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ON THE COVER

The Southern African Large Telescope (SALT) – the largest single optical telescope in the southern hemisphere, with a hexagonal mirror array 11 m across – was officially opened by President Thabo Mbeki in November last year. SALT will be able to record distant stars, galaxies and quasars a billion times too faint to be seen with the naked eye (photograph Stephen Potter, SAAO)



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VIEWPOINT

Going for a ride?

All aboard!

To train or not to train?

A bridge too far?

The magic dragon ...

To go or not to go?



On the one hand ... on the other hand ...

THE CONTROVERSIES concerning Gautrain are a columnist's delight and frustration. Just think about all the wonderful titles that clever people have come up with. My prize for the best one in 2005 goes to:

Jack of all trains

which was splashed across page 9 in the *Midrand Reporter* of 9 December 2005.

And maybe that is what we are experiencing ... all of my colleagues and peers and even the public want to be Jacks and Jills of all trades. That is a common civil engineering trait. We often believe we know all, can do all ... After all, 'success comes in a can', said David Molapo. And for the public? Well, every person in this country is a house builder, for example, so what is wrong with trying your hand at a little input into the transportation debate?

And that is precisely at the root of all of this: we all have to travel, to commute to work, to go somewhere. Transport is not a luxury for the rich. It is not a choice. It has become almost as important as breathing, eating, drinking and ... getting rid of waste.

So whether we like it or not, something has to happen to improve and enhance our public transport sooner rather than later ... it is in fact later than we think and in some cases too late.

And maybe this is where we should take a deep breath of polluted air and get a little bit carried away, as some of us really like to do. Let us become wide-eyed dreamers and innovators and leave our hang-ups behind and even maybe – just maybe – stop thinking for others.

Maybe think about what is best for the country as a whole, maybe think about all,

and not only for some.

Maybe we can even look at quick-fix and even quick and dirty solutions that would help us out of the mess we are currently in in terms of public transport.

Maybe look and listen.

Maybe criticise less and do more?

Maybe if we stand united, we will be strong?

Some of our members have indicated that SAICE officially supports the Gautrain, but the SAICE Executive Board and Council have not taken a standpoint on the project, although we have noted that the Transport Forum did exactly that ... [▶ see page 33 – Ed]. Maybe at 'National' SAICE we cannot? Maybe the diverse views of members, some even members of the Transportation Division, do not allow us to be partisan or myopic or parochial? Maybe we will offend and divide and create camps within camps? WHAT IS YOUR VIEW?

But we do need to mobilise our profession to do something or do more about the crisis in public transport and transportation, not only in Gauteng but everywhere.

We therefore extend an open invitation to our members to use our magazine as a vehicle to come up with solutions that are smart.

And this SMART stands for Sustainable, Magnificent thinking and innovative, Amazing solution, Right for the time and place, Truly and proudly civils South Africa.

The road ahead is yours. We are waiting to share in the pioneering ideas and African open-skies-and-plains thinking. We await your comments!

Dawie Botha and Mike Deeks
December 2005

And maybe this is where we should take a deep breath of polluted air and get a little bit carried away, as some of us really like to do. Let us become wide-eyed dreamers and innovators and leave our hang-ups behind and even maybe – just maybe – stop thinking for others. Maybe think about what is best for the country as a whole, maybe think about all, and not only for some. Maybe we can even look at quick-fix and even quick and dirty solutions that would help us out of the mess we are currently in



Compiled by Sarie Moolman
Editor, Civil Engineering
Photographs South African Astronomical
Observatory (SAAO)

ON THE COVER

'First light' at



SALT BEGAN TO REACH its potential in 2005. In May, technicians installed the last of the 91 1 m mirrors. On 1 September the SALT team released the first colour images from SALT's imaging camera, SALTICAM. Then, on 11 October, the Robert Stobie Spectrograph was installed, the main tool SALT astronomers will use to analyse the light of distant stars and galaxies. At the same time, the final active optics for SALT's primary mirrors was installed, and the final testing started.

AN ICON FOR SCITECH DEVELOPMENT AND COOPERATION

'SALT was an initiative of South African astronomers that won support from the South African government, not simply because it was a leap forward in astronomical technology, but because of the host of spin-off benefits it could bring to the country,' says project scientist David Buckley. 'Indeed, the SALT project has become an iconic symbol for what can be achieved in science and technology in the new South Africa.'

SALT is not simply a South African project, however. It is an international partnership involving 11 different partners from six countries on four continents – including Germany, Poland, New Zealand,

President Thabo Mbeki officially opened the Southern African Large Telescope (SALT) at Sutherland in the Northern Cape in November last year – a little over five years after groundbreaking.

SALT is the largest optical telescope in the southern hemisphere and equal to the largest in the world. Gathering more than 25 times as much light as any existing African telescope, SALT can detect objects a billion times too faint to be seen by the naked eye – as faint as a candle flame on the moon

the UK and the USA.

A talented team of mostly local engineers and scientists has succeeded in building SALT on a rapid – for big telescope projects, at least – five-year timescale. Not only that, but the cost of construction been kept to within the original budget of \$20 million defined in 1998, even before the final designs were completed. According to Kobus Meiring, project engineer, this is due in part to the fact much of the original design concept for SALT was modelled on the Hobby-Eberly Telescope in Texas, giving a useful starting point and allowing

SALT's engineers to make creative use of the 'lessons learned' with the only previous telescope of this type.

ACHIEVEMENTS, AND PROGRESS TO COME

Although scientific observations have begun with SALT using the imaging camera SALTICAM, fine tuning is continuing. Many exciting possibilities in research are opening up with the installation of the major first generation instrument, the Prime Focus Imaging Spectrograph (designed and built for SALT by the University of Wisconsin-Madison and Rutgers

SALT

SALT has unique capabilities. It is optimised for wavelengths and observing modes not available on other very large telescopes. Astronomers within the SALT consortium keenly look forward to the scientific fruits of what has been, until now, an extremely successful engineering project



University) – now renamed the Robert Stobie Spectrograph in honour of the past SAAO director and first chairperson of the SALT board, Dr Robert S Stobie. It was Bob Stobie's dedication and enthusiasm that helped launch, and later steer, the SALT project to success. His untimely death in May 2002 was felt by all his colleagues and the renaming of this major instrument in his name is in recognition of his major role in the SALT project.

Since the declaration of first light announced in September 2005 that SALT had arrived on the astronomical scene, telescope and instrument commissioning has continued, as well as optimisation of SALT and its subsystems.

SALT has unique capabilities. It is optimised for wavelengths and observing modes not available on other very large telescopes. Astronomers within the SALT consortium keenly look forward to the scientific fruits of what has been, until now, an extremely successful engineering project.

Like the SALT consortium itself, the science programmes to be conducted on SALT will be many and varied – from studies of the most distant and faint galaxies to observations of solar system objects like asteroids and comets.

INFORMATION AGE TELESCOPE

SALT is truly representative of the century in which it has been built. It is not only a sophisticated computer-controlled precision instrument, but also an Internet-age telescope. Astronomers in the consortium don't need to travel to SALT to use it. Instead they submit their observing requests over the Internet and eventually, once the observations have been conducted by the dedicated SALT scientific and technical staff, they also receive their data over the Internet.

UNDREAMT-OF ENDEAVOURS

Astronomers from southern Africa will now be able to undertake endeavours undreamt of before the arrival of SALT. Its huge light collecting power will foster a growth in the study of galaxies and the evolution of the universe.

'Astronomers are also excited about looking at how things change over very short timescales, down to seconds or less. This opens up exciting new realms for studying black holes,' says SAAO director Phil Charles.

SALT, like the science it will produce, has the gift of inspiring the imagination. Young visitors to SALT who stare in awe at the 'Giant Eye', explore time and space at

► Exactly five years after groundbreaking, the Southern African Large Telescope (SALT) project released its first colour images late last year. This marked the achievement of 'first light' and the successful debut of full operation for SALTICAM, a \$600 000 digital camera designed and built for SALT at the South African Astronomical Observatory (SAAO). Gathering more than 25 times as much light as any existing African telescope, SALT can detect objects as faint as a candle flame on the moon. The sample images were taken during the camera's first trial period of operation, which also achieved SALT's first significant scientific results. Eventually the sharpness of SALT's images will be improved by the full implementation of its active optics control, but although this is not yet operational, the best frames produced by SALT and SALTICAM show star images as small as 1 arcsecond (1/3600 degree), despite being taken when the seeing was 0,9–1,0 arcseconds.

► From left to right: 47 Tucanae, NGC 6530 (Lagoon Nebula 2), NGC 6744, The Lagoon Nebula, Central Regions

the newly opened visitor centre, and peer through the new public viewing telescopes at night – and youth encountering SALT in the media or in the classroom – will know that cutting-edge science can also happen in southern Africa. Sparking interest in science and technology, pulling bright young minds into careers in science and technology, is the real future benefit to South Africa. ■



THE KID FROM THE CASBAH

'I grew up in what was known as the Casbah district of Durban, an area filled with spicy smells and a vibrant communal life,' Sam fondly remembers. 'We didn't think of life as tough or unfair, although I suppose you could say we were poor. My parents were great entrepreneurs – my mother started as a seamstress and my father as a travelling salesman – but they grasped every opportunity life offered them. They eventually established a clothing shop and then a fast food outlet, making a success of each enterprise in order to provide an education for their children. To them, if they could achieve that, they would have fulfilled their purpose in life.'

The four Amod children learned to work hard from early childhood. 'You got a job anywhere you could as soon as you were tall enough to see across the counter.' Through it all they maintained a family life filled with laughter, fun, good food and boisterous interaction. 'The building we lived in had Tamil, Hindu, Muslim and Christian people living there – there was no sense of division, so I suppose that's where you built up a lot of understanding and compassion. There was no subject closed to discussion, and in a country fractured by law, we learned freedom of association and expression.'

In 1975, at age 16, Sam entered Durban-Westville University with no idea what he wanted to do. 'In my first year I did general sciences, because if you were good at maths and inclined towards analytical things, you were automatically channelled towards sciences.' But he didn't particularly enjoy it and decided to take a 'gap' year at university, without telling his parents. 'I used it to study everything from psychology to social studies to chemistry, you name it.' He also became involved in the turbulent scene of student activism. Finally his parents told him in no uncertain terms that he must decide what he wanted to do with his life; there wasn't money to support his laxity of purpose.

The next year he enrolled for civil engineering, which was then a six-year degree. His political profile didn't particularly endear him to conservative-minded lecturers and he became a member of the first students' representative council that was elected by the students and not imposed by the administration. He graduated in 1983 and entered the formal job market, though he had worked consistently for construction or consulting firms during university holidays.

His first job was with Liebenberg & Stander in Johannesburg, a move that was brought on by his girlfriend, Lekha, trans-

PROFILE



Civil engineers need more *emotion and*

'The true test of leadership is whether one has boldness combined with wisdom.' For Salim (Sam) Amod, the incoming president of SAICE for 2006, these qualities, which he saw embodied in his parents, his earliest role models, have underpinned his life. In talking to Sam at the offices of Development & Engineering Consultants (DEC), the company he established in 1994, Lorraine Fourie was given a glimpse into 40 plus years of his personal pursuit of boldness and wisdom

locating there to work as a geophysicist at the head offices of Soekor. 'We met in the engineering faculty at Durban-Westville, but she then moved into the pure sciences, eventually doing her honours in physics.' He continues: 'Although I was taken on as an engineer, I was initially employed as a draughtsman. In fact, I spent a lot of time cleaning drawing boards and pens for the senior staff,' he comments drily. It was excellent experience at a time that good firms placed emphasis on mentoring.

IF YOU'RE GETTING INVOLVED, KNOW YOUR SUBJECT

Sam was not to be subdued by the office politics of the day. He worked his way through the design office, simultaneously addressing an issue that had been hounding him. 'My final-year class at

Durban-Westville had one student – me; the attrition rate in engineering was extremely high. So I was never able to benchmark myself, knowing how good or bad an engineer I was.' On arriving in Johannesburg, Sam immediately registered for the graduate diploma in engineering (GDE) (Structures) at Wits, passing it with flying colours. 'I thought to myself, this is all too blooming easy.'

In 1987 Soekor's Moss gas project came on stream, with Liebenberg & Stander being a member of the international consortium responsible for the design of the offshore oil production platform. Sam successfully applied for a transfer as structural engineer to the project's Cape Town offices, where he soon became one of the lead engineers, with many overseas engineers and draughtsmen reporting to him. 'They earned a lot more



▶ *Left: Sam and Lekha with daughter Shaista and son Shiraz, December 2004*

▶ *Right: Sam on offshore platform (Mossgas) in Saldanha Bay*



'I really think we did go one better on Mossgas. We achieved many international firsts – the weight of structures we lifted and installed offshore were the highest, with the greatest reach of cranes, in some of the worst seas offshore in the world

compassion

than I did, which I didn't like, but that was the way it was in those days.'

The technical challenges on Mossgas were tremendous and taxed South African engineering ingenuity to the limit. Sam followed an approach that he would apply throughout his life: to exhaustively research the field of expertise required and then to go one better. 'I really think we did go one better on Mossgas. We achieved many international firsts – the weight of structures we lifted and installed offshore were the highest, with the greatest reach of cranes, in some of the worst seas offshore in the world. It also built up capacity and developed skills in the engineering sector that might not have developed otherwise.'

On returning to Johannesburg in 1991 Sam felt the need to move away from high-tech design and apply his skills to benefit people at grassroots level. 'I became involved in community-based projects in the townships while I was still in the Cape. So I decided to move into community-based construction and project management and as a member of the then Soweto Contractor Development Programme I did a lot of labour-intensive work in Soweto and the underdeveloped areas of the Vaal Triangle. It had become clear to me that I

had a privileged life and that I had to do something about it. So my work was driven not only by interest, but also by passion, something I wholeheartedly believe in. We engineers need to have more emotion, more empathy. We're taught to be too analytical, too distanced from the beneficiaries of the work we do.'

Sam's enthusiasm has always been matched by that of Lekha – whom he married in 1986 and into which union two children were born – but in 1994/95 they went into overdrive. He swept through the GDE in project management, obtained an MSc Eng degree (with distinction) and established the company Development & Engineering Consultants (DEC), while her involvement with women's groups and informal settlements led to her being elected mayor of Randburg, which is where they settled after returning from Cape Town. 'It would be a one-term appointment only because no family could go through that kind of upheaval for long and retain family cohesion,' he says. Lekha, who in the meanwhile had also achieved actuarial qualifications, subsequently became financial director at DEC.

In the late 'nineties his energies were increasingly channelled into the areas of public policy development and formulating

strategies for the construction industry to move to a better future. He contributed inter alia to the drafting of a Green Paper on establishing an enabling environment for the industry, which eventually culminated in the Construction Industry Development Board (CIDB), of which he was a founder member. He also took part in a CIDB task team that examined procurement in detail, focusing on all aspects of specification, supply chain management, contract documentation, and black economic empowerment methodologies, policies and procedures. In due course he would become ever more involved in transformational issues. For his contribution to the development of the South African construction industry he received the CSIR's Outstanding Achiever Award in 1999.

FASCINATION WITH AVIATION

DEC was still a relatively small company when, in 2000, it was appointed by the Airports Company of South Africa (ACSA) to project-manage the development and construction of a new domestic terminal at Johannesburg International Airport. Sam was also advisor to ACSA on procurement, an area in which he had considerable expertise, having undertaken a study for the Presidential Review Commission into

procurement in all areas of public service expenditure two years earlier.

The project fitted Sam like a glove. 'I had been fascinated with aircraft and flying ever since the day when, as a huge present, my parents put me on a plane to fly to Pretoria for a holiday. I managed to fasten my seat-belt, but didn't know how to unfasten it, so I wiggled out from underneath it when the plane landed. My ambition is still to be able to pilot an aircraft and also to scuba dive – to fly high and dive low, so to speak.'

True to his motto of fully understanding a subject when becoming involved in it, he made some enquiries and found that the Massachusetts Institute of Technology (MIT) ran a high-end course in airport systems and aviation design. 'So off I went to MIT, because I didn't think that I could call myself a project manager of a top-end terminal without knowing what international best practice is.'

Working under constraints in an operating airport, project-managing 53 contracts, was pretty complex, but Sam had done his homework well. 'We South Africans sometimes tend to think that when the going gets tough we'll be able to make a plan, but there's a lot to learn if you're going to create the world's best practice,' he says. Visiting Singapore, Malaysia, the UK and Europe, Sam complemented his learning of American aviation strategies and systems and brought back valuable expertise to South Africa. He attributes the success of the project to careful planning and teamwork.

DEC has not been involved in further improvements at the airport, and he considers it unfortunate that the capacity which they had developed now has to be acquired from scratch for the construction of the international terminal. 'South Africa can ill afford to lose the capacity we developed in the five years that we worked on the domestic terminal. We need to find methods like partnering, long-term relationships that allow expertise to develop, and create centres of excellence within the country that allow companies with specialised knowledge to be sustainable.'

The force that propelled him towards MIT manifested itself again when he enrolled for the senior executive programme at Harvard Business School in 2003. 'It's a joint programme run between Harvard and Wits, but on obtaining the qualification you become a Harvard alumnus.' It was another life-changing experience for him, as he explains: 'Tuition happened solely by way of real-life case studies. Often the CEO of a well-known top-level company would be sitting at the back of the class while we were analysing problems in that organisation, and would then at the end of the discussion give us first-hand insight into the solutions the company had initiated. It was an incredibly hands-on exercise.'

