statements such as ‘real leaders are ordinary people with extraordinary determination.’ As we indeed experience Dawie like this, we could honestly reply: ‘Dawie lives the vision and dream of Proudly South African and was instrumental in founding the Africa Engineers Forum. His pioneering spirit enhanced the Institution’s image – crucial to any nation’s development and stability. SAICE became the vehicle to influence people locally and internationally. Inherent faith in people, conviction, enthusiasm, perseverance led to SAICE becoming world-renowned – accepted, respected, a world leader. The American Society of Civil Engineers, Institute of Civil Engineers UK and others can attest to this.’

All the perspiration to qualify the various statements in the minimum number of words turned into elation when we were informed that Dawie was chosen as one of the six finalists for this prestigious award. When the phones started ringing and the photographers arrived the reality of the situation really dawned on us. It became quite hectic with interviews on radio and for magazines. To top it all, an absolutely select panel of adjudicators interviewed Dawie for almost an hour at the Sandton Sun and Towers Intercontinental Hotel.

When we met the other five finalists, we could see why they were there – each and everyone worthy of being the title-bearer of Boss of the Year! The incredible rapport among these finalists, all competing for the same title, was inspiring to observe. The other finalists were Henry Sambane, production director of Crabtree Electrical, Vanessa Bluen, managing director of The Consultant Warehouse, Piliswe Twala-Tau, regional director of Johannesburg Council’s Region 3, Johan Viljoen, mine manager of Mponeng Anglogold Ashanti, and Ismail Dockrat, chief executive of Wesgro.

On Friday 14 October the excitement of the supporters of the six finalists, as well as of the media representatives and sponsors, reached fever peak during a luncheon at the Sandton Sun and Towers Intercontinental Hotel. After dessert, Ms Ornella Trinco, one of the founders of the Boss of the Year competition, finally announced the winner – Ismael Dockrat, chief executive of Wesgro.

Although we were disappointed that Dawie did not become the title-bearer, we all realised that the big winner in all this was SAICE itself. With the exposure that Dawie had received, SAICE’s image was boosted and the understanding of what civil engineering is all about was enhanced.

STARS

Of this competition Ms Ornella Trinco said: ‘The annual search for top bosses, for role-models of workplace leadership is an incredible journey … It is no different to that of astronomers, particularly pioneer astronomers of the past who knew that what they could see with the naked eye was just a hint of what our highly populated and star-lit firmament had to offer. The only way forward was to invent the telescope, and keep improving on it so that no faint star would be left unexamined and deemed less important.’

She continued by saying that the Boss of the Year Award had become the telescope finding the stars in the galaxy of South African workplaces, and she likened each of the six finalists to star-like qualities. Of Dawie she said: ‘ … in Dawie the engineering field has found a true navigational star that has changed their course. Dawie’s influence and impact in the community he leads and serves is of a huge magnitude, and he has brought recognition, excitement and stellar dynamism to the field.’

What more can we add? □

Winners of 2005 awards announced

SAICE'S MOST OUTSTANDING civil engineering project achievements for 2004 were announced at an awards ceremony in Midrand on 12 October. The categories were community-based, technical excellence and international projects.

SAICE AWARDS

Community-based projects

Commendation: Amadiba Road Project

Amadiba Road Project: Ismael Essa (Sanral regional manager, Northern Region), Wayne Petersen (Sanral regional manager, Southern Region), Mike Deeks (president SAICE)

Technical Excellence Projects

Winner: Thesen Islands Development
Commendation: Deepening of West Quay, East London Harbour
Commendation: Sebokeng/Evaton Leakage Reduction

Thesen Islands Development: André du Preez (MD, Power Construction), Philip Grobbelaar (director, Arcus Gibb), Mike Deeks

Deepening of West Quay, East London Harbour: Johan Lombard, Henry de Wet, Pheko Montwedi, Mike Deeks

Sebokeng/Evaton Leakage Reduction: Ben van der Merwe (Metsi), Hennie Duvenhage (Metsi), David McConville (WRP), Ronnie McKenzie (WRP), Mike Deeks (SAICE), Potso Mohajane (Metsi), Willem Wegelin (WRP), Darius Mnguni (DMM), Collin Kekana (Metsi)

International Projects

Commendation: Kagera Sugar Mill Rehabilitation Project

Kagera Sugar Mill Rehabilitation Project: Raj Ramchuran (director, SBA), Max Stemele (MD, SBA), Mike Deeks, Clive Swaisland (CEO, B&A Group), Sid Turner (National Operations Director, SBA, and chairman of SAICE's Durban Branch)

SMART AWARDS

This year, for the first time, the Sanral-SAICE SMART Awards have been awarded.