► SAICE's 2006 president, Sam Amod, with his wife, Lekha

SAME APPLICATION OF INTELLIGENCE

Sam considers himself fortunate to have been involved in finding sustainable solutions to technical and social challenges in his career. 'I think all great challenges require the same intensity of application of intelligence. Technical challenges might have a more rigid approach to their solution, while those encountered in the social environment need a far more wide-looking and broad-based understanding. Here consultation and communication become very important, areas in which engineers traditionally have fared poorly. We need to be able to feel more compassion for the client's situation. Engineers are slowly learning to be better at these qualities, but far too often they get secondary attention. We still regard the technical and analytical skills as being more demanding and therefore more important.'

A project that is currently taxing resources at DEC's project management and policy development division is the proposed construction of a medical centre at Chris Hani-Baragwanath Hospital where treatment of the family of HIV-related diseases will be integrated under one roof. 'At the moment adults and children infected with HIV/Aids, TB sufferers and patients who need palliative care are treated separately and on separate days at Bara,' Sam explains. In realising the need for a holistic approach to treat HIV/Aids, these four medical units have joined forces and, with DEC as the selected project managers, are planning to build a centre for which not a single cent is yet available. 'The work we have put in so far comes entirely off our own bat, but we are hopeful that sufficient funds will be raised to launch the project in 2006, because I don't think there's a more deserving undertaking currently in the country than this one,' Sam concludes emphatically.

Setting audacious targets will be high on Sam's agenda as president of SAICE for 2006. 'We need to fully understand the role the engineering profession is playing in the broader context. I often say that all development in South Africa is leveraged off infrastructure, and all infrastructure is leveraged off the skills of civil engineering professionals. The fact of the matter is that the economic and social health of the nation is underpinned by the civil engineering industry – creating good shelter, water supply, sanitation and transport impacts directly on the increased lifespan of people. SAICE therefore needs to motivate fostering and retaining high-calibre individuals in the profession. The industry is driven not by organisations but by individuals; I'm a firm believer that individuals can make a difference.'

'We need to make civil engineering a



Sam's enthusiasm has always been matched by that of Lekha – whom he married in 1986 – but in 1994/95 they went into overdrive. He swept through the GDE in project management, obtained an MSc Eng degree (with distinction) and established the company Development & Engineering Consultants (DEC), while her involvement with women's groups and informal settlements led to her being elected mayor of Randburg, which is where they settled after returning from Cape Town. 'It would be a one-term appointment only because no family could go through that kind of upheaval for long and retain family cohesion,' says Sam

“sexier” industry. Youngsters see chartered accountancy, financial services or IT as more appealing, but engineers form the basis of our society. The social health of a nation is very much like an iceberg, with the contribution of the civil engineer sitting below the waterline, keeping everything afloat. If that fails, everything else will sink. If there is one message that I'd like to get across, it is this.' ■



Text Rod Harper and Kerry Knowles
Sonnenberg Hoffmann Galombik



LEGAL AND MANAGEMENT

Understanding fixed term contracts of employment

How employers can avoid pitfalls

MANY EMPLOYERS in the construction and civil engineering industries grapple with understanding the complexities of fixed term contracts of employment.

Fixed term contracts of employment are also referred to as limited duration contracts or LDCs. There has also been a degree of uncertainty for many employers when deciding on the appropriate duration of a fixed term contract of employment.

Usually it is clear from the outset why an employer wishes to engage an employee on a fixed term basis as opposed to concluding an indefinite employment contract. By way of example, where an employee is required to perform a task on a specific project, whether short term or longer, there would be no need for this person's services once the task has been completed.

FREQUENTLY ASKED QUESTIONS

The most frequently asked questions that employers raise about the duration of fixed term employment contracts are:

- How to decide on the appropriate duration of the contract at the time it is concluded
- Can an employer keep renewing a fixed term contract of employment regularly and is there a risk associated with doing so?
- Is there any limitation on the duration of a fixed term employment contract or may it be of any duration?

In order to answer these questions, we need to examine what exactly is a fixed term contract in legal terms.

FIXED TERM VERSUS INDEFINITE PERIOD CONTRACTS OF EMPLOYMENT

A fixed term contract of employment differs from a conventional indefinite period contract in that it is for a fixed period which has been agreed upon by the parties in advance. The fixed period may be determined by the completion of a specific task or a project or

may provide at the outset for a fixed expiry date. With the conventional contract of employment an employee is regarded as 'permanently employed' and the contract of employment in these cases will only terminate on grounds of dismissal based on misconduct, incapacity, the operational requirements of the employer, or where the employee resigns. Death of the employee may also result in the termination of the contract.

In instances where the fixed term contract is linked to the completion of a specific task, the fixed term contract of employment automatically comes to an end upon the task being completed. For example, where an employee is employed solely on the basis of 'designing and signing off of the ABC support structure on the XYZ project', the task would be completed when the structure had been designed and signed off and the fixed term contract of employment would therefore automatically terminate on the happening of that event(s).

It is critically important that employers clearly define the 'terminating event' in fixed term contracts with as much accuracy as possible. If it is clear at the time of entering into the fixed term contract of employment that the happening of a specific event will automatically terminate the contract (and this is also clearly set out in the contract), employers will substantially reduce the risk of being challenged by employees on the basis that they have prematurely terminated the employment contract.

On occasion employees may argue that the terminating event has not yet arisen and this may have to be clarified. A common problem is the subsequent extending of the 'terminating event' by conduct or requests to the employee, without appreciating the legal consequences of doing this. This may happen when the employee is requested to

take on additional work or tasks (not sufficiently closely linked to the original task to be considered part of the original task) and thereby 'extending' the scope of the 'terminating event'. An example of this would be where employee D is specifically employed on a fixed term contract to lay bricks for the foundations of building A. The 'terminating event' as defined in the fixed term contract of employment is to the effect that the contract will automatically terminate on the completion of the laying of bricks for the foundations of building A. Owing to an unforeseen increase in workload caused by employee J who works on building B having taken ill, employee D's supervisor instructs him to start laying the bricks for the foundations of building B. Strictly speaking employee D's contract of employment should have automatically terminated on completing the brick laying of foundations for building A, but as a consequence of the supervisor's actions, the employer has either 'extended' the duration of employee D's contract or entered into a new agreement. When employee J recovers from his illness and returns to work, the employer has two people for one job at double the cost. If the employer terminates employee D's contract, in these circumstances employee D may be successful in arguing that his fixed term employment was extended or that he entered into a fresh agreement with the employer which may be indefinite in nature.

It may be simpler to insert a predetermined termination or expiry date in a fixed term contract of employment than to define the termination date by means of a 'terminating event' as this generally leads to greater certainty and less risk for employers. In these cases, the employment relationship automatically terminates when the termination date arrives and no notice of termination is required. However, the nature of business in the construction and civil engineering industries, especially in respect of project-based work, does not always give an employer the luxury of certainty regarding project completion dates. If employers were able to make use of crystal balls or reliable fortune tellers and look into the future with precision, all fixed term contracts of employment would contain a fixed termination date. As this is not the case, employers often need to rely on the 'terminating event' provisions.

HOW LONG CAN THE PERIOD OF A FIXED TERM CONTRACT BE?

There is no law prescribing the period of a fixed term contract of employment. An employer is therefore entitled to employ a person for any period the employer deems fit.

WHAT HAPPENS IF THE EMPLOYER TERMINATES EARLY?

If the employer terminates the fixed term employment contract prematurely (for example before completion of the task or

the expiry date), the employee could sue for damages based on a breach of contract for the remaining period of the fixed term contract, or for unfair dismissal. If the remuneration package was substantial, this could be expensive for an employer. An employee has, however, a duty to mitigate his or her damages by attempting to find other employment and accordingly this may reduce the extent of the claim. In employment law disputes an employer is entitled to request information regarding employment since the termination in order to ascertain the damages allegedly suffered by the employee. An employee is obliged to prove his or her damages. Therefore, should the employee find new employment, this will be taken into account in determining his or her damages and will reduce the amount of the claim if he or she has a valid claim. Contrary to popular belief the employee is not automatically entitled to payment in respect of the balance of the contract.

Another basis on which an employer may be challenged is when an employee on a fixed term contract does not have his or her fixed term contract renewed or where the employer does so on less favourable terms than the previous fixed term contract. The Labour Relations Act (LRA) regards the failure to renew a fixed term contract of employment or the renewal but on different terms as a type of dismissal in circumstances where an employee reasonably expected the employer to renew the fixed term contract. Section 186(1)(b) of the LRA defines this kind of dismissal as: 'an employee reasonably expected the employer to renew a fixed term contract of employment on the same or similar terms but the employer offered to renew it on less favourable terms, or did not renew it'.

What commonly happens in these cases is that the employee argues that he or she had a reasonable expectation of being offered a further contract or renewal of the previous contract on the same terms and conditions. It may be argued by the employee that a reasonable expectation was created by the employer when it habitually renewed a fixed term contract on several past occasions or where the employer advised the employee that the contract would be renewed when the old one expired, but the renewal does not take place. By way of example, an employee is appointed on a fixed term contract of six months to 'stand in' for an employee who is on maternity leave and upon her return from maternity leave, the fixed term contract employee is offered a further six-month contract on the same or similar terms as the initial fixed term contract. The employer at the end of each fixed term contract automatically renews the fixed term contract on four more occasions in a mechanical fashion without any meaningful discussion with the employee regarding the reasons for the renewal thereby creating the impression

that the contract will be continually renewed. It may be argued that the employer's failure to renew the fixed term contract once again (as it had done automatically on the past several occasions) was unfair as the employer by its conduct has created a reasonable expectation in the mind of the employee that the contract will be renewed.

It is thus very important for the employer to ensure that the employee cannot prove that he or she had a reasonable expectation of renewal of the contract on the same or similar terms after expiry of the current fixed term contract. This can be done by ensuring that no well-meaning promises of possible renewal of the fixed term contracts are made in passing to the employee and that proper consideration is given to the purpose of renewing a fixed term contract in the first place. This may mean reviewing whether this type of employment contract still meets the current needs of the employer or whether other options would be more suitable.

TIPS FOR EMPLOYERS

The employer must not create the expectation that the fixed term contract of employment will be renewed unless it will be definitely renewed. Here an employer must ensure that neither its verbal comments (eg verbal undertakings) nor its conduct (eg correspondence with the relevant employee or inclusion of the relevant employee in plans extending past his or her employment termination date) may be interpreted as creating a reasonable expectation of renewal of the fixed term contract.

From case law it is clear that the courts place emphasis on past practice and prior promises. As mentioned above, the more an employer has renewed the fixed term contract in the past, the more easily it may be argued that an employee has a reasonable expectation that the contract will be renewed again in the future.

IMPORTANT CLAUSES TO CONSIDER INSERTING INTO FIXED TERM CONTRACTS

- If a party (the employer or the employee) repudiates or commits a material breach of the fixed term employment contract, it may be terminated by either party before its expiry. It is therefore advisable to insert a clause which stipulates a notice period in the fixed term contract of employment during the life of the contract
- The employer may insert a 'disclaimer clause' in a fixed term employment contract where it is stated clearly that there is no expectation of its renewal. Although such clauses are not conclusive proof that the employee could not reasonably have expected the fixed term contract of employment to be renewed, they do provide an indication
- Employers are sometimes faced with a dilemma when embarking on a restructuring exercise which may result in the

retrenchment of employees. In the case of *Buthelezi v Municipal Demarcation Board (2005) 2 BLLR 115 (LAC)*, it was held that an employer could not prematurely terminate a fixed term contract of employment by retrenching an employee. The employer was accordingly held liable to pay the retrenched employee the balance of the fixed term contract. It is therefore advisable to insert a specific provision for premature termination based on operational requirements in the contract. If such a provision is not included, an employer cannot retrench employees for operational requirements without financial risk

CONCLUSION

When concluding a fixed term contract of employment, the employer should be clear on the following:

- The reason for employing on a fixed term basis as opposed to an indefinite period
- If the employer is certain that the purpose for which the fixed term employee is employed will cease at a specific date, the contract should state the end date. If not, enter into the fixed term contract of employment based either on the completion of a specific task or the project
- If the employer requires the services of the employee for a further task or project it should conclude a new fixed term contract of employment based on the further task or project. As this would again be linked to a specific task or project, it would be difficult for an employee to argue that he or she had a reasonable expectation of renewal. On the other hand, if an employer merely renews or extends the 'old' fixed term contract of employment for a further task/project, this may give rise to creating a reasonable expectation that the contract will again be renewed in future. Then failure to renew may result in an alleged unfair dismissal dispute

The drafting of fixed term contracts of employment needs to be given as much attention as drafting indefinite period contracts of employment and fixed term contracts should not be viewed as a lesser 'legal beast'. If not understood and managed properly they have the potential to cause unnecessary legal and financial implications for employers.

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Uncompetitive joint ventures?

WHEN COMPETING FIRMS form joint ventures or consortiums to bid for a tender, there is a very real risk of transgressing the Competition Act unless companies take due note of the provisions of the Act.

As a starting point, the awarding of a tender highlights the difference between competition in a market and competition for a market.

The essential purpose of competition law is to ensure that competition in a market flourishes. The competition authorities will therefore make every effort to prevent firms from conspiring to subvert free market forces by combining in one way or another to undermine the competitive process.

The most telling example of this would be the provisions in the Competition Act that prohibit firms from allocating markets between themselves or fixing prices or rigging tenders. Clearly agreements of this nature undermine the market and prevent customers gaining access to best prices and services.

In a similar way, competition law regimes throughout the world would act against firms who attempt to monopolise markets by either forcing competitors out of the market through anti-competitive practices or by placing hurdles in the way of firms wishing to enter or expand in markets.

However, it happens that certain markets

for one reason or another cannot cater for competition in a market. A suburban bus route might be an example, where government decides that it cannot have a number of bus companies competing on a given route; or where it decides that a new port, airport or railway line needs to be built in a certain town, but that it cannot permit a number of firms building competing ports, airports or railway lines there. By its very nature, competition in the market is therefore limited or non-existent.

It is then important that competition for the market be entrenched through a competitive bidding process. The institution that invites the tenders must ensure that the bidding process is fair and transparent and conducive to promoting competition for the market.

However, the bidding process could be undermined if suppliers become involved in what is generally referred to as 'bid rigging' or 'collusive tendering'. This practice is prohibited by the Act and firms contravening the provision would face a fine of up to 10 % of their turnovers on first offence.

Unfortunately collective activity which on the face of it might seem perfectly in order might fall foul of this section of the Act or, alternatively, be caught under the price fixing and market allocation prohibitions.

The size of the business being put out for tender often forces firms to join forces

in an attempt to be in a position to put in a bid and, if the bid is successful, to service that contract. Competitors who form a consortium or a joint venture to deal with the tender request could easily find that they are in contravention of the Act.

The key here is whether the partners in the joint venture or the consortium are actual or potential competitors. Put another way, would they be able, individually, to garner the support of non-competitors to service the tenders and to submit competing bids, or are they by the complementary nature of their activities not actual or potential competitors?

If they are actual or potential competitors, their agreement as to how they will respond to the request for a tender could put them in contravention.

Competing firms forming joint ventures or consortiums are therefore warned to take due cognizance of the provisions of the Competition Act. Similarly, for other competitors that feel they have been overlooked or injured by such decisions, it may be worthwhile investigating their rights to see whether they could interrupt or overturn any tender awarded.

It may very well be that a lacuna exists in the Competition Act, but until such time as this is remedied joint ventures and consortiums of this nature are at risk. □

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Liability of registered professionals

with specific reference to professional civil engineers

ONCE A PROFESSIONAL person in the civil engineering industry has registered in any one of the Categories of Registration as provided for in Section 18 of the Engineering Profession Act, Act 46 of 2000 (the Act), he or she will be subject to the Code of Professional Conduct. Should the civil engineering professional be guilty of a charge of improper conduct, it will be investigated in terms of Section 28 of the Act.

The powers of the disciplinary tribunal are set out in Section 32(3) of the Act. If a person is found guilty, the tribunal may, in brief,

- caution and reprimand
- impose the pain of a fine
- suspend the registration of the civil engineering professional for a period not exceeding one year, or
- cancel the registration of the civil engineering professional

The penalties set out above are not cumulative and relate mostly to the status of registration of the civil engineering professional.

The Act does make provision for a statutory appeal procedure in Section 33 of the Act. It is common cause that the decision and/or procedure of disciplinary tribunal are always subject to review by the High Court with jurisdiction.

Over and above the fact that the civil engineering professional is subject to the Code of Professional Conduct, he or she, as a professional person, may incur legal liability in his or her personal capacity in the course of exercising his or her profession by committing breach of contract or delict.

BREACH OF CONTRACT

The terms of a contract, he or she has entered into with professional associates, employees or an employer, may demand certain conduct

in the exercise of his or her profession. Any conduct contrary to those terms in that contract will constitute a breach of contract and the aggrieved party will have at its avail the appropriate contractual remedies.

Generally, five forms of breach of contract are distinguished: default by the debtor (*mora debitoris*), default by the creditor (*mora creditoris*), malperformance, repudiation, and prevention of performance. Of interest is the distinction of positive malperformance, in which the professional tenders faulty or defective performance.

Remedies for breach of contract include specific performance, the right to resile from the contract, the right to uphold the contract, and damages.

DELICT

A civil engineering professional commits a delict if he or she does any work in a negligent or culpable manner which work results in injury to persons or causes damage or loss to another person or persons.

A delict is described as the act of a person which in a wrongful and culpable way causes harm to another. However, all five elements of a delict, namely an act, wrongfulness, fault, harm and causation, must be present before the conduct which is complained of by the aggrieved party can be classified as a delict.

It is unfortunate that the wrongful act by a civil engineering professional can be an 'improper conduct' and may constitute, in the circumstances, both breach of contract and a delict. The aggrieved party may then decide on which grounds it wishes to base its cause of action.

Having perhaps overstated the fact that a civil engineering professional remains personally liable for his or her conduct, it is of con-

cern that many civil engineering professionals practise their profession under the cloak of a propriety limited company or a close corporation (in terms of the Companies Act, Act 61 of 1973, as amended, and the Close Corporation Act, Act 69 of 1984). Whilst not prohibited in terms of current legislation or existing statute, it is considered irregular and will not protect the individual or constitute a defence against personal liability in the case of improper conduct and/or wrongful conduct on the part of the civil engineering professional.

It is considered appropriate for professionals who wish to practise their profession under the protection of the Companies Act to do so in terms of Section 53(b). Commonly referred to as an 'Incorporated' (or abbreviated to 'Inc') this section makes provision that directors, past and present, shall be liable jointly and severally, together with the company, for such debts and liabilities of the company. The Close Corporation Act has no similar provision.

In conclusion it must be mentioned that, under certain circumstances, a close corporation can be converted into a company and a private company can, by special resolution, be converted into an incorporated company.

References

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Emilé is an arbitrator, advocate of the High Court, professional civil engineer and registered town planner. Members are cordially invited to submit topics of interest to Emilé for discussion in this column



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TRADITIONALLY, the roles of the human resources (HR) head and department have been to look after operational issues such as payroll, recruitment, selection and performance management – basically ensuring that a company's staff contingent performs optimally to impact on a business in the most efficient and profitable manner possible.

However, over the last few years HR practice has gradually started to undergo a metamorphosis with companies finally realising that the department is not only there to

recruit and retain staff but ultimately to play a very important strategic function in its business operations.

BECOMING A BUTTERFLY

For years, HR practitioners have been preaching that people are the most important asset of any business. This is in stark contrast to the reality, where people were mostly treated as numbers. But now, for the first time, the theory is turning into practice.

Indeed, people are and should be acknowledged as the most strategic resource of a company.

The reality is that the most key and strategic competitive differentiator companies

have is the type and quality of people they employ.

HR has gone from a recruitment and payroll function to a strategic department that is responsible for skills, competencies, attitudes and value. Importantly, it is now a discipline that should take an integrated approach to recruitment, retention, talent development and business performance management.

LOCAL ENGINEERING SCENARIO

And this brings us to the South African engineering industry; a marketplace where HR plays a very important role, particularly in the light of the skills shortage issues.

Skills shortage is a countrywide problem



Alumni talent

How losing the retention battle can help win the talent war

AT THE MOMENT one of the pains in the human capital side of business is the 'war for talent'. With the global village increasing the mobility of our top employees, and the increasing skills shortage in certain key areas, organisational talent is a commodity as valuable and desirable as gold. However, the more Baby Boomers try to do the things that made *them* loyal to the company, the more their young talent seem to bolt out of the door.

Today's young talent are seen as arrogant 'snobs' who refuse to earn their keep and patiently work their way up the corporate ladder. It is nothing like the 'good old days' when talent understood that they were being groomed for greatness, and they just needed to wait their turn. On top of this, the market is competing so aggressively for these individuals that it would be unrealistic to expect them not to move for the types of salaries and opportunities they are being promised. There must be another way to get what we need out of these stars.

In order to find an alternative way to benefit from this group it is helpful to reframe the perceived problem. At the moment organisations are fighting to keep their Bright Young Things (BYTs) from walking out of the door. If, however, we reframe the exit process to acknowledge that we may lose their presence but not necessarily their soul or passion, we are in a position to develop a new value proposition for talent. This new proposition will require a fundamental change to the way we deal with those talented members of our business who choose to enjoy a period of employment in another company.

The position that savvy leaders must increasingly take is that it is okay to lose these individuals for a season, but our company

must never lose their hearts. In a sense they should spend the rest of their careers feeling like alumnists of our organisation. They must speak about and promote our organisation with as much passion and fervour as they do their academic alma mater. In short, retention strategies need to shift from a 'bums in seats' mentality to a corporate alumnist strategy.

Many companies already have alumnist-type programmes in place. Unfortunately the vast majority are strategically useless. They are often implemented as an HR project consisting of a quarterly newsletter. Sadly, the content of the newsletters generally remind the alumnists why they left, rather than fostering a sense of belonging.

In a field like engineering this loss of talent and the subsequent relationship mismanagement is endemic. The profession is about numbers, data, and qualifications. The softer HR and people sides of the business are generally tolerated as a necessary evil rather than a strategic asset. In the current industry the proverbial roosters are now coming home to roost as most companies have no idea, let alone a realistic strategy, on what to do.

An effective, talent focused alumni programme will reflect the following principles:

- It will be a strategic priority. The days of dropping HR in at the end of a board or exco meeting and giving it the crumbs off the table are over. An effective alumni strategy will not only have the sponsorship and support of the HR manager but will have been the subject of intense discussion and planning at the most senior levels of the company
- It will have a well-crafted exit interview process. The exit process will not just be a 'tick box' activity, but will be key in discovering why talented people are leaving. At

the same time the exit process will serve as a marketing exercise so that these people are aware of what they are leaving behind and what will be waiting for them should they return in the future. Finally, the exit process will indicate interest in their future, letting them know that their career and professional development will be tracked with interest

- The exit interview process will have identified certain key individuals whose future should be tracked because they have the potential to be a future CEO or senior executive. There will then be processes to facilitate this tracking. The process will report back at three levels; to the HR director, to the board, and to the people themselves (it will serve to reinforce that they are important and highly regarded)

- It will become the cornerstone of future executive recruitment. The alumni programme will create a pool of talent who not only know the culture of the business, but have also been kept updated on the organisation's development. They will consequently be in a position to make a significantly more efficient re-integration into the business than a stranger. This also adds weight to the exit process experience
- As these talented individuals return, they bring back the investment and development they have enjoyed at the competition. This allows the business to harvest skills and abilities that weren't originally sown. The benefits to a business begin the day management decides to strategically let their talent walk out of the door. The advice: 'If you love someone ... set them free' has never had more relevance in the corporate world than in today's talent wars.

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with even President Thabo Mbeki emphasising it at various and recent state-of-the-nation addresses. Unlike our Western counterparts we have enough people but simply not enough skills to fill the various industry positions.

So, industries such as engineering should ensure that they bring the right people into the organisation and then work hard at retaining them. An effective retention strategy is critical.

It is also important to manage people effectively while at the same time identifying those who don't have the right type of values and address the problem.

Here training and subsequent talent

Human resources *the butterfly effect*

development become even more important. Again, employing people with the right attitude is an important first step, as they will be enthusiastic and embrace training readily.

It is important for HR practitioners to understand the important link between skills development and the strategic objectives of a business. If this link is established, the immediate impact of talent development will be seen, felt and measured.

In line with the above, performance management has also evolved from a once-a-year

practice to a more important, continuous and developmental approach. Well-known industry gurus all believe that focusing on performance problems instead of continuous recognition of performance does not add any value to an organisation.

In the end what it all boils down to is that the HR department now plays a very important strategic role, working more closely than ever with CEOs and MDs, thus ensuring that the organisation's most competitive advantage is retained and honed. ■

Top 50 companies

These include well-known names in the engineering industry, such as Pretoria Portland Cement (second the previous year), Golder Associates, Umgeni Water and Kumba Resources. Barloworld features prominently.

- 1 Pretoria Portland Cement Company Ltd (part of the greater Barloworld Group)
- 2 Microsoft SA (Pty) Ltd
- 3 Rand Merchant Bank (a division of Firststrand Bank Ltd)
- 4 Net#work BBDO
- 5 WesBank (a division of Firststrand Bank Ltd)
- 6 South African Breweries Limited
- 7 Flight Centre SA Pty Ltd
- 8 Hollard
- 9 Kelly (a division of Logical Options) (Pty) Ltd
- 10 Syngenta SA (Pty) Ltd
- 11 Barloworld Limited
- 12 The Jupiter Drawing Room (Pty) Ltd
- 13 Monsanto South Africa (Pty) Ltd
- 14 Discovery Holdings Ltd
- 15 Strate Ltd
- 16 Edgars Consolidated Stores Limited (Edcon)
- 17 Eli Lilly (SA) (Pty) Ltd
- 18 Investment Solutions
- 19 AIDC Development Center (incorporated under Section 21)
- 20 Touchline Media (Pty) Ltd
- 21 Golder Associates Africa (Pty) Ltd
- 22 The X-Pert Group
- 23 Internet Solutions
- 24 Pam Golding Properties (Pty) Ltd
- 25 Umgeni Water
- 26 Ince (Pty) Ltd
- 27 MultiChoice
- 28 Emmanuels Staffing Services (Pty) Ltd
- 29 Maxidor (Pty) Ltd
- 30 Kumba Resources Limited
- 31 Arch Chemicals (Pty) Ltd
- 32 SAP Africa (Pty) Ltd
- 33 Munich Reinsurance Company of Africa
- 34 Santam Limited
- 35 Avis (Part of the Barloworld Group) (Pty) Ltd
- 36 Procter Gamble SA (Pty) Ltd

- 37 Storm Telecom (Pty) Ltd
- 38 Barloworld Logistics (part of the Barloworld Group) (Pty) Ltd
- 39 Barloworld Motor (part of the Barloworld Group) (Pty) Ltd
- 40 Barloworld Equipment (part of the Barloworld Group) (Pty) Ltd
- 41 Network Healthcare Holdings Limited (Netcare)
- 42 Hannover Reinsurance Group Africa Ltd
- 43 GlaxoSmithKline SA (Pty) Ltd
- 44 Prestasi Brokers (Pty) Ltd
- 45 Bankserv Ltd
- 46 Safmarine (Pty) Ltd
- 47 McDonald's SA
- 48 Ackermans (a division of Pepkor Retail Ltd)
- 49 Converge (Pty) Ltd – Trading as Wine of the Month Club
- 50 UCS Solutions (Pty) Ltd

Industry winners

- ▶ **Telecommunications & Media, TV, Radio & Press** Net#work BBDO
- ▶ **Banks** Strate Ltd

- ▶ **Finance General** Rand Merchant Bank
- ▶ **Information Technology** Microsoft SA (Pty) Ltd
- ▶ **Insurance** Hollard
- ▶ **Tourism & Leisure** Flight Centre SA Pty Ltd
- ▶ **Manufacturing** Pretoria Portland Cement Company Ltd
- ▶ **Mining & Resources** Kumba Resources Limited
- ▶ **Professional Services** Kelly (Pty) Ltd
- ▶ **Retail** Edgars Consolidated Stores Limited (Edcon)
- ▶ **Automotive & Components** AIDC
- ▶ **Building, Construction and Engineering** Golder Associates Africa (Pty) Ltd
- ▶ **Chemical & Pharmaceutical** Eli Lilly (SA) (Pty) Ltd
- ▶ **Consumer Business** Procter Gamble SA (Pty) Ltd
- ▶ **Logistics, Shipping & Transport** Barloworld Logistics (Pty) Ltd
- ▶ **Public Sector/Utilities** Umgeni Water
- ▶ **Agricultural** Syngenta SA (Pty) Ltd

Best Company to Work For

Survey highlights changes in employee expectations

ENTRIES IN Deloitte's The Best Company to Work For survey, released in September last year, showed a 20 % increase on the number of entries the previous year.

Deloitte's Best Company to Work For team attributes this increase in numbers to the fact that companies are taking workplace issues more seriously. Organisations which did not fare so well have entered again to gauge the impact of their human capital interventions and benchmark themselves against their competitors.

The Best Company to Work For is an objective tool which helps South African organisations identify their strengths and address their weaknesses, allowing them to retain their staff and attract high-calibre talent in their recruitment drives.

AREAS MOST IMPORTANT TO EMPLOYEES

Employee expectations and workplace experiences have changed fairly substantially over the last number of years. In line with the changing landscape, the 2005 survey highlighted the areas which feedback has shown to have become more important:

- Achieving a **suitable work/life balance** for employees has become an important factor. As outlined by Graeme Codrington in his book *Mind the gap*, Generation 'Xers' born in the 1970s and 1980s have a totally

different attitude to their work compared to Baby Boomers born in the 1950s and 1960s. 'Xers', who are coming up in the ranks at the moment, need flexibility and space to be creative and employers are having to recognise this trend and establish structures which recognise and accommodate this attitude. In other words, while employers want people who live to work, employees work to live. Unlike the Baby Boomers (those born in the period 1946–1964), they are not prepared to let work dominate their lives.

- Recognition of the **HIV/Aids problem** and addressing it with appropriate policies and education programmes have become a prerequisite for being an employer of choice. Employees need to feel that they will be cared for in the event of a positive diagnosis and also that they will not have to experience discrimination in the workplace.
- **Corporate social investment (CSI)** and **social upliftment** have become key issues for employers.
- The **culture and values** of the organisation have become increasingly important to employees. The more they identify with the culture and values and live by their organisation's ethics, the more satisfied employees will be.

These 'soft' issues have now taken on a vital

role in gauging employees' job satisfaction.

However, 70 % of the survey dealt with standard issues:

- Job satisfaction
- Leadership
- Management style
- Communication
- Relationships and trust
- Training and development
- Policies and procedures
- Rewards, recognition and performance management
- Diversity
- Change and transformation

VALUABLE FEEDBACK

Companies who participate in the survey benefit by receiving invaluable feedback from their employees. As a consequence, these companies have:

- An improved ability to attract and retain better talent
- Feedback to benchmark, develop and track action plans
- Improved employee motivation, dedication and customer satisfaction
- Greater productivity and profitability
- Independent, statistically valid external input
- Identified gaps between employer/employee perceptions
- The opportunity to learn from the best □

Best of the best

The best environmental and engineering consulting company to work for

THE DELOITTE Best Company to Work For survey has evolved into one of the most influential business surveys in South Africa. Its growth over the years bears testament to the increasing recognition of this value to companies aspiring to achieve the accolade of the 'Best Company to Work For'.

Golder Associates Africa was voted the 21st best company to work for in South Africa in 2005. In addition, they were selected as the best in their industry (building, construction and engineering). They received the award at a presentation ceremony at Gallagher Estate in September.

Fred Sutherland, MD of Golder Associates, pointed that Golder has taken part in this survey for three years now. 'In the first year we rated 74, in the second we came in at 33 and this year we have reached position 21. We have constantly moved up the rankings and this has occurred despite our rapid growth. Our aim is to be to get into the top ten in the next year and I am sure we can get there if we all pull together.'

Golder Associates is a premier global group of consulting companies specialising in ground engineering and environmental services.

Operating as an employee-owned group since its formation in 1960, Golder Associates has created a unique culture with pride in ownership and a commitment to providing technically sound and cost-effective consulting and contracting services. Golder Associates has experienced steady growth for more than four decades and has more than 4 000 people operating in local companies, with offices across Africa, Asia, Australia, Europe, North

America and South America.

In recent years Golder Associates Africa has expanded its HR services to meet its growth needs, the requirements of legislation and the needs of staff. Golder has implemented a number of specific initiatives to provide staff with higher levels of self-fulfilment, training and growth opportunities within both the South African and the international operations of the company. Golder worldwide has achieved a number of 'Best Employee' awards and it prides itself on its high level of employee loyalty and low staff rotation.

One of Golder's strengths lies in the combining of their collective local and regional knowledge and experience with the worldwide expertise of Golder Associates. They have highly qualified and experienced professional engineers, hydrogeologists, geophysicists, geologists, environmental and social scientists, agricultural and agribusiness specialists, chemists and planners, public participation and communication experts and information managers, all with proven track records in their fields.

This unique balance of skills, experience and proven track record makes Golder Associates Africa one of the foremost resource management consulting firms in Africa.

In 2003, to support BBBEE aims, Golder Associates Africa assisted in setting up Zitholele Consulting, with a majority black shareholder. Zitholele operates independently of Golder, but, when necessary, it draws on Golder for technical expertise, resources, management systems and

administrative support. Zitholele Consulting is an empowerment company that provides specialist consulting services to the public sector in public participation, social development, environmental services, engineering (environmental, water, structural), agri-business and project management. Since its formation in mid-2003, the company has steadily expanded its services to the public sector. Zitholele provides environmental assessment, waste management, policy and strategy consultation and local government capacity building for projects ranging from water and sanitation services supply to municipal infrastructure. The company has grown to a staff of 15 black professionals and technical specialists.

By servicing client's needs and building strong client relationships, their people have made Golder Associates one of the most trusted sources of professional services in the world. They have worked hard to earn their reputation, built on the quality of their professionals and the success of their clients. □



► Dr Fred Sutherland, MD of Golder Associates, and Joy Bouwers, HR manager, with the Best in Industry Award, having won the Best Company in the Building, Construction and Engineering category and being ranked 21st in the overall Best Company to Work For in South Africa competition



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A sobering reminder for the construction industry

ACQUIRED Immunodeficiency Syndrome (Aids) is a real disease caused by a real virus, the Human Immunodeficiency Virus (HIV), which has reportedly killed millions of persons across the world.

Even with the development and introduction of newer drugs, there is at present no amount of medical treatment that has been able to prevent the eventual collapse of the immune system in people with HIV infection or Aids. There are no vaccines against Aids, no cure for it, and no effective long-term medical treatment.

Since HIV and Aids threaten every sector of society and the national economy, their effects are being felt by all economic sectors including construction. Owing to its mobility and migrant nature, the construction industry is the third hardest hit by HIV and Aids, after mining and transport.

The pandemic in South Africa threatens to reduce the overall construction labour force, shift the age structure due to mortality, change the skill composition of the construction labour supply, and increase labour turnover. The resultant absenteeism, medical incapacity, sick leave and disability pensions, medical care, pensions to surviving dependents, and loss of productivity potentially affect the direct costs of construction companies and thereby the cost of construction.