The SMART Awards, a joint venture between SAICE and the South African National Roads Agency Ltd (Sanral), were established to satisfy the need to award not only projects but individuals who come up with SMART solutions to problems or innovative inventions – SMART in the sense of

S = Sustainable
M = Magnificent thinking, innovation
A = Amazing solution
R = Right for the time and place
T = Truly and proudly Civils South Africa

Winner: Roodeplaat Dam Dry Chamber – Dr Nick Dekker
Commendation: cncPave – an innovation in concrete road design: Bryan Perrie, Dr Pieter Strauss and Dr M Slavik

Roodeplaat Dam Dry Chamber: Dr Nick Dekker (Dekker & Gelderblom), Mike Deeks

cncPave: Dr Pieter Strauss, Bryan Perrie, Dr Martin Slavik, Mike Deeks

PHOTOGRAPHIC COMPETITION

The winners of the annual SAICE photo competition were announced as well:

Winner: Sky eye – Rudy du Preez
Second: Reach for the sky – Marius van Coller
Third: What a view – Henk Aartsma

All these awards will feature in our February 2006 issue

SAICE 2006 essay topics for professional registration

THE CURRENT PROCESS of registration with the Engineering Council of South Africa (ECSA) has been implemented in January 1998. The ECSA 'Discipline-Specific Guidelines for Civil Engineering' of February 2003, Clause 6.5, indicates that two essays will have to be written by candidates:

- The first essay will be on one of two technical subjects set by the reviewers in the context of the training report and the interview.
- The second essay will be on one of two topics selected by the interviewers from a list published in advance by SAICE.

Guidance notes for the assessment of essays are set out in the Guidelines for Professional Registration of Civil Engineers, available from the Institution.

The topics for the second essay for 2006 are listed below and have been approved by the Professional Advisory Committee on Civil Engineering at ECSA:

- Discuss the changing roles of engineering professionals in the built environment and the civil engineering profession in particular.
- During periods of recession employers are forced to reduce their running costs. Discuss the possible implications of a major reduction in the training budget. Suggest some alternative options and give reasons.
- Discuss whether the civil engineer of the future should become more of a specialist or a generalist.
- Discuss the way in which the resources required for a design project or a construction contract should be organised and managed in order to ensure that technical objectives are met and work is completed on time and within budget. Refer to your own experience where appropriate.
- Many civil engineers would call themselves managers but few become leaders of their organisations. Discuss the qualities which enable a manager to develop into a leader.
- Globalistion presents new challenges and opportunities to the engineering profession in South Africa. Discuss the implications for South African civil engineers and their employer firms.
- In projects for developing countries emphasis is often placed on the need for the transfer of technology. How can this best be achieved in practice?
- Discuss the effect of environmental regulations on the design, documentation, and construction of civil engineering projects.
- Discuss appropriate and sustainable engineering solutions, having regard to the environment and the use of unskilled and semi-skilled workers (for example roads, arch masonry bridges, and soil-cement).
- Although failures may be a disaster for the individuals concerned, many have led to advances in theory, design, and construction methods. Discuss how failures should be dealt with so as to ensure the maximum benefit to society and the engineering community.
- Increasingly South African industrial and infrastructure projects are being evaluated according to the impact on communities within which they are located. Discuss the opportunities and threats inherent in such projects and the role civil engineers can play in delivering value to society through their involvement in such projects.
- To what extent should the public be involved in the decision-making process for Infrastructure projects? What role should civil engineers play in such consultations?
- Discuss the problems involved in meeting the requirements of the Occupational Health and Safety Act in the design, construction, upgrading and maintenance of civil engineering projects, and discuss health aspects which may not be covered by the Act (for example skin cancer, malaria, HIV/Aids and TB).
- Discuss the difference between 'quality control ' and 'quality assurance'. Discuss the requirements for quality management by clients, designers and contractors, and their respective contributions to the success of a project.
- Industrial relations affect activities on a construction site. How can they influence flexibility in working practices, incentive schemes, quality of work and safety?
- Risk is inherent in most civil engineering work. Discuss the ways in which such risks can affect the employer and the contractor, and how they can influence the form of contract and the contract price.
- 'The estimation of costs of schemes and their budgetary control is one of the key functions of the engineer.' How should engineers be trained to fulfil this function in design and construction?
- Identify the areas in which disagreement between a resident engineer's staff and the contractor's staff may develop. How can good relations between these parties be achieved? Illustrate where possible from your own experience.
- Describe the power of the engineer to delegate decisions to the engineer's representative under the General Conditions of Contract (GCC 1990 / Colto GCC 1998). In what circumstances could an engineer vary the level of delegation during the construction period?
- Continued learning is part of the professional engineer in a fast changing environment. Discuss how Continuing Professional Development could be applied to maximise lifelong learning irrespective of location.
- What impact will the 'Knowledge Economy' have on the civil engineering profession in South Africa?
- Discuss how the application of ethics in civil engineering projects or contracts should be managed in order to ensure that the negative impact of corruption and similar practices are minimised. □