Drawing from data gathered from 565 participants during a series of more than 40 national multi-stakeholder workshops and seminars, 300 workers in the Western and Eastern Cape provinces, and 400 workers in Namibia, we argue that construction employers continue to remain uninvolved and apathetic to the potential impact of HIV and Aids, both in the workplace and in the communities from which their labour force originates. Our workshop and seminar sample included architects (6 %), contractors (21 %), engineers (22 %), quantity surveyors (6 %), project managers (7 %), co-contractors (4 %), public sector clients (24 %), and private sector clients (5 %).

Participants at the national series of workshops and seminars confirmed that very few employers were involved with primary health promotion programmes or had

in place any HIV and Aids interventions. In particular, we found that only 36 % of the respondents had written HIV and Aids policies in place while 46 % provided their workers with educational material on HIV and Aids. HIV and Aids education was arranged for all their workers by only 38 % of the respondents.

Most of the surveyed construction workers reported that the main contributors to the spread of HIV and Aids were the lack of awareness and education. Construction employers clearly can play a role in providing such education and awareness programmes. However, to be able to play such a role employers will have to reverse worker negativism relative to their potential influence.

Our studies established that construction employers were the 11th (out of 12) least likely agency to influence existing behaviour and bring about lifestyle and behaviour changes. If the war against the ravages of HIV and Aids is to be effective and the rate of new infections reversed, construction employers have to become more involved than is the case at present.

The forms of employer involvement should not only include the provision of male and female condoms, awareness and induction programmes, but also increased focused HIV and Aids education that fulfils multiple purposes. These include:

- The dissemination of necessary information that includes primary health issues
 - Persuasion to change attitudes and behaviour
 - Equipping workers with the life skills necessary to prevent the spread of HIV infection
 - The care of infected workers
- Workers need to be educated about the need for universal protection against infection in situations of possible infection in the workplace. This includes the use of gloves and the correct methods to clean up accidental spillage of blood and body fluids – whether injured workers are HIV positive or not. Workers also need to be made aware that they can be held liable for damages if they infect sex partners without informing them about their HIV serostatus.

Relative to what their employers could do apart from the provision of condoms, workers indicated that the use of a knowledgeable speaker as part of an awareness education programme at work was the most preferred form (95,6 %) of employer-driven information sharing about HIV and Aids. Counselling provided or made available during worker wellness management was also highly popular (85 %). Other popular forms of preferred employer information sharing included posters (82,3 %) and induction or orientation programmes that included information about HIV and Aids (80,8 %).

Although 73 % of workshop and seminar respondents reported that HIV-infected persons and Aids sufferers were entitled to the same rights, benefits and opportunities as uninfected construction workers, 64 % thought that they posed a risk of transmission to co-workers during ordinary workplace contact. Evidently, this form of inconsistency pervades the industry. Further, while people living with HIV are capable of performing to the same levels of other workers, many employers have systematically marginalised them once their serostatus is known.

Less than a quarter of the workshop and seminar respondents (24 %) were aware of the HIV and Aids specification of the Department of Public Works and most of these (82 %) would implement its provisions in their organisations. This finding indicates that government is not doing enough to communicate with and reach industry participants about its initiatives.

Where respondents had no HIV and Aids interventions in place, only 43 % intended to introduce such programmes in the near future. These programmes included the development of corporate HIV and Aids policies, involvement of agencies such as the Department of Health and local clinics, and establishment of worker representative and support structures.

Clearly, if the present rates of HIV infection are to be reversed, everyone needs to become increasingly involved in communicating new and effective messages that lead to changed sexual behaviour. All construction employers cannot be inert bystanders.

Finally, the business case for construction employer involvement is evident. By improving the quality of life of their workers, who are in reality their most valuable asset, the health condition of workers will improve, which in turn positively impacts productivity on construction sites while at the same time enhancing the welfare of workers and their families. ■



FOCUS ON YOUNG ENGINEERS



Going full circle

At 34 Henri Honiball has steered his professional life to accomplish the perfect circle. He has journeyed from civil engineering to management consulting and back, adding a truck-load of value en route. His journey did not stem from a lack of fulfilment or a feeling of disillusionment with civils. On the contrary, it was undertaken with deliberation, foresight and a touch of *carpe diem*. Lorraine Fourie traces his steps

THE YOUNGESTER STOOD next to his mother viewing the newly constructed portal bridge over the Gouritz River. She said, 'Henri, if you become an engineer, this will be the kind of work you'll do – designing bridges and so forth.' The youth was not impressed and shrugged, 'No, it doesn't look like something that'll interest me.'

In due course his beliefs changed and in 1990 he enrolled for civil engineering on an Iscor scholarship at the University of Pretoria (UP). When, in his final undergraduate year, the company released its bursary holders from their contractual obligations, Henri was awarded a UP scholarship to further his studies towards an honours degree.

Recognising that his penchant for being a 'professional student' had reached its due date, Henri scanned the job market. After what he considered to be a less than successful interview at Knight Piésold (then Watermeyer, Legg, Piésold & Ullmann) Consulting Engineers in Johannesburg, he secured a position with the firm. 'I believe everything in life happens with a purpose – my appointment at Knight Piésold was the ideal start to my professional career. Much of the finer, practical aspects of engineering that have served me so well over the years I learned there,' Henri recalls.

His drive and dedication were soon noted and in 1996 he was appointed consultants' representative on the civil, geotechnical and structural functions of the Saldanha Steel Project. 'The moment I heard Saldanha was on the cards, I started badgering my seniors for an assignment there. It was a tremendous learning opportunity for a young engineer and the responsibilities were awesome. But it wasn't as if it simply

landed in my lap; I believe that one should set firm goals for oneself in life and work resolutely to fulfil those goals.'

By 1998 he had progressed to senior engineer and obtained his master's degree in geotechnical engineering cum laude at UP. 'It was a time that frontiers started opening to South African business and I got to cut my teeth on several project assignments in Africa. We did a number of feasibility studies, conceptual designs and cost estimates on mining projects, especially for gold mining companies with interests in particularly West Africa,' he says. Geotechnical and civil design work, analyses and project management were also carried out for the heavy industrial and infrastructure sectors in the domestic market.

'The civil engineering industry, especially consultancies, experienced a downturn by mid-1999,' he continues. 'Knight Piésold had embarked on a re-engineering and repositioning drive and I was fortunate to be part of a core group of employees who, in conjunction with management consultants, actively participated in this process. I found this very stimulating because I had always believed that engineers should, in addition to their technical capabilities, be proficient business managers. At its core we are in the "business of engineering" and the better we master this business, the better it will ultimately be for the profession.'

This experience set the scene for Henri to actively pursue an MBA qualification. However, the intention was not to make a permanent exit from the engineering profession. 'I wanted to do the MBA because I felt it would add to my growth as a professional by complementing the training and

experience I already had. If you delve into the history of the MBA, you'll find that the degree was originally developed in the USA principally for engineers to complement their largely technically focused training with general business principles and skills.'

From the *Financial Times*' list of the top 100 international business schools he chose the University of Nyenrode's school at Breukelen in the Netherlands, and left South Africa in July 2000 for 13 months' full-time study. His resignation from Knight Piésold was not without regrets; he was also leaving behind his fiancée, Lisinda, who was a fellow civil engineer at the company.

'At Nyenrode, exchanging ideas with students from countries as far afield as the USA, China and Sweden accentuated different perspectives and broadened one's insight tremendously.' On the strength of a proposal involving the design and development of a financial and commercial strategy for a start-up software technology company, which he submitted for his final MBA dissertation, he was invited by PricewaterhouseCoopers NV to do the project in partnership with them. After Henri graduated – top of the class – they wanted to recruit him for their office in Amsterdam, but he decided to return to South Africa.

He was now in two minds whether to join a management consultancy or a financial institution. What he did know was that it would be an interim arrangement and that, ultimately, he would return to the engineering field, having added value to his career along the way. In 2002 Henri joined MAC Management Consulting as a senior consultant, primarily handling



strategy development, re-engineering, change management and speciality projects for major players in the mining industry and financial sector. 'What struck me was how intensely people-oriented management consultancies are. Companies often declare their employees to be their major asset, but they merely pay lip service to this creed. I thought to myself that the engineering profession could in this take a leaf from the book of management consultants. Future success for the profession will be determined not only by how effectively we have employed our "hard" engineering skills, but increasingly also by how successfully we have managed to integrate "soft" skills in the total conduct of our business.'

By the beginning of 2005 Heinri was ready to roll the diverse influences he had

assimilated into a self-owned enterprise, and cPOD Consulting was born. 'When I started toying with the idea of branching out on my own, one aspect prevailed: it had to be a consultancy with a difference, offering more than the "usual",' he says with passion. Even the choice of name is different – 'POD' for that universal and modern feel, and 'c' for creativity and client. 'We not only address the technical, product-related needs of our clients, but we also provide them with strategic solutions that can turn their companies into top performers.'

Located in Fairlands, Johannesburg, cPOD prefers not to operate on a grand scale and conducts its business by entering into partnerships and joint ventures, focusing on selected clients from the mining industry.

► *Left: MBA graduation day at Universiteit Nyenrode – Heinri and two of his South African classmates with Nyenrode Castle in the background*

► *Middle: Heinri and his wife both enjoy travelling and exploring new places – this picture was taken in Phuket, Thailand*

► *Right: 'Koninkinnedag' in The Netherlands (the queen's birthday – a public holiday) with festivities being held all over the country. This picture was taken in Amsterdam*

As for his personal life – he married Lisinda, but 'we didn't want to create the perfect storm and plunge into a business and family simultaneously'. At the moment his energies are channelled into building a resourceful company displaying an entrepreneurial and creative spirit. □



Civil young ladies

IT IS ALWAYS heartwarming and inspiring to observe enthusiastic students striving to reach their goals, but even more so when they have to surmount financial and personal stumbling blocks. Lilene Louw and Segametsi Smous are two young ladies who have made it to the top as best achieving civil engineering students at their tertiary institutions. We traced them to their places of work and found the two ladies thoroughly enjoying what they are doing, and still displaying the determination and perseverance that got them through their studies.



LILENE LOUW grew up on a farm in the Soutpan district, north of Bloemfontein. It had always been her dream to become a civil engineer but, owing to financial constraints, she had to work while studying for many years. Lilene completed her National Diploma in Civil Engineering in 1991 at the then Technikon Free State, and followed it up with the National Higher Diploma in Civil Engineering (cum laude) at the same institution in 1993, and in 1997 with a BSc (Hons) (Geohydrology) (also cum laude) at the University of the Free State. During these years she worked at Ninham Shand, progressing from student technician to senior technician. This is where she met and married her civil engineering husband, Jean.

In a bid to achieve her ultimate goal, she eventually resigned and enrolled full time for the degree in civil engineering at the University of Pretoria (UP), passing with distinction in 2003. While at UP, Lilene received the BKS–G P R von Willich Prize two years in a row for the best second- and third-year student in the Department of Civil and Biosystems Engineering, and the BKS–D W de Vos Medal in her fourth year, also as best student. In 2003 she received the Stewart Scott

Award for the Most Innovative Research Project, titled 'The prevention of cavitation in control valves', topped by the SAICE Annual Merit Award for the best final-year student in civil engineering at UP. UP also awarded her honorary academic colours.

After graduating, Lilene joined the City of Tshwane Metropolitan Municipality for a year where she gained experience in water systems (bulk and reticulation) and where she was also responsible for the planning and detail design of a pump station. Since the beginning of 2005 she has been employed by Kwezi V3 Engineers, where her duties entail planning, detail design, contract administration and site supervision for water, sanitation and stormwater systems.

Lilene says that her long years of studying made her feel 'forever young', as she found herself increasingly surrounded by younger students. She therefore quite understandably subscribes to the adage that 'age is all in the mind'!

Apart from civil engineering, Lilene's big passion in life is reading. She is a compulsive reader who covers the full spectrum: romance, Harry Potter, archaeology, suspense, novels, science fiction, biographies – name it and she reads, or has read it!



SEGAMETSI SMOUS comes from Polokwane. She moved there when she was nineteen, after spending her childhood and teen years in Taung in North West Province. She had long since set her sights on becoming a metallurgical engineer, but her dream kept on eluding her because of a serious lack of funds. She matriculated at the age of 17, but it was only on the very day that she turned 21 (in 2001) that she could eventually start her studies at the then Technikon Northern Gauteng. She had been offered a bursary to study civil engineering and she duly

enrolled for the National Diploma in Civil Engineering.

Segametsi completed her National Diploma in July 2004 and later that year received the SAICE Annual Merit Award for the best final-year student in civil engineering at Technikon Northern Gauteng. Looking back on her student years, Segametsi says that it was a blessing in disguise that she did not have money to study further immediately after matriculating. Because she was more mature and determined by the time that she could enrol for her diploma, this not only helped her to focus on her studies and organise her timetable judiciously, but also made inevitable sacrifices much more tolerable. She jokes that, although her name means 'daughter-in-law' in the figurative sense, she had to concentrate so hard on her studies that there was no time for boyfriends, let alone marriage!

For the first few months after receiving her diploma she worked on the Bakwena Platinum Highway (Platinum Joint Venture), thereafter joining Eskom, where she was involved mainly with civil maintenance of structures, as well as some construction work. Around September 2005 she joined WBHO and is currently working on the extension of one of the existing aprons at Johannesburg International Airport, as well as the construction of a completely new apron.

Although civil engineering was Segametsi's second choice, it has now become her mission in life. She finds her work very satisfying and meaningful as she feels that it contributes to the development of a 'happy country'. Since her introduction to civil engineering as a profession, she has become acutely aware that life is not possible without civil engineering. She plans to continue her studies in the not-too-distant future by completing a BTech degree, specialising in either structural engineering or construction management.

Segametsi's faith is extremely important to her – she says that without inspiration and help from above, she would not have achieved her goals. She relaxes by watching comedies and National Geographic documentaries on television, but her great love outside civil engineering is soccer, in particular ladies' soccer. While working at Eskom, she played regularly in their ladies' team. Asked whether she intended to start a ladies' soccer team at WBHO, she replied, 'There are not enough girls here – yet.' □



Civils tops!

THE INSTITUTE OF PROFESSIONAL Engineering Technologists (IPET) recently conferred their annual awards on the best engineering graduates at BTech Engineering level in Johannesburg.

This year the illustrious Ipet Top Engineering Graduate Award, a 75 mm gold-plated medal sponsored by Caltex Oil (SA), went to Rishaal Ramchunder, a BTech Civil Engineering graduate from the Durban Institute of Technology, who had achieved the highest academic results across all disciplines for the BTech Engineering degree countrywide. Rishaal obtained the degree with an average of almost 90 %. Apparently it is quite unusual to have a civil engineering student as the winner.

Born in Merebank, Rishaal grew up in Isipingo Hills, south of Durban. He had been interested in structures from a very young age and his library books related mainly to bridges and other innovative landmarks. No wonder he went on to the Durban Institute of Technology to realise his dream! He studied there from 2000 to 2004.

Rishaal is particularly interested in structural design and project management. He said, 'I believe that if the individual understands structural design he would be able to make better decisions when problems arise on-site.' As for project management, he finds the daily interaction with diverse people at various levels of an organisation very stimulating.

Asked how he had experienced the civil engineering course, he replied, 'The course was really enjoyable. I found the degree to be relevant to the exigency of industry. As I enjoyed the course, it was easy to excel!'

To the question of how he as a young civil engineering technologist assesses the role of civil engineering in South Africa and Africa at present and how he would like to see it in the future, he explained, 'The twenty-first century has been termed Africa's century. As Africa is developing, infrastructure shall have to be constructed to meet these development objectives. Civil engineering shall be at the forefront of this development. In the future, I would like to see the civil engineer



► Willie Lötter, president of IPET; Rishaal Ramchunder; Tom McKune of the Durban Institute of Technology

raise the levels of safety to zero tolerance and attract more individuals into the profession to cope with the apparent shortage!

He added that he would like to attain either a commercial or project management qualification and be involved in the construction of a landmark structure in his career.

Rishaal has also received the following awards:

- SAICE Merit Award for best NDip student at Durban Institute of Technology for 2002
- Excellence in Structural Steel Design – 2003 – South African Institute of Steel Construction (SAISC)
- Deans Merit Award for Academic Excellence in Civil Engineering – 2005
- Engineering Council of South Africa (ECSA) Merit Medal for Outstanding Achievement in Engineering – 2005

When asked how he had managed to achieve so much, Rishaal replied, 'I believe in a healthy mind, body and spirit. It is important to know the theory well so that you may be more effective in its practical applications.'

However studious this may seem, Rishaal believes in a balanced lifestyle. His interest in strength training, movies, music and socialising will stand him in good stead in the tough civil engineering environment! □



SAICE'S influence on my career choice

'I WANT TO BE a civil engineer when I grow up.' This is not something a young child, and probably not even a high school student, will easily say. It was no different in my case. As a young boy I wanted to be a brave fireman, a veterinarian or a policeman when I grew up.

As I grew older, my interests changed. I fiddled with everything in my father's garage from ball bearings to our old petrol lawnmower. I also enjoyed taking my toys apart and putting them back together again. By age 11 tinkering was one of my

favourite hobbies, and when it was time to choose which high school to attend, it only took a suggestion from my father for me to realise that a technical high school was exactly what I was looking for.

It was also at this time that I was introduced to the SAICE bridge building competition. I was attending Bellville Technical High School's open day. The Civil Department had a bridge on display and staff explained to the parents and future scholars what bridge building entailed. I was immediately hooked and started

playing around with ideas on designing my own bridge.

In high school I took Technical Civil as my technical subject since it was the subject that was closest to my hobbies. I started to enjoy the various aspects of the subject: planning, designing and implementing; but I still didn't consider it a possible career. I had quite diverse career options that varied from a chemical engineer to an explosive technologist.

It wasn't until I took part in the bridge building competition that things in my head started clicking together. In Grade 11 I took part in the competition for the first time and it was very exciting to see how learners bent together over a design and how it was 'brought to life'.