CALL FOR COMMENTS ON THE GENERAL CONDITIONS OF CONTRACT FOR CONSTRUCTION WORKS (GCC 2004)

SAICE Procurement and Delivery Management Panel

The 1st edition of the General Conditions of Contract for Construction Works (GCC2004) was published in May 2004. This form of contract replaced the General Conditions of Contract for Civil Engineering Works (GCC 1990) and the General Conditions of Contract for Road and Bridge Work for State Roads Authorities (COLTO 1998). It is one of the forms of contracts prescribed by the Construction Industry Development Board for use in the public sector.

SAICE's Procurement and Delivery Management Panel, with the aim of continuously improving procurement practices, is considering the need to amend GCC 2004 and to possibly bring out a second edition. Users of GCC 2004 are accordingly invited to make submissions on possible amendments to the secretary of the panel, Alain Jacquet (fax 011-404-1728; e-mail: ajacquet@ssinc.co.za) by **30 November 2005**. The panel will take a decision in January 2006 as to whether or not a second edition is warranted based on submissions received.

GIJIMA
Branch Visits

Harbour scene, Richards Bay

Zululand

Mike proclaimed the Zululand Branch visit at Richards Bay the best branch visit he had ever had – of course he had to concede that it was his first branch visit!

Livania Kasaven-Reddy made sure his visit was memorable, interesting and varied. The former chair and vice-chair were all there, as well as the other youthful committee members.

The National Ports Authority was our host. Past, present and future of the port was presented and the success story is like a never-ending tale. Conceptual planning and preparing for a future 50 years ahead when the full potential could be reached is Lynton Demont's daily bread.

The Richards Bay Coal Terminal visit proved that the world can be black and green at the same time. To see South African coal sucked into the world is fascinating. Sustainability to export coal is there for another 100 years or more. But what then?

The day was concluded with a function at the local municipal offices hosted by Frik Bosman and we had a further chance to discuss issues of mutual interest.

Coal tipplers at Richards Bay Coal Terminal (RBCT)

Durban

We brought the rain to the province, they said – not that we minded, especially since they needed the rain! But maybe Kimberley would mind because the SAICE president is their annual rainmaker …

The visit started at a soaking wet uShaka Marine World where we had to 'duck and dive' but still got wet.

To get any engineering group talking, take them to the Upper Deck Restaurant where clever interior decorating makes everyone believe that the floor is tilting, that magnets keep the things on the tables, where Peter Fisher even measured the chair leg lengths to make sure they were even. Well, we at last agreed that maybe the floor is slightly level and the other things like windows slightly at an angle …

The site visit was cancelled, but that meant more time for the committee to meet with us. Sid Turner and his team are very alive and well, and Durban is in good hands. This meeting seamlessly flowed into the members' cocktail function and all of us parted with new ideas, more information and fresh approaches.

This branch received the Executive Director's branch award for the best large branch for 2004 and Howard Goodes and team were once more congratulated on a job well done.

Pietermaritzburg

A young and energetic committee with a sprinkling of the more mature is currently under the able leadership of Shalen Jangali. For the first time in years we were on time, since the breakfast function took place at the Redlands Hotel, where we also stayed for the first time.

It was a nice change to have Peter Forrest apologise for being late and not us! In previous years we stayed in Durban and had to struggle uphill to Pietermaritzburg in the morning and Peter always took us to task about this.

The room was just big enough for the 30 guests and again we could discuss SACPCMP, CPB, career guidance, identification of work and other professional issues. I believe we all benefit from this type of interaction.

Mike was presented with a beautiful découpage ostrich egg supported on elephant heads. For those who do not know, Pietermaritzburg's emblem incorporates an elephant.

We then met with Dr Simon Oloo, who is the manager of the Technology Transfer Centre at the Department of Transport, KwaZulu-Natal. They have implemented a fascinating model of career guidance that we have also seen in the Transkei. Career guidance is offered at schools adjoining road construction projects. We shared a number of ideas and suggested that this career guidance outreach should be extended to include community orientation.

Training of young professionals remains a huge responsibility. In the current environment mentors are simply not available and fast-track training is needed. The shortage of skills is hurting progress.

We are looking forward to novel ideas and approaches and close cooperation between this department and the local branch, assisted by SAICE National Structure.