To date the bridge building memories are among my fondest ones, and professionally I am quite grateful for the experience, since the interaction with SAICE gave me a better insight into civil engineering. Based on my education and interests

up to that point I seriously started to consider civil engineering as a future career. I didn't realise how committed I was to my decision until I was asked at the bridge building competition what I wanted to do for a career. After I had answered, 'a civil engineer', I mulled the words over in my head and realised for the first time how strongly I felt about it.

Four years later I graduated from Stellenbosch with my engineering degree and I am currently working for Africon Consultant Engineers International. Now, every evening when I get home from work I can reflect on the day and be satisfied with what I did. Looking back at my path to date I can see no error in my career choices. Sure, I have come in contact with many aspects of life and my personal interest field has broadened, but civil engineering remains my home.

Tiaan Nel, Africon

From businessman to carpark attendant to doctoral student



With a few dollars in his pocket, he embarked on the journey to South Africa with a small group of people, and was dropped off at the border between Namibia and South Africa

I HEARD THE FULL STORY for the first time on a train from Pisa to Rome after we had attended an international conference at which Mbiya Baudouin presented the work he had done for his master's thesis. It is a story of endurance, faith and fate.

He was always interested in electrical engineering. He did the requisite subjects at school, but the university he was able to attend in Lumbushi, Congo, did not offer electrical engineering, so he completed his BSc in mining engineering. After working for some time, he decided to go back to his passion for electronics and started a flourishing business wiring newly built houses. But the political condition deteriorated, and he realised that his only way to ensure a better future would be to find employment in another country. This happened to be South Africa.

With a few dollars in his pocket, he embarked on the journey to South Africa with a small group of people, and was dropped off at the border between Namibia and South Africa. After walking for a few kilometers, he reached the town of Springbok where he found accommodation with

one of his 'brothers', who was selling goods on the pavement. The next morning he took a taxi to Cape Town where he ended up in a backpackers lodge in Long Street. He had intended to go to Johannesburg because of the mines, but here he was in Cape Town with just enough money to pay for a few nights' stay. And so he became the carpark attendant for a few shops in Long Street. This earned him about R2 000 per month and accommodation in the notorious Gimpie Street.

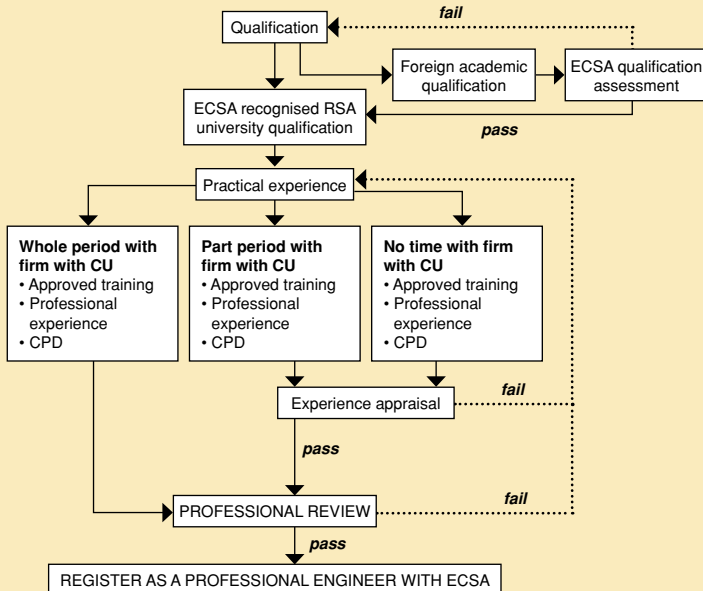
Then, by faith and through fate, he spoke to Dr Reiner Berg, a former colleague of Professor Paul Slatter, while he was looking after his car. Dr Berg pointed him in the direction of the Cape Technikon (now Cape Peninsula University of Technology, CPUT). Again he tried to do electrical engineering, but because of his qualifications he was sent to Professor Slatter in the Department of Civil Engineering, which offered postgraduate studies in slurry flow technology.

This is where I met him. I realised that this was a determined young man, hardworking and smart. I persuaded him that the Waterside Residence might be more conducive to postgraduate studies than Gimpie Street. He joined the team and completed his MTech successfully in 2003. He is now employed as a lecturer in the Engineering Foundation Programme at the CPUT and has completed his second year of doctoral studies.

He has recently become the proud father of a first-born son, who, with his mother (a final year medical student) joined him in December. □



Negotiating the road to ECSA registration



► **Figure 1** Main routes to registering as a professional engineer with ECSA

THE LATEST STATISTICS SUGGEST that more civil engineers are retiring from the profession than are entering it. More alarmingly, 'young' professional civil engineers only marginally replace retired professional civil engineers. Although several companies have incentives such as salary increases to encourage their young engineers to register as professional engineers, the rate at which professional civil engineers are entering the discipline is not sufficient. Recent conversations with young civil engineers indicated that the problem could be attributed to lack of experience (because of the nature of the work, the necessary experience could not be obtained), insufficient time to complete the process due to pressure of work, lack of information (details are not always clear in the manual) and lack of interest.

The aim of this article is to summarise the process of professional registration, highlight some of the key points, and encourage those readers who have not yet registered to do so (myself included). For further details, consult the Engineering Council of South Africa (ECSA) website (www.ecsa.co.za) or contact ECSA at 011-607-9500.

QUICK GUIDE

Academic and practical experience

The process of professional registration as a civil engineer is summarised in figure 1. To register, the candidate should have obtained the necessary academic and practical experience. Academic experience is obtained at an academic institution (South African or foreign) that is accredited by ECSA. ECSA assesses foreign qualifications to ascertain that they meet certain predefined standards. If not, more academic experience is required.

In terms of practical experience, candidate engineers must demonstrate that they can satisfactorily apply engineering principles and methods within their disciplines and accept professional responsibility for making and executing engineering decisions. The council takes the nature, standard and variety of practical training into account during assessment. Candidate engineers must obtain practical experience that demonstrates that the following procedure was adopted:

■ **The problem** The candidate engineer must demonstrate that a problem had been identified and formulated; information was

sourced; the relevant information was selected; data was obtained via evaluation, investigation, testing and research; and all factors that might influence the solution had been assessed

■ **The solution** A solution must be developed using all the information obtained during the identification of the problem

■ **Execution and implementation** All resources must be used in the execution of the engineering tasks or projects – that is, staff, materials, machines, equipment and funding – to achieve the end result

Potential professional engineers should register as 'candidate engineers' before they embark on their practical training. During this period candidates must familiarise themselves with the ECSA Code of Conduct and undertake continuing professional development (CPD). A minimum of three years post-qualification practical experience is prescribed for professional registration.

Continuing professional development

CPD may be defined as 'the systematic maintenance, improvement and broadening of knowledge and skills, and the development of personal qualities necessary for the execution of professional and technical duties throughout an engineer's career'. SAICE recommends that 30 days of approved CPD should be obtained during the training period. Ideally this 30-day period should consist of the following:

- Ten days of technical subject courses
 - Ten days of managerial and/or professional and ethnical subject courses
 - Ten days of either of the above or any type of CPD listed below
- The following are considered acceptable CPD:
- Courses, seminars, congresses and technical meetings organised by SAICE, universities, other professional bodies and course providers
 - Participation in accredited conferences, or service on technical or professional committees and working groups
 - Structured self-study (ie using textbooks with examples)
 - Study of technical literature (eg journals and magazines)
 - Correspondence courses and other supervised study packages
 - In-house courses provided by employers
 - Formal postgraduate studies
 - Writing technical papers or presenting lectures at organised accredited events
 - Participation in site visits organised by SAICE, universities or other professional bodies
- Sufficient time should also be spent on public health and safety, and environmental issues.

The above practical experience can be gained with 'commitment and undertaking',¹ with partial 'commitment and undertaking' or without 'commitment and undertaking'. Once the prescribed tasks have been completed, the applicant may apply for registration. The requisite forms should be sent to ECSA. These include:

- ECSA application (forms A1.1 and A1.2)
 - Certified copies of all qualifications
 - Documentary proof of SAICE membership
 - Reports from professionally registered referees (form A4.1/2)
 - Interview records (form AC8)
 - The training schedule (forms AC7.1 to AC7.8)
 - Summary of training/experience reports (forms A2.2)
 - Training/experience reports completed during the training period (form A2.1)²
 - 4 000-word project report³
 - CPD logbook containing details of CPD approved to date
- These should be signed off by the mentor (in the case of 'commit-

ment and undertaking') or the candidate engineer to indicate that the tasks had been completed.

Special cases

Recognition is also given to candidates who have moved into specialised fields, completed postgraduate degrees, held lectureships, and obtained practical training outside South Africa.

Specialisation

Candidate engineers who have specialised in an engineering field during their practical training to the extent that they do not comply with all the general requirements may register as professional engineers, provided that they have attained knowledge in their field of engineering to at least master's degree level and obtained a minimum of five years' experience after obtaining a bachelor's degree.

Postgraduate degree

A maximum of 12 months may be contributed towards practical training during the period of postgraduate studies, provided that the level of responsibility and nature of work are equivalent to those of a candidate engineer trained in accordance with the principles and requirements in the policy statement and the appropriate discipline-specific guidelines.

Lecturership

Lecturers are allowed to register as professional engineers provided that they complete some of the tasks listed below as part of their practical training. These should be carried out in addition to lecturing:

- Consulting work that complies with the guidelines for practical training
- Planning, design, development, commissioning and/application of research equipment or processes associated with engineering projects
- Accepting responsibility for the management of workshops, laboratories and ancillary facilities
- Execution of research projects and calculation or processing of results

The above tasks would be carried out on a part-time basis. As a result the minimum training period for lecturers is in the order of five years.

Practical training outside South Africa

Practical training outside South Africa is considered in accordance with the principles and requirements of the ECSA policy statement.

Experience appraisal

Experience appraisals are applicable to all candidate engineers who have not completed their training by means of a 'commitment and undertaking'. These are carried out by ECSA to assess whether candidates have achieved the required objectives, levels and professionalism to qualify for the professional review. If necessary, interviews may be held with the candidate, but these do not replace the professional review. Should a candidate fail to meet the objectives, he or she will be informed of aspects that need attention for the professional review. Once these have been met, the applicant may reapply.

Professional review

The professional review is a comprehensive review of the candidate's engineering career to assess the quality of his or her professional attributes and level of competence. The professional review takes the form of an interview and is compulsory for all candidate engineers.

As part of the professional review, civil engineering candidates are required to write two essays. Ninety minutes are allowed for each. A list of topics for the following calendar year is published by SAICE in the magazine. These topics may be prepared in advance and constitute one of the essays. The topic of the second essay is presented to the candidate on the day of the written exam.

As indicated in figure 1, essay writing forms an integral part of

the professional review. The results of the professional review and the essays are returned to ECSA for consideration by the relevant professional advisory committee.

Successful candidate engineers are then registered and a certificate of registration is issued shortly afterwards. Candidates who fail the professional review are informed of the reasons of their failure and must repeat the entire application process after they have obtained the necessary experience. Candidates who failed only the essay section of the professional review may rewrite the essays within a year of their first attempt.

Notes

- 1 Employers undertake to structure the training, train and provide regular guidance to their candidate engineers through mentors registered with ECSA.
- 2 A training report must be completed for each training period. Each report should set out the candidate engineer's training and practical experience and should explain their level of responsibility (2 000 words maximum for the combined reports).
- 3 The separate 4000-word project report should demonstrate the technical and professional competence of the candidate engineer. Attention should be given his or her role in the development of the projects, and the background to important decisions. It should also incorporate all design details (maximum 4 000 words).

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- ECSA 2004. Acceptable engineering work for candidate engineers for registration as professional engineers. Policy statement R2/1A.
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AUTOMATION OUTLOOK 2006

Cyber security breaches threaten, smarter factories and and engineering talent base

ENGINEERS WHO BEGAN their careers 25 or more years ago have witnessed, benefited from, and contributed mightily to the greatest technological leap forward in history. And the wonders will continue during the coming year. But those engineers who tracked into management may scarcely notice them, spending the year feeling, instead, as if they're tip-toeing through a clutch of just hatched rattlesnakes.

Automation industry executives place worldwide growth in 2005 in the neighbourhood of 5 %, a substantial improvement over the past several years, and expect to see similar overall growth in 2006. Yet they note significant disparities among market sectors and geographical regions

▶ FAST FORWARD

- Automation industry executives place worldwide growth in 2005 in the neighbourhood of 5 %, and expect to see similar growth in 2006
- Next-generation plants will be smaller and more mobile
- Experts agree tactical strikes against vital public infrastructures prior to physical attacks is possible and perhaps likely
- US students earning science and engineering degrees continue to decline, prompting analysts to predict a coming crisis of talent

'What I'm finding is that engineers don't want to go into refining, or power, or semiconductors anymore. They want to go into nanotechnology or genetic engineering' – Bolick

and are carefully watching several worrisome trends.

From the kitchen table to the neighbourhood merchant, from corporate boardrooms to the White House cabinet room, the cost of energy is the ever-present concern. Have the world's economies and industries at last grown so interdependent that – as when the failure of an obscure, overextended state bank triggered cascading failures that launched the Great Depression – a business failure here, or storm there, or terrorist attack elsewhere, might be felt worldwide?

'High energy prices will eventually put a damper on world economies,' said Emerson Process Management President John Berra. He added he doesn't think it's inevitable, and the worry shouldn't be overblown. 'I'm optimistic about the next two-to-three years.'

CONSULTING THRIVES ON ENERGY COST HIKES

Industry's response to the problem of increasing energy costs has been a boon to automation firms. In the US, Emerson Process Management and Honeywell are enjoying rapid growth of their consulting services and a nice uptick in product sales, as companies search for ways to squeeze more profit from their existing industrial infrastructure, turning to tactics that range from improved instrumentation to intelligent, finely tuned controls and information management systems that make the decades old dream of instantaneous plant-floor-to-boardroom communication a near reality.

Both companies have found consulting is the most rapidly growing part of their North American business, with clients seeking everything from analyses of current operations and recommendations for retrofitting, to resident plant-engineering services. And both companies anticipate their consulting services will grow in importance, displacing or overtaking traditional integrators.

SMALLER, MORE MOBILE FACTORIES

Further, plant upgrades and new capacity are designed to run more cheaply and efficiently than ever. The era of 'lights-out manufacturing' envisioned by the early proponents of robotics is quietly becoming a reality. As a 2003 article in *The Wall Street Journal* reported: 'The future of manufacturing for me is doing it whenever possible with no labour at all,' said Pete Evans, the fourth generation in his family to head its 73-year-old business. By expanding lights-out manufacturing, he expected to double output in the coming two years without adding to his 49-person workforce.

Though streamlining, upgrading, and increasing efficiencies is the industrial trend in the mature economies, new industrial capacity is growing rapidly in the emerging economies, with construction of new factories under way throughout China, India, the Middle East, western Africa, and South America.

The model for next-generation plant capacity is also undergoing significant changes. 'Factories are going to become smaller, and more mobile, too,' said industry observer and founder of San Diego-based Action Instruments Jim Pinto. 'When there's no more gold, or no more coal, or whatever resource you're using, you don't need the factory to be there. So you disassemble it and move it.'

STUDENTS SNUB SCIENCE

Engineers will probably be more mobile, too, as students outside the developing nations turn their backs on careers in science and engineering. South African municipalities are currently unable to fill 40–45 % of their technician and engineering positions, said Allyson Lawless, a former president of the South African Institution of Civil Engineering.

American executives remain worried. Honeywell President Jack Bolick said there are areas worldwide, but especially in North America, where it's difficult to locate the engineering talent he needs.

processes emerge, consulting business booms, shrinks

‘What I’m finding is that engineers don’t want to go into refining, or power, or semi-conductors anymore. They want to go into nanotechnology or genetic engineering.’ The company is responding by consulting with retirees and codifying their knowledge in their software products, adding laid-off engineers to their own consulting staff, and contemplating a day when management of remote systems and some types of maintenance are done over the Internet.

Watching the decline in engineering enrolments, Emerson is cultivating relationships with universities worldwide and sponsoring work-study programmes. ‘In the long run, availability of engineering talent is going to be a global issue,’ Berra said.

CYBER SECURITY REMAINS VULNERABLE

The electronic security of manufacturing systems has already become a global issue, with more than 100 documented instances

of cyber events that affected, or could have affected, process control. And because few companies willingly disclose breaches of security, experts believe the actual number is much higher.

■ In Australia, a disgruntled contractor remotely arranged the release of one million litres of raw sewage into adjoining waterways

■ In Tempe, Arizona, an intruder gained access to the Salt River Project system, disrupting delivery of power and water to utility customers and stealing account information, including financial data

■ Iranian hackers entered Israel Electric Corp’s controls in 2003 and repeatedly attempted to disrupt that nation’s power supply

■ Hackers disabled vital PLCs during the Venezuelan general strike of 2002, closing that country’s main port
Most of the attacks against industrial

controls prior to 2001 were committed by insiders, said Eric Byres of the British Columbia Institute of Technology. Then, he said, the preponderance of attacks started to come from the outside. Presently, 80–90 % of attacks from the outside are opportunistic – the work of someone who finds the site by happenstance – and the remainder are targeted at a specific facility (for industrial espionage, for instance). Organised crime has moved into computer crime in a big way, setting up high-tech sweatshops in undeveloped nations where legions of cheap, skilled computerheads troll cyberspace looking for easily penetrated systems.

‘We’re still in the Wild West of Internet security,’ said Byres, and the complexity of manufacturing software systems, with their many portholes, makes them especially vulnerable to somebody who wants a look inside.

Students turn away from engineering studies

The world was reminded of the vital work of engineers when Hurricane Katrina destroyed thousands of square miles of southern Louisiana and Mississippi: no power, no water, no fuel; failed levees, failed roads, failed bridges; and entire cities ruined and uninhabitable.

But at the very time that advancing technology is driving up the demand for engineering know-how, American students are rejecting careers in science in engineering. Microsoft Chairman Bill Gates is so desperate for talent he asked Congress last April to remove limits on certain classes of visas, complaining the company is unable to hire domestically all the engineers it needs. Similarly, announcing plans to provide financial support

intended to encourage employees to transition to careers in teaching, IBM Foundation head Stanley Litow said, ‘Over a quarter-million math and science teachers are needed, and it’s hard to tell where the pipeline is. That is like a ticking time bomb not just for technology companies, but for business and the US economy.’

In October, the National Academies of Science and Engineering and the Institute of Medicine issued a joint report grimly titled ‘Rising Above the Gathering Storm’, noting, ‘After secondary school, fewer US students pursue science and engineering degrees than students in other countries.’ About 6 % of US undergraduates study engineering – the second-lowest percentage among developed coun-

tries. Engineering students comprise about 12 % of undergraduates in most of Europe, 20 % in Singapore, and more than 40 % in China. ‘Students throughout much of the world see careers in science and engineering as the path to a better future.’

The report concludes, ‘Having reviewed the trends in the United States and abroad, the committee is deeply concerned that the scientific and technical building blocks of our economic leadership are eroding at a time when many other nations are gathering strength. We strongly believe that a worldwide strengthening will benefit the world’s economy – particularly in the creation of jobs in countries that are far less well-off than the United States – but we are

worried about the future prosperity of the United States.’

National Science Foundation data confirm science and engineering enrolments are down. Science and engineering graduate students numbered 330 057 in 1993, dipped to 290 711 in 2000, then revived to 327 332 by 2003. The percentage of non-American science and engineering graduate students increased steadily, however, from 32 % in 1993 to 45 % in 2003.

Only two engineering disciplines have shown appreciable increases in enrolment during the same period. Biomedical engineering enrolments increased to 5 347 from 2 675, and electrical engineering enrolments increased to 41 745 from 35 290. As for the rest, automation industry pundit Jim Pinto explained declining enrolments succinctly: ‘The glamour is not there, and you can’t fake that.’ – Bob Felton

Most hackers, once in, will simply go looking for financial data that can be stolen, packaged, and sold. But attackers who know what they are doing can, and have, seized control of the HMI console.

Byres said the majority of manufacturing systems remain vulnerable. 'We're quite immature in this field,' he said, adding effective system security must be embedded into corporate culture, like safety. 'This isn't a diet,' he said. 'It's a lifestyle change.'

ISA released the latest draft of its proposed electronic security standard, ISA-99.00.01, Manufacturing and Control Systems Security, in October 2005. Ambitious in scope, it aims to address manufacturing and control systems whose compromise could result in any or all of the following situations:

- Endangerment of public or employee safety
 - Loss of public confidence
 - Violation of regulatory requirements
 - Loss of proprietary or confidential information
 - Economic loss
 - Impact on national security
- The concept of manufacturing and control systems electronic security is applied in the broadest possible sense, encompassing all types of plants, facilities, and systems in all industries. Manufacturing and control systems include, but are not limited to:
- Hardware and software systems such as DCS, PLC, SCADA, networked electronic sensing, and monitoring and diagnostic systems
 - Associated internal, human, network, or machine interfaces used to provide control, safety, and manufacturing operations functionality to continuous, batch, discrete, and other processes

The standard is expected to include four parts; the first two are slated for release in mid-2006. Few experts worry about the garish scenarios proposed a few years ago in which cyber terrorists actually modified plant operations and caused defects to be built into products, but there is widespread agreement that tactical strikes against vital public infrastructure prior to physical attacks is a possibility or even a likelihood.

Since 11 September 2001, the critical link between cyberspace and physical space has been increasingly recognised. Critical infrastructures face an increasing threat of cyber attacks in addition to physical attacks. In July 2002, NIPC reported the potential for compound cyber and physical attacks, referred to as 'swarming attacks', is an emerging threat to critical infrastructures. The effects of a swarming attack, according to NIPC, include slowing or complicating the response to a physical attack. For instance, a cyber attack that disabled the water supply or the electrical system, in conjunction with a physical attack, could deny emergency services the necessary resources

to manage the consequences of the physical attack – such as controlling fires, coordinating actions, and generating light.

BETTER SYSTEMS, TOOLS EMERGE

If the horizon appears crowded with vaguely defined perils, there is also a lot to look forward to. First and foremost, instruments and the electronic ganglia that connect them are improving steadily, increasing productivity and reducing costs.

After years of hype, lights-out manufacturing is quietly becoming a reality, allowing plants to reliably increase productivity without increasing personnel, or maintain productivity levels while reducing personnel levels.

Similarly, true floor-to-boardroom communications amongst a wide range of legacy systems is taking hold. Whirlpool just completed a worldwide harmonisation of disparate systems that gives users customised reports in HTML format they can access using a Web browser.

Better tools are in the pipeline, too.

The National Institute of Standards' Manufacturing Engineering Laboratory (MEL) is conducting a series of research projects that aim to ease the production of nanoproducts while improving their quality, extending their usage into areas that not so long ago were the stuff of science fiction.

In the movie *Fantastic Voyage*, a team of scientists is shrunk to microscopic size in order to travel through a critically ill man's bloodstream to carry out a delicate repair to his brain. That isn't going to happen, but nanotechnology and medicine are teaming up to deliver therapies almost as fantastical. According to the 2005 edition of MEL's annual report, 'nanoparticle drug delivery systems (NDS) are a generic technology that is currently under intense development by the health-care community for a broad range of applications. The NDS payload may consist of not only gene-carrying DNA but, for instance, regulatory proteins that turn on or off specific cellular processes.'

Mindful of the growing importance of nanotechnology throughout industry, MEL has initiated a number of programmes that aim to support manufacturing. The Small Force Metrology Laboratory provides accurate force standards to researchers and manufacturers that employ micro and nano-mechanical tests for product development, fabrication, and quality control. Forces from millinewtons down to nanonewtons, commonly measured in industry and academe using devices such as instrumented indentation machines and atomic force microscopes, can now be realised with traceable relative uncertainties less than 0,01 % at loads near a micronewton.

Machining of small parts is about to get better, too; currently, the laboratory is investigating the feasibility of utilising micro-level wire electrical discharge machining

technology for use in creating precision components, complex geometric mechanical parts, and assemblies.

STRENGTH IN MEMs

Micro-electromechanical (MEMs) systems are also getting better. In October, Rice University researchers reported they had created 'a single molecule nanocar containing a chassis, axles, and four wheels ... the first to roll on four wheels in a direction perpendicular to its axles'. Its creation evidences the steady improvement of the ability to create special purpose molecules, which means manufacturers can expect to see more application-specific materials and delicate instruments.

Even as the tools used by manufacturers improve, consumers are increasingly demanding one-of-a-kind products tailored to their specific needs. Accordingly, build-to-order, which was scarcely more than a pipedream five years ago, is today becoming the norm. Dell pioneered build-to-order, and Sony announced in August it will offer custom-built computers in Japan, including its popular VAIO model.

Integra, a maker of high-end home theatre systems, said in January it, too, is now taking custom orders. Kayak manufacturer Action Fish has joined the act, taking it a step further. During kayak building, customers receive updates on the construction of their wood-built kayak via a private website, including photographs. Customers can also receive direct e-mail and phone contact with the builder.

This doesn't mean the end of the production line, but it means greater use of standardised, interchangeable components, and some tweaking of the production line. If done properly, build-to-order means greater profits; factory direct sales eliminate retailers.

Indeed, build-to-order is so pervasive it has spawned its own support industry – software developers who specialise in creating packages that support online specification of the myriad details of a purchase, collect payment, and send the details to bookkeeping and the plant floor.

If the only constant is change, as the old adage has it, then 2006 will be business as usual – only more so as exceptional opportunities and unfamiliar dangers jostle for attention. The automation industry is enjoying the best business environment in years as the mature economies upgrade and new facilities come online in the developing world. Opportunity beckons as new technologies become available and competition compels their adoption.

From rising fuel prices and declining interest in science and engineering careers in the developed countries to the emergence of computer crime as an industry in its own right, successful firms will be looking not only forward, but over their shoulder. ■



Managing municipal infrastructure assets

THERE IS EVIDENCE that few infrastructure asset owners, including water services authorities (WSAs), are making adequate provision to maintain, rehabilitate, replace and protect, that is, to 'manage', their infrastructure assets.

We continue to extend services without making sufficient provision for the necessary rehabilitation, replacement or disposal of infrastructure assets. Compromises are being made and, increasingly, the services will break down.

The Minister of Water Affairs and Forestry, in her budget speech of May 2005, stated that the monitoring of service quality by her department shows 'how important it is to manage infrastructure effectively. Last year, I reported that water supply to 37 % of households was interrupted for more than a day during the previous year – mainly for technical reasons, rather than for non-payment ... This year, we focused on the quality of drinking water, and I regret to say that 63 % of municipalities could not confirm that they met the Drinking Water Quality guidelines ... [Also] there are serious problems in the management of wastewater treatment works ...'

Yet many WSAs are delivering infrastructure services reliably, without unscheduled interruption, and according to specification. In these WSAs, skilled staff are in place, and management of infrastructure assets and services is seemingly sufficiently budgeted for. The challenge to all WSAs is that they manage their infrastructure assets if they are to deliver services sustainably, as indeed they are obliged to do.

SOUTH AFRICA

A 2004 Department of Provincial and Local Government (DPLG) study (funded by the European Union) of infrastructure management in four municipalities (two each in Limpopo and Mpumalanga) reported the following five reasons for below-par performance:

- The priority of the WSA had become to deliver new infrastructure, rather than to operate and manage existing infrastructure
- There were limited basic management skills
- Service levels were ill defined
- There was limited asset knowledge and management information
- Responsible officials had insufficient knowledge of statutory and regulatory requirements

Furthermore, a financial modelling exercise

undertaken in 2005 on behalf of DPLG and the Development Bank of Southern Africa (DBSA) showed that new infrastructure rollout targets of the majority of WSAs, if met, will lead to their acquiring infrastructure at a pace at which they will be unable to afford the costs associated with the operations and management of that new infrastructure. This, apart from the fact that many are unable to afford the operations and management costs of their current infrastructure. The prospect, therefore, is one in which an increasing proportion of infrastructure in the care of WSAs will be unable to deliver the service for which it was constructed.

Finally, studies by, among others, the South African Institution for Civil Engineering (SAICE) on behalf of several Sector Education and Training Authorities (SETAs) showed that the number and expertise of staff responsible for the operation and management of municipal infrastructure (including water services) has not kept pace with the increase in the stock of infrastructure – indeed, it has diminished in many municipalities.

WHAT SHOULD BE DONE

Judicious interventions are needed to make current trends visible and to mitigate emerging vulnerabilities and risks. WSAs must be held responsible, but where there is inability to respond, external support is required.

While some measures are within the power of a WSA, some can only be done by, or are best done by, a larger grouping, or by another entity, such as by a government department. An example of what cannot be done by an individual WSA is a gathering and critical analysis of good practice. But, above all, there is a need for a national strategy to ensure that municipal infrastructure assets deliver services to specification for the whole of their design lives – and for the carrying through of this strategy into the legislative, regulatory, institutional, financial, technological, human resources and other changes that are no doubt required. Part of this national strategy must be a skills plan to ensure the long-term supply of technically trained human resources. DWAF is leading the way by preparing a national plan of action for the sustainable management of water services.

National initiatives notwithstanding, there is plenty of scope for WSAs themselves to deal with their infrastructure asset

management challenges. Below are some of the most important considerations:

- Ensure you know the level of vulnerability of your infrastructure assets, and know if you are in trouble
 - Plan to influence resource allocation in the interests of ongoing financial viability and the sustainability of to-specification service delivery. This involves ensuring that the IDP and sectoral plans address basic services needs without financial over-stress, taking into account the contribution of the equitable share
 - Implement measures, with incentives if possible, to manage the performance of services and assets, and the performance of councillors and officials responsible for the acquisition and/or operations and management of infrastructure and services
 - Consider how to bridge immediate skills and experience gaps in the short term, and in the medium term look at partnerships as an option to operate and manage elements of infrastructure
 - Retain skilled staff, recruit on merit for key personnel posts, and train and mentor inexperienced staff
 - Practise responsible and accountable infrastructure asset management
 - When planning for the acquisition of infrastructure, know the total cost of providing a service – account fully for all costs of use of and management of assets (physical, financial and human resources). Ensure the total cost is reflected in the IDP and sectoral plans (and their financial plans over at least ten-year timeframes). Ensure that funding is identified and allocated in medium-term expenditure frameworks and annual budgets
- Clearly, each WSA must take ownership of its situation. In the short term some of the following might be necessary:
- Identify the most important infrastructure components, and the consequences for service delivery should they fail – especially if probability of failure is significant, and these consequences could involve risk of loss of life. Then do whatever is necessary in order of priority, even at the cost of neglect of other, less important, infrastructure components, or of other WSA functions
 - Improve revenue streams (eg by improving the rate of payment for services), reduce current costs (eg by reducing leakage of water), and reduce future costs (eg by reconsidering planned acquisition of new infrastructure, or reconsidering the level of service of planned infrastructure). ■

SITE HEALTH AND SAFETY 'ALARMINGLY IGNORED', WARNS GMBA

AN ALARMING NUMBER OF EMPLOYERS in the building industry are still not familiar with – or blatantly ignore – the requirements of the Occupational Health and Safety Act and construction regulations, says Nigel Folley, Safety, Health, Environment and Quality (SHEQ) Consultant to the Gauteng Master Builders Association (GMBA).

'Of particular concern is that even some of the bigger contractors seem to have limited concerns about workers' health and safety, and do not even budget for it. It's a case of obsession with profits, apathy and ignorance – despite the heavy penalties the courts can impose on defaulting employers,' he stated.

In terms of the Act, an omission by employers that leads to just a single fatality can carry a fine of up to R100 000 and a two-year prison sentence; an omission that leads to disabling injuries carries the same fine and a one-year prison term; while committing a reckless act in the workplace could lead to a R50 000 fine and a year behind bars.

Folley says the Occupational Health and Safety Act 85 of 1993 (amended in 2005) calls for the employer to maintain a work environment that is safe and without risk to the health of the worker. The employer must ensure that the workplace is free of substances, articles, equipment or processes that may cause injury, damage or disease. Where this is not possible, the employer must inform workers of the dangers, how to avoid them, and how to work safely.

'The employer must see that all work equipment and systems are oper-

ating according to the work requirements. Personal protective equipment must be issued – but only after every attempt has been made to remove the applicable danger to the health and safety of workers. The employer must also protect workers against hazards that may result from the production, processing, usage, handling, storage or transportation of articles – anything that the workers may come into contact with.'

Folley says the employer must also:

- Identify and locate work hazards in the workplace
- Establish the necessary precautionary measures
- Inform the workers as well as train and supervise them on what is permissible on site
- Prohibit the execution of any task unless precautionary measures have been taken
- Ensure that every worker complies with the requirements of the Act
- Enforce the necessary health and safety control measures
- Ensure that applicable work and equipment are supervised by a worker familiar with the hazards concerned. This worker must ensure that precautionary measures are implemented and maintained

'The employer must also inform his company's health and safety representatives of the occurrence of an incident in the workplace – such as when a person is killed, injured or becomes ill. It could also be the spillage of hazardous chemicals, or when machinery runs out of control without necessarily causing injuries or fatalities,' Folley added.



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US STUDY FINDS CONCRETE ROADS AS QUIET AS ASPHALT

A RECENT INTERNET COMMUNIQUÉ by the American Concrete Pavement Association (ACPA) says that concrete roads are so durable that they often exceed their design lives by years – or even decades – and often handle three times more traffic than designed for.

ACPA also states that:

- The durability of concrete roads minimises the need for repair and annual maintenance
 - A study on tyre/highway noise conducted by the American National Centre for Asphalt Technology (NCAT) demonstrated that concrete roads were just as quiet as asphalt surfaces. In fact, a section of diamond-ground concrete was the quietest among eight sections tested (including a variety of asphalt surfaces measured by the NCAT)
 - Concrete roads could be designed for any requirement and placed quickly under traffic conditions. They could also be constructed or re-constructed to meet a wide range of performance, longevity, and budgetary requirements
- In South Africa, the Cement & Concrete Institute (C&CI) – which has been entrusted with the promotion of concrete roads locally – has two major publications available on concrete roads:
- **Low-Volume Concrete Roads** by the Institute's Roads Project Leader, Bryan Perrie. Aimed at consultants, municipal engineers, and contractors, the publication provides guidelines on designing, specifying, and constructing low-volume concrete roads. It covers cost-saving issues such as the incorporation of stormwater drainage
 - **Concrete Intersections**, compiled by Bryan Perrie, provides information for the design and building of concrete intersections, including guidelines on preventing typical problems such as rutting, shoving, and softening caused by oil and diesel spills

Finally, C&CI's latest, upgraded version of its mechanistic design program for concrete pavements/roads, cncPave – which facilitates competent decision-making for the design of concrete roads – is available free of charge from the Internet after registration at www.cncipave.org.za. This innovative computer program received a Special Commendation in the 2003 Fulton Awards, presented for concrete excellence by the Concrete Society of Southern Africa, as well as a recent SMART award commendation from SAICE.

► Info

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HR PROCESSES ON LINE

HR & PAYROLL PROCESSES ARE traditionally resource intensive. Employee Self Service (ESS) streamlines the process and increases productivity and efficiency.

The Accsys Peopleware solution has been enhanced to incorporate an effective, comprehensive module that empowers your employees and frees your HR department for more strategic purposes.