The Pietermaritzburg Committee: Back: Peter Forrest, Mike Deeks, Shalen Jangali, Preshane Chandaka, Kobus Burger. Front: Adriana Lazarova, Dawie Botha, Logashri Sewnarain, Jan Norris

In die pekanneutverwerkingsfabriek (Jandi Exports): Hannes de Kock (voorsitter, Upingtontak), Maureen Magagola (kwaliteitsbestuurder), Hanlie Rust (finansiële bestuurder), Michele Deeks, Mike Deeks, Ria Botha en Tienie Kotze (besturende direkteur) met Dawie Botha heel voor

Upington

Sondag vroeg opstaan, want daar is net een vlug per dag.

So teen 10h30 was ons daar, maar die hotel was nog nie reg vir ons nie. So eers uit na Augrabies, wat maar teen 65 kumek geloop het – die rivier was baie laag. Vergelyk dit met die 7500 kumek met een van die vloede!

Toe was dit saam eet met Hannes en Annette de Kock, en Frans Ferreira en menige storie wat so uit die hart van die Kalahari opbruis.

Volgende oggend – nog donker in hierdie geweste van die land – toe wag so 20 van die Upingtonners ons in vir ontbyt en die gebruiklike presidentsrede en saampraat – ons praat en die lede is saam!

Daarna het ons een van die uiters interessante niche-bedrywe besoek – neute uit Afrika! Jandi Exports en Kalahari Desert Products se Tienie Kotze is so entoesiasties oor sy pekanneutverwerking en -verpakking dat dit tonne moed gee vir die toekoms. Dit skep werk, opleiding, opheffing, bemagtiging en ons was ongelooflik beïndruk met sy inisiatiewe. Hy is entrepreneur, boer-maak-'n-plan, sakeman en mens en hy sê hy is nog bowenal getroud ook! Hanlie hou die geldbeurs in orde. Maar dit is tog jammer dat die banke in Suid-Afrika nog nie regtig die geroemde helpende hand is wat hulle sê hulle is nie. En dit is 'n jammerte dat hulle die entrepreneur so terughou …

Maar volgende keer as jy 'n pakkie pekanneute koop – wees bly dat daar sulke wonderlike produkte in ons land gekweek en bewerk word. En meer nog – dat hierdie man soveel doen vir 'n beter Suid-Afrika.

Ons het toe nog 'n vinnige draai by KWV se druiwesuikerkonsentraat- en brandewyndistilleerder gemaak, vanwaar ons land se druiwestroop tot selfs aan Mitshubishi in Japan gelewer word.

Wat 'n land, watter mense, en mense in diversiteit en harmonie – die toekoms in Upington is so blink soos hulle druiwestroop en wie is daar om te bedank? Die ingenieursprofessie.

Dankie, Hannes en Kie! □

DIARISE THIS!

Course	Organisation	Contact	Course date	Venue	Presenters
SAICE Lecture: Professional Issues: Identification of Work; ECSA CPD Requirements	SAICE	Angelene Aylward Tel 011-805-5947 aaylward@saice.org.za	16 Nov 2005	SAICE Offices, Midrand	Ron Watermeyer, Johan de Koker
Sanral New FIDIC Red Book Workshop	Sanral	Dawn Hermanus Tel 011-805-5947 dhermanus@saice.org.za	23 & 24 Nov 2005	CSIR Convention Centre, Pretoria	Vaughan Hattingh, Evan Massey, Andrew Fairfax
Roundabout Seminar	SAICE Transportation Division	Carla de Jager Tel 011-805-5947 cdejager@saice.org.za	21 & 23 Feb 2006	Midrand and Cape Town	Christo van As, Christoff Krogscheepers and John Sampson
SA Transport Conference	UP	Conference Planners; Amie Wissing Tel 012-348-4493 wissing@iafrica.com	10–13 July 2006	CSIR Convention Centre, Pretoria	
Business Finances for Built Environment Professionals	SAICE	Dawn Hermanus Tel 011-805-5947 dhermanus@saice.org.za	2–3 Feb 2006	Midrand	Wolf Weidemann
Environmental Applications of Geochemical Modelling	CEE (University of the Witwatersrand)	Lesley Stephenson	21–23 Nov 2005	University of the Witwatersrand	
Soil Stabilisation	SARF	SARF, Peter Pearse	28–29 Nov 2005	President Hotel, Bloemfontein	Graham Selby
Handling Projects in a Consulting Engineering Practice	SAICE	Dawn Hermanus	31 Jan – 1 Feb 2006	Midrand	Wolf Weidemann
Technical Reportwriting	SAICE	Dawn Hermanus	9–10 March 2006		