'There are many levels of implementation of the employee self service component, which can be structured to an organisation's requirements. At primary level, this module initiates a workflow process allowing an employee to update demographic or personal details. This can be something of a nightmare for HR departments, because it usually necessitates sending out questionnaires and the time-consuming process of waiting for responses,' says Gerrit du Plessis, product manager of the Peopleware range.

'Another practical example is leave management. Under normal circumstances, this is a paper-based administration process that requires input at various levels. With ESS, the employee can initiate the request (which is electronically processed through line management) and gain an automatic response. The key benefit is that the system applies all the company leave rules already defined and being used by the system,' adds Du Plessis.

At a higher level managers can utilise the workflow to capture values on the payroll on behalf of the employee, for example capturing leave for

employees not at the office, or commission to be paid out, allowing selective control and responsibility.

'The advantage of ESS is that reporting structures are customised according to requirements. It can be implemented for both horizontal and vertical escalations.

The major benefits to businesses are the reduction of costs through increased productivity and the freeing up of high level HR personnel to focus on strategic issues,' adds Du Plessis.

► Info

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CIVIL DESIGNER 6.4 HAS MORE IN STORE FOR ALL

THE MUCH ANTICIPATED Civil Designer 6.4 has recently been placed under the spotlight with rigorous testing by the software developers. According to Vincent Bester, CEO of Knowledge Base, the soon to be released version has something in store for everyone.

'We have listened to our clients and have been able to add some great new functionality to all the modules. This will help to increase productivity and enable engineering designers to have more time to add their own personal touches to their work.

'The new and upgraded features deliver a much wider range of design and business benefits to engineers and designers alike. By listening carefully

and analysing client comments, we have been able to provide an unmatched design experience in the upcoming version,' explains Vincent.

The 6.4 functionality was first introduced by means of an in-house training session in December 2005 to the Knowledge Base Support, Training, Sales and Marketing Divisions. 'In the Roads module, we concentrated more on enhancing the user friendliness of the program in order to allow our clients to get the most out of this already feature packed module. Enhancements were made to the Design criteria function to suggest transition curve lengths to the client if and when required. In addition to this, we have added a Pipes database that will allow clients to enter additional services to be displayed when designing and plotting long sections and we have also added an option to model vertical curves as circular curves instead of parabolic curves to accommodate for the increasing use of the Roads module when doing railway design,' says Vincent.

Civil Designer 6.4's improved water module now includes multiple pipe layer functionality, allowing the capture of pipe layer data according to dimension and material. Data presentation has also been enhanced allowing the user to define and sort information in a spreadsheet format. In addition, text settings on nodes can now be adjusted individually so that they do not interfere with the visual design.

With regard to the program's Sewer functionality the new version is equally impressive. 'We have included the erf connections functionality to the Sewer module. Users can now graphically insert erf connections using the familiar Sewer user interface while the program automatically indicates the lowest point on each erf. The Erf connection database can then be analysed to report results and warn the user where erf connections are unable to drain to the main line. The sewer network can be altered graphically in the Vertical Alignment view while erf connections are displayed on the Plan layout and Long section drawings,' notes Bester.

A further improvement is the development of a graphical user interface for the full SWMM5 analysis that clients can run after a network has been

designed using the existing storm module. 'The Wallingford Modified Rational runoff calculation method has been added to accommodate our UK clients. In addition to this, we've also added the Modified Puls reservoir routing method as another option to the existing continuity method for reservoir routing calculations. Sub-catchments can now graphically be added or deleted which means that the sub-catchment areas will automatically be calculated and added to the area field for affected nodes.'

Another powerful feature that has received special attention is the newly created Strings application for Platform design. 'The Strings tool has been enhanced to facilitate easier design and works similar to a 3D polyline in that it consists of a sequence of 3D points called vertices. It also differs from polylines in that multiple strings have an effect on each other in a hierarchical manner and it is this hierarchical structure that defines the String's dynamic nature. We enjoy the Strings functionality because it can be used to design complicated terraces,' explains Vincent.

Strings are used for designing parking areas, curved dam walls, berms and channels with complicated benching. The hierarchical nature of Strings means that a designer can change his design by simply moving a corner of the terrace, grading a string or surface, or moving the entire terrace without having to re-generate all the affected strings. The affected strings and toe points will then automatically be re-calculated.

The new version is likely to be released in the early half of 2006 and users can be assured that there are many new surprises in store.

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Improving the transport network critical, says Transport Forum

THE DEBATE REGARDING the Gautrain Rapid Rail project is most welcome, because it puts the current inadequacies of the transport system high on the agenda of public debate. Given these inadequacies and their inhibiting impact on economic activity, the Gautrain will be a welcome addition to the transport system, said the Forum of Professional Transport Associations (FPTA) in a statement released on 5 December 2005.

The FPTA presents a collective voice of the transport professionals in South Africa. Its members include the South African Institution of Civil Engineering, South African Society for Intelligent Transport Systems, South African Road Federation, South African Academy of Engineering, Chartered Institute of Logistics and Transport in South Africa, and Southern African Transport Conference.

'The primary purpose of the Forum is proactive engagement with government to provide technical leadership and guidance aimed at promoting and sustaining economic growth expediting service delivery, and motivating job creation in the transport sector,' says FPTA chairperson Kollan Pillay.

NEW VISION

The Forum is of the opinion that the Gautrain project is a proactive step that will contribute to the expansion and development of the transport system in Gauteng and set a precedent for improvements to public transport in South Africa as a whole. It should be seen as a lead project, providing a new vision for transport in South Africa. This new vision should strive for a balance between access and mobility, and recognise the role the different transport modes should play in a balanced transport system.

The Gautrain project is a paradigm shift for mass transit in South Africa and should be a catalyst for economic growth and spatial restructuring in urban areas in the RSA. Thus, the Gautrain should be viewed as one of the first of many necessary pioneering transportation initiatives.

GRIDLOCK

As a result of the economic growth since 1994, new urban development and car ownership have grown rapidly, while supporting infrastructure development, specifically roads and new public transport facilities and systems have not been provided. As a result, traffic congestion is moving towards inevitable gridlock unless serious interventions are made. This congestion is particularly

severe in the corridor between the City of Johannesburg, the Tshwane Metropole and the Ekurhuleni Metropolitan Municipality and is already seriously hampering economic activity in the economic hub of South Africa.

The Gautrain will be an important element – complementary to several other much-needed initiatives – to address the very real threat of gridlock in the corridor if the situation is left unattended. Other initiatives include the recently announced R7 billion highway plans for Gauteng announced by the SA National Roads Agency Limited (SANRAL) and the development of the Strategic Public Transport Network by the City of Johannesburg.

A better balance between different modes of transport is urgently needed and Gautrain is an important step in the development of an integrated transport system for Gauteng. It also complements the strategic objective that rail should re-claim its appropriate place as the 'backbone' of public transport in the densely populated province of Gauteng. The rail mode on its own will be ineffective and road-based feeder and distribution services will also be required.

NO CHOICE

Criticism of Gautrain in isolation misses the point, says the Forum. It is not a choice between building additional road capacity for high occupancy vehicle lanes or building Gautrain. All of these elements and several other initiatives will be required to sustain economic growth in congested and spatially inefficient parts of South Africa.

No project should be treated in isolation, and the transport profession seeks to proactively engage with stakeholders to work towards the desirable common goal of an efficient and integrated transport system. Projects need to be aligned with, and complement each other. For example:

- The provincial governments and metropolitan authorities should pro-actively implement and elevate the various strategic public transport networks
 - These high priority routes and the Gautrain should be planned to complement one another, where applicable
 - The continued provision of road infrastructure will be necessary to support economic growth in the province. However, the provision of road infrastructure must incorporate public transport and non-motorised transport needs in the design
- No metropolitan area of the size of the fast-growing 'Gauteng City' of nearly 9 million

people can, in the future, sustain an urban environment of reasonable quality without a system of modern rapid transit as a key element of the total integrated transportation system. Buses and other road vehicles alone can never provide an acceptable solution for the future needs of such a large complex. Hong Kong, Singapore and Bangkok all introduced rail transit in the past 20 years, when their populations reached the 5 million level. The Gautrain will deliver a level of service that can compete with the private vehicle and redirect the present growth pattern of South Africa's largest and most dominant metropolis towards much greater densification, and environmental sustainability, says the Forum.

If South Africa is to improve its position as an international investment destination and trading partner in the global village, the quality of the transport system will be one of the elements in assessing the attractiveness of South Africa, thereby encouraging foreign direct investment. Gautrain has the ability to significantly enhance South Africa's international image as well as the risk profile of the country as a whole.

It is unlikely that the economic growth and development in Gauteng can be sustained in the future without efficient mass transit being the 'backbone' of the transportation system. It should also give rise to higher density and thus more efficient development in proximity to the rail corridor. Implementation at a later stage will become increasingly more difficult because of increased costs and lack of available land for the rail line and stations.

The past decade has been characterised by endless planning but little implementation in the transport sector. It is time for the transportation profession and government to take up the challenge and shared responsibility to deliver an integrated transportation system.

The Forum welcomes the debate and the Gautrain initiative as an impetus for providing a sustainable transportation system for Gauteng and South Africa. The Gautrain project will certainly transform the transportation system in Gauteng. If the project is scrapped, a unique opportunity will be lost (perhaps forever) for a paradigm shift for public transport in South Africa.

In conclusion, all stakeholders in the transport profession are challenged to ensure that the larger vision of a balanced and well-integrated transport network, with attractive public transport elements, is implemented as a matter of urgency.

The Forum stressed that their statement was not an exclusive statement in support of the Gautrain, but an argument for the delivery of an improved transportation system. A holistic network will not emerge as a given but will develop through integrating constituent components. The Gautrain is just one of those components. □

Stargazing for 2006 and other wonderful pastimes

PAUL KRUGER SAID: 'Look back first and then build on the good things in the future' and I say: 'Ja, Oom Paul.'

Maybe if more of us heeded these wise words, we would have a better future than we sometimes do. But human nature – and certainly my own nature – says to get on with it and what is past is past.

Others say: 'Grasp the moment; grasp the opportunity as it comes along' and 'Yes!' I say again. If a window of opportunity opens, like the one that opened for our beloved country in 1994, you go for it unreservedly. At least at SAICE we did. The only problem is that SAICE is now so popular that we groan under the load.

Other people say that you only live once – also true – but what do you do with that life?

So first let's look back to 2005: a year of challenges, triumphs, failures and successes. A year that will never be repeated. A year that I certainly do not want to repeat: a rollercoaster of elation and achievement; and also a year of personal sorrow. SAICE moved into a wonderful new building and we call it SAICE House. In his year of presidency Rodney Burrell quoted Churchill: first we shape our buildings and then they shape us – 100 per cent true of SAICE as we experienced it. Home after 103 years!

Second, we had seventeen African countries around one table in March – our Africa Engineers Forum has come of age! Then just before I took my second stint of long leave – something of a sabbatical in my 15 years at SAICE – my mother passed away suddenly at the age of 82. I salute her as one of the biggest consistent

and persistent drivers in bringing up two boys after our father died in 1950. For her the goal was an education for us. And what a privilege it was to have such a parent. Then on to a wonderful visit to relatives in Europe; a visit to my colleague Jan Jerström in Sweden (who passed away subsequently, in June); and a relaxing time back in South Africa at Mabibi on the Maptuland coast – my favourite hideaway and 'wegbreek' place.

And so on to paying tax for such a break ever since I came back in June!

The launch of *Numbers and needs*, the Boss of the Year Finalist event, the World Federation of Engineering Organisation's Capacity Building Committee in Puerto Rico and the ASCE conference in Los Angeles were further highlights and also generators of more and more work. And that is on top of running this vibrant institution.

DANKIE AAN EEN EN AL, MAN EN MUIS!

Well, now I have looked back so much that the editor's brief of 500 words does not leave much to dream about for 2006. Just as well, because who really knows what will happen?

I therefore conclude with a couple of events on the 2006 calendar:

- We will see a flurry of activity around Gautrain and other transportation issues. We cannot wait longer. Maybe some brand new taxis in which everybody will feel safe?
- The UNESCO Workshop at SAICE House on poverty alleviation and engineering capacity in February will attract a number of dignitaries from all over the world, including our own AEF signatories
- The meeting of the World Federation of Engineering Organisation's Capacity Building Committee at SAICE House in September or October
- Many of the projects mooted in *Numbers and needs* will be implemented

And my wishes?

A busy, busy year for all our members; a fuller or fatter pay package for all; constant interest rates; lots of good decision making by government; more capacity building by SAICE; and many more. But, volunteers, we need you to be active and contribute to our fantastic profession for the benefit of all in South Africa.

Anchors away, all aboard!

Dawie Botha
22 December 2005

Commentary required!

THE 2ND PHASE OF the Codes of Good Practice under the Broad-Based Black Economic Empowerment Act of 2003 have finally been published and South African businesses (including medium, small and micro-enterprises) have at last been given an indication of what government's regulatory intentions are, says a statement by the Cliffe Dekker Regulatory Team.

The documents listed below have been released for public commentary within 60 days of the publication date (20 December). See <<http://www.dti.gov.za/>> for details of how to make public commentary.

There is also a request for proposals regarding the recognition of indirect ownership.

Codes released for comment:

- Code 000 Statements 001 and 002
- Code 100 Statements 102, 103 and 104
- Codes 400–700
- Codes 1000–1700

Call for comments on the General Conditions of Contract for Construction Works (GCC 2004)

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 **31 March 2006**. The panel will take a decision in April 2006 as to whether or not a second edition is warranted based on submissions received.

History and Heritage Panel for SAICE

OWING LARGELY TO THE INTEREST generated by Graham Ross's tremendously successful book on the Cape Mountain passes, the SAICE Executive Board has decided to establish a History and Heritage Panel to celebrate people and projects which have played an important role in civil engineering in Southern Africa.

Tony Murray has been asked to convene the panel, which will enjoy full status among SAICE administrative groups.

The panel will take its cue from the very active section of the London ICE, which attracts good attendances at its meetings and even publishes its own newsheet.

Tony sees the primary duties of the panel as follows:

- To keep a register of people interested in the history of civil engineering in Southern African, and in particular of those who are engaged in any research, writing or promotion of such
- To coordinate historical research and to promote the publication of engineering history
- To promote the identification, preservation and celebration of notable works of civil engineering
- To establish a museum and library of items of historical engineering interest at SAICE House

These duties will be fleshed out over time, and it is hoped that other SAICE structures, particularly the divisions, will contribute to the efforts of the panel. In fact, each branch and division should devote some time and thought to this initiative, and larger units could dedicate a committee member to concentrate on the aims of the panel.

Tony believes that an active History and Heritage Panel will do more than simply preserve nostalgia. Based on the reactions to the successful lecture series he recently convened for the UCT Summer School, he feels that presenting the engineering achievements of the past to lay audiences increases awareness of the profession and raises its status. This surely is a vital and tangible component of the SAICE Strategic Plan, he says.

► Info

If you are involved in any sort of historical activity or simply have an interest in matters historical, you are **invited to serve on the panel** or to **become a corresponding member**.

Please contact Tony at e-mail asmurray@iafrica.com or write to him at PO Box 198, Rondebosch, 7701



► Receding waters churning at Kalutara on the south-western coast of Sri Lanka on 26 December 2004 during the most destructive tsunami in recorded history

RedR sets up in Southern Africa

SAICE COUNCIL HAS AGREED TO SUPPORT efforts to establish RedR, the international disaster relief agency, in Southern Africa.

RedR, which stands for Register of Engineers for Disaster Relief, is an offshoot of the London ICE. It now has branches in Australia, New Zealand, India and Canada, all coordinated from its headquarters in Switzerland.

Basically RedR trains engineers and other professionals to operate in disaster situations, and allocates such operatives to other humanitarian organisations such as the Red Cross, Oxfam and the World Health Organisation to provide technical expertise in the wake of international catastrophes. Scores of RedR operatives have been deployed in the areas affected by the tsunami and the Pakistan earthquake.

RedR is governed and supported by members who wish to be associated with the organisation. Operatives, who may or may not be members, are volunteers who agree to serve in disaster areas for appropriate remuneration. Initially in Southern Africa, founder members will elect a Board of Directors which will be responsible for the management of the association. A Section 21 company is in the process of formation, after which application will be made for registration as a charitable trust.

Paul Hodge, a professional engineer who has worked extensively in South Africa and overseas, has been asked to set up the South African branch. A well-attended launch function was held in Cape Town in November and similar events are planned for Gauteng, KwaZulu-Natal, and other centres in early 2006. Watch SAICE newsflashes for further details.

► Info

If you are **interested in becoming a founder member**, or would like any **additional information** about RedR and its fledgling Southern African branch, phone Paul Hodge at 021-683-4325, e-mail phodge@mweb.co.za or write to RedR Southern Africa PO Box 198, Rondebosch, 7701

CPD – the issues, the answers, the future

IN A PREVIOUS ISSUE, we highlighted matters concerning the new ECSA CPD policy, which will come into effect on 1 January 2006. If you have not seen the full document, please visit www.ecsa.co.za for details.

In this issue we wish to explain the role of the SAICE Education and Training Panel and provide some tips and ideas that will help you to obtain your compulsory credit in category 1 for developmental activities, that is, conferences, congresses, workshops, etc.

According to ECSA CPD policy, voluntary associations (such as SAICE) and accredited tertiary educational institutions may run activities that will be acknowledged for obtaining CPD credits (10 hours = 1 CPD point). ECSA regards these bodies as capable of ensuring that all their courses, seminars or conferences, etc, are of an adequate standard.

For all other bodies, such as private training providers or state organisations, the content of every event they provide for in this category of CPD must be approved by the recognised voluntary association. The SAICE Education and Training Panel has finalised its system for validating courses in the civil engineering field with the assistance of the SAICE technical divisions and experts in the various disciplines.

It is essential to remember that CPD was introduced to benefit the profession. Once the requirements are fully understood, professionals will quickly realise that they can easily comply, as five CPD points per annum are not onerous. Each training course that SAICE verifies will be issued with a unique identification number to assure members that this training does

count towards CPD. Irrespective of whether the training is provided by SAICE or an external provider, each CPD course verified by SAICE will be published on the SAICE website.

Opportunities such as SAICE afternoon and branch lectures will also be acknowledged for CPD, though these may be subject to minor verification requirements. Another option for obtaining CPD credits has been created through the Engineering and Construction Channel (ECTV), which will be launched by Lifelong Learning Solutions (LLLS) in February 2006, following successful negotiations with the South African Association of Consulting Engineers (SAACE), as the first content provider.

This channel will enable e-learners to view training material, news and discussion programmes via DSTV satellite, to participate in CPD tests to verify participation by cellular phone or via the website, to receive online certification of credits and to manage and record their CPD points online under an individual password-protected profile. All CPD records will be submitted on behalf of registered professionals to ECSA. (More information can be obtained on www.llls.co.za.)

SAICE is committed to ensuring that its members have ample opportunities to meet the CPD criteria. To launch the 2006 CPD events, we are arranging the following courses in Midrand early in 2006.

■ HANDLING PROJECTS IN A CONSULTING ENGINEER'S PRACTICE (30–31 January)

This core two-day course was developed

at the request of SAACE. It gives a unique overview of the consulting engineer's work. It is highly condensed, yet covers all significant aspects. There is an important section on communication and people skills. Essential financial and legal aspects are also addressed. Useful procedures and checklists are developed that can later be quality assured.

■ BUSINESS FINANCES FOR BUILT-ENVIRONMENT PROFESSIONALS (2–3 February)

This course is essential for the competent business management of a practice, as it teaches the specific financial principles of a consultancy, enabling professionals and their colleagues to communicate with their financial people, understand their terminology, and ask them for the indicators that are essential for effective control. In addition, they will be able to calculate the disastrous effects of discounting.

Wolf Weidemann (PrEng), who developed the course, has trained just over a thousand practitioners with this type of course. It has been developed for small groups to allow for individual interaction.

A technical report-writing course will be presented on 9–10 March 2006.

► Info

Contact Angelene Aylward at tel 011-805 5947 or aaylward@saice.org.za for further details

Ensure that you check the events database or events column in *Civil Engineering* regularly for upcoming events

Procurement issue clarified

Question

We at Mbombela Local Municipality are currently using a variance of –3 % to +10 % on a shadow price (estimate) when adjudicating tender. There is a feeling that –3 % is very limiting. Would a variance of say –7,5 % to +7,5 % be more reasonable, particularly if you have contractors who are in the area and in the process of completing a contract (have plant, etc) and are tendering on new projects?

Rodney Wandrag

SAFCEC's answer

SAFCEC's view is that an engineer's estimate as benchmark is defeating the

whole objective of tendering, because it becomes a mechanistic rule that almost makes proper evaluation of the tender by a consultant/client obsolete. There may be special circumstances for a specific contractor (like having a premix plant close to a road project site, which none of the other contractors have) that could dramatically influence the price.

If you use this as a way of disqualifying tenderers falling outside the bands (variance), then you act unconstitutionally.

The Director Norms and Standards, National Treasury, advised organs of state about this practice (directive Ref 3/4/3/2/10 dated 10/05/2005). The applicable sentence reads:

Deviation by more than a predetermined percentage from the cost esti-

mate of the project/commodity cannot be regarded as a justifiable reason for the rejection of a bid and has, therefore, not been approved as an evaluation norm by the National Treasury.

We are not completely certain whether this is applicable to all organs of state immediately, due to certain clauses of the MFMA only coming into effect at later dates. But, if it is unconstitutional (according to the Director Norms and Standards), then it has to be applicable immediately.

Henk Langenhoven
SAFCEC

Obituaries

Robert Ian Douglas MacCrone Myburgh (1920–2005)



ROBERT IAN Douglas MacCrone Myburgh, FSAICE, MICE, MEPA, MSAConsE, one of South Africa's outstanding civil engineers, passed away peacefully at his Pretoria home on 24 November 2005. He will be fondly remembered by many who came into contact with him during his very active professional and private life. Many of the engineers who served in the Department of Water Affairs at the time will have benefited from his influence on their own professional careers.

Robby was born on the farm Joostenberg, Muldersvlei, in the Stellenbosch district, and was educated at Paarl Gymnasium, matriculating at the age of 16. He qualified cum laude as a civil engineer at UCT in 1939 and won the Cape Town City Corporation Gold Medal for the best civil engineering student. He subsequently volunteered for the Sappers and saw action in Abyssinia during World War II.

After the war he joined the Irrigation Department, later known as the Department of Water Affairs (DWA), and gained construction experience in DWA's construction division at Bothaville on the OFS Goldfields Water Supply Scheme before returning to the design section in Pretoria. He became involved in and led the design of all aspects of water schemes, dams, canals and irrigation and related matters, but his speciality was the design of arch dams, particularly thin double curvature arch dams, for which he had an intuitive sense of structural behaviour. His knowledge of these structures and advanced methods of design by world standards led to his obtaining his MSc from UCT in 1962. He had also obtained an MBA degree in 1958 from Pretoria University. He was instrumental in the successful implementation of the Gariiep and Van der Kloof dams and the Orange-Fish Tunnel of the Orange River Project as well as many other large and small projects undertaken by the department.

In 1965 he moved to the Department of Water Affairs in Namibia, then South West Africa, as deputy director and subsequently became director of the department. He was not only involved in policy decisions, but also led the department to construct dams and water supply schemes in Namibia and, together with NamPower (then known as Swawek), to build the Ruacana Hydroelectric Power Scheme and Calueque Dam on the Cunene River. In 1973 he went into private practice as a consultant in Windhoek. In 1977 he was instrumental in founding the Association of Consulting Engineers of Namibia, becoming the first president. He returned to Pretoria in 1986, where he eventually retired, but retained an active interest in civil engineering.

Robby was a well-known big game hunter throughout his life and always took his wife and four children with him on his hunting expeditions into central parts of Africa. His home was adorned with many of his trophies. He was also a keen fisherman

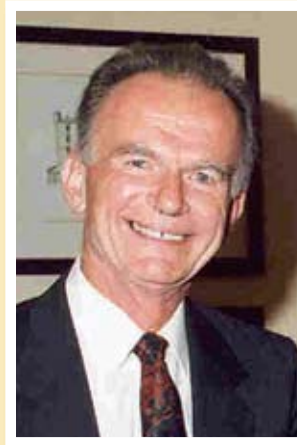
and spent many weekends on the Namibian Skeleton Coast, where he was most successful in his shoreline catches. In addition, Robby was a keen part-time farmer, owning two cattle farms in the northern parts of Namibia, one of which he converted into a hunting farm for foreign hunters.

We will all miss his knowledgeable and firm approach to all matters, his extremely dedicated and meticulous approach to his work, his sound and logical reasoning, and his gentlemanly manner towards friends and colleagues. Many engineers will regard Robby as having been their mentor in the early part of their engineering career and will always remember the strong influence he had on their work. Above all, Robby was a family man.

Our thoughts go out to his wife, Paddy, and children Ian, Nina, Jean and their families, including three grandchildren and one great-grandchild, knowing that they will find comfort in their fond and loving memories of him.

Ron Immelman

Jan Witold Stanislaw Kaminski (1938–2005)



IT WAS WITH GREAT SADNESS that we learned about SAICE Fellow Jan Kaminski's passing away on 17 October 2005.

Jan W S Kaminski was born on 20 July 1938 in Potok, Zloty, Poland. His family were evacuated to Siberia and eventually reached England via India. After attending various primary schools in India and England Jan graduated at Loughborough College of Technology in 1960. He initially worked on major projects with John Laing in England and Spain. In 1967 he accepted a position

with LTA in Johannesburg. Subsequently he worked for Rand Earthworks, African Batignolles and Fowler Construction before co-founding Ovcon in 1975. From 1995 he was deputy chairman of Wilson Bayly Homes Ovcon Ltd and chairman of WBHO Cape (Pty) Ltd.

He was chairman of the Cape Opera Board (of which he was a founding member) until two weeks before his death. His strong personality and love of opera were infallible ingredients for a leader with a vision to promote opera in the Western Cape.

Jan was a keen tennis player and mountain walker. In the last years a small tennis club played on his court at home.

I got to know Jan as a co-reviewer of PrEng applicants. This is where I became acquainted with a very fair reviewer and someone who was extremely proud of his profession. It was therefore a historic moment when he called on Monday 19 September 2005 to apologise for not being able to assist with reviewing scheduled for Thursday 22 September. The full toll was claimed on 17 October.

Jan leaves his wife, Gloria, and three children.

To a colleague with exceptional qualities we say:

*At the break of day and in the evening we will remember
Solank as ek bly lewe, solank sal Jan voortleef.*

J F Kapp



Text Dawie Botha
Executive director, SAICE

GIJIMA

Branch Visits

Mike Deeks and I rounded off the 2005 presidential visits to the SAICE branches with some very interesting round-trips, which we would like to share with you through the following snippets and photos

Amatola



► Mike Deeks (SAICE 2005 president), Dawie Botha (SAICE executive director), Stephen Richter (chairman Amatola Branch) and his wife, Simoné



► Mike Deeks, Johann du Preez (2005 treasurer, Amatola Branch) and Dawie Botha on the Kei Mouth road near the turn-off to Magrangeni – an example of a reinforced earth wall where galvanised welded mesh was used, faced with carefully placed rock and obtaining its strength from the tie-back strips that are embedded in the backfill



► Mike Deeks (SAICE 2005 president), Geoff Roberts (2005 chairman, Algoa Branch), Achilles Limbouris (Coega Development Corporation)



► Dolosse effectively strengthening the breakwater at Coega

Algoa

Geoff Roberts was the host for our visit to this friendly part of the world.

We were first treated to a glimpse of 2010 at Stewart Scott and learned something new:

■ Engineers should not always tell other people what they ought to be doing. Maybe engineers do not even need to offer a recommended solution, but should understand the need of politicians to make their own decisions. Perhaps we should accept that we are certainly able and well equipped to develop – and then wait. However, that pre-supposes informed decision-makers.

Our next stop was with the Coega Development Corporation and a progress visit to the IDC (Industrial Development Corporation), the harbour and a look at the start of this 75-year project. Engineers' impatience to do, to complete, to see action and to progress will not work here. What

these pioneers have started will probably bear fruit only when our great-great grandchildren walk this planet. It remains a leap of faith for everybody involved, from the South African government down to the local inhabitants.

The evening function at St George's went smoothly, with Geoff displaying a humorous side that we did not know about. 'Old' colleagues and new faces could 'kuier' around the excellent meal, topped with great exchanges of very useful information.

Thanks, Algoa!



► Eighty per cent of East London's water is treated at the Umzoniana water treatment works, which uses the Umzoniana dam as a balancing dam. The raw water to the dam is obtained from the Buffalo River via five high-lift pumping mains, three of which discharge into surge chambers 128 m above the level of the river at the head of two 900 mm diameter gravity mains. These gravity mains discharge into the inlet portal of a 200 m long tunnel. After passing under a low ridge the tunnel discharges into the dam. Owing to the critical nature of the raw water supply system, the whole supply system is duplicated, except for the tunnel. After the collapse of the centre sections of the



tunnel in the 1960s a structural lining of segmented corrugated steel was installed and the void was backfilled with sea sand to prevent further collapses. This lining has now become corroded, however, to the extent that its structural integrity is at risk and another collapse is feared. Refurbishing options were constrained because the raw water supply system can be switched off for only three days every six weeks, because the Umzoniana dam has the capacity to store only three days' water. A further area of concern was that, should a collapse happen during construction, it is unlikely that the supply would be restored in three days and the greater East London area would experience severe water shortages. The only way to solve this problem was to construct a second tunnel parallel to the existing tunnel, which would allow the system to continue to operate during the refurbishment of the existing tunnel and allow for greater transfer capacity of the entire system. Construction of the second tunnel started in July 2005, and the refurbishment of the existing tunnel will commence once the new tunnel has been commissioned

Transkei



► This boardwalk, currently used by construction workers, has been built where a 245 m long viaduct will cross the gorge to clear the indigenous forest below

Chairman Simon Mqamelo arranged an enlightening visit for us to observe progress on the construction of the new 50 km R600 million road between Ugie and the Langeni sawmill. This road forms part



► The highest pier will stand 45 m tall



► Hein van Heerden (Department of Transport, Eastern Cape), Simon Mqamelo (chairman, Transkei Branch), Thobile Mhlhlo (MEC, Department of Roads and Transport, Eastern Cape), Dawie Botha, Lan Situma (National Department of Transport), Mike Deeks, John Gibberd (project leader of phase 2 of the Ugie-Langeni road)

of the greater transportation plan for the Transkei.

Phase one is 33 km long and stretches from Ugie to Nyibeni village. Phase two connects Nyibeni village with the Langeni sawmill. This section stretches over 17 km, 3 km of which run through, and especially over, a beautiful indigenous forest boasting tall yellowwood trees, making for some innovative and challenging engineering.

Kimberley

The photos (top, right) show various angles of a massive stormwater project in Kimberley being 'inspected' by Mike Deeks, 2005 SAICE president. Kimberley is dry and virtually flat. Nevertheless the town has to deal with huge volumes of water when the heavens open. This project forms part of an extended public works programme.



Bloemfontein



► The Bloemfontein branch committee in session, together with Mike Deeks and Dawie Botha and the effervescent and evergreen committee guest, Oom Paul Nicolaysen. Back: Herman Schoeman, Jurie Vermaak, Johan Koen, Mike Deeks, Attie Badenhorst, Gert Fourie. Front: Henrie Kotzé (2005 chairman, Bloemfontein Branch), Dawie Botha, Oom Paul Nicolaysen

Highveld

Chairman Vino Naicker and his team were caught up in producing leadfree fuel in time for the 2006 deadline. They were so busy that we did not even get a chance to take a photo (only joking!). 'Megabucks' are spent around the Sasol plant and we thoroughly enjoyed the site visit.

Did you know that the polypropylene plant that is being developed in Secunda packs its pellet format product in 25 kg bags that are mostly exported to China? Why 25 kg bags? Because in China small-scale individual entrepreneurs buy a bag at a time, carry these home on their bicycles, and then produce mouldings for many things at home. How's that for an EPWP project!

Lowveld



▶ Patrick Ramatsea (2005 chairman, Lowveld Branch) and Mike Deeks in front of a row of offices serving around five contractors who are building a 20 km stretch of gravel road between Gutswakop and Lutisi, east of Nelspruit. Each contractor is being developed by utilising EPWP funds. This is a learnership project in which each contractor is responsible for building a short section of the road, while learning and progressing through the various phases of gravel road construction. A praiseworthy project, indeed! □

▶ Hosepipe with holes at Coega



HAVE YOU HEARD?

Contractors and names

With all the challenges facing our construction community a new term has unfortunately been coined for some emerging contractors:

Submerging Contractors!

Worthy of a SMART award nomination?

What is worthy of a nomination for its inventor? A long hosepipe full of holes to provide curing water for a huge capping wall at Coega

DID YOU KNOW ...

■ That the C in SAICE stands for 'Capacity Building'

■ That SAICE has been awarded a five-year, R575 000 per annum project to facilitate and provide bursaries for technicians to become technologists? The benefactor is the Local Government SETA. Terms and conditions apply! Contact Marthelene at 011-476-4100.

■ That SAICE has been approached by the Department of Provincial Local Government to assist with putting the wise old men (mostly men!) in charge of small teams of energetic but inexperienced young aspirant-professionals in local authorities to bridge the skills and coaching (mentoring) gap? Allyson Lawless is leading this initiative.

Date	Event	Presenters	Contact details	Venues and notes
30-31 January 2006	Handling Projects in a Consulting Engineer's Practice	Wolf Weidemann	Dawn Hermanus T 011-805-5947 dhermanus@saice.org.za	SAICE House Midrand
2-3 February 2006	Business Finances for Built Environment Professionals	Wolf Weidemann	Dawn Hermanus T 011-805-5947 dhermanus@saice.org.za	SAICE House Midrand
21 & 23 February 2006	Roundabouts	Various prominent speakers	Carla de Jager T 011-805-5947 cdejager@saice.org.za	Midrand and Cape Town
23-35 February 2006	International Forum on Engineering and Technology for Poverty Reduction		Carla de Jager T 011-805-5947 cdejager@saice.org.za	SAICE House Midrand
9-10 March 2006	Technical Report-writing	Insite Training	Dawn Hermanus T 011-805-5947 dhermanus@saice.org.za	SAICE House Midrand
14-17 March 2006	The Design of Slurry Pipeline Systems	Dr Robert Cooke Dr Angus Paterson Graeme Johnson Peter Goosen	Terry Carolin T 021-683-4734 terry@pcce.co.za	Graduate School of Business Breakwater Lodge Cape Town
30 May - 1 June 2006	PMSA International Conference 2006	Conference is held in cooperation with PMI SA Chapter	Taryn van Olden PMSA Conference Organising Committee +27-82-779-1314 info@cyansky.co.za	Johannesburg Visit www.pmsa.org.za/ conference for more information
6-9 March 2007	e-Transport Conference (SASITS)	Conference	Carla de Jager T 011-805-5947 cdejager@saice.org.za	Gauteng
21-25 May 2007	CIB World Congress	Conference	Carla de Jager T 011-805-5947 cdejager@saice.org.za	Cape Town Call for Papers