Focus on SAICE Networking
Snape Memorial Lecture 2014
MACCAFERRI AFRICA

Maccaferri works in partnership with its clients, offering technical expertise and a full product range to deliver versatile, cost effective and environmentally sound solutions to the global construction industry. Maccaferri develops, manufactures, designs, supplies and installs solutions from coastal protection to reinforced soil structures and from landfills to ground stabilisation. Every day, Maccaferri’s professionals based in 65 companies across 5 continents, focus on a common goal: Engineering a better solution
A FRIEND who hails from a small village near Thohoyandou in Venda dropped in over the weekend to deliver some honey that we had ordered from a contact in Limpopo. He had kindly offered to fetch our order on his way back to Johannesburg.

Our friend has a BTech in structural engineering and has recently completed his Master’s. He used to work for one of the big state-owned companies, but resigned because he found the level of corruption and inefficiency too frustrating. He has since started his own successful small business where he employs a number of people, doing his bit to alleviate poverty by empowering fellow countrymen, and successfully completing one engineering contract after the other.

When he was a child, there was no water and no electricity in his village, and he received his schooling under a tree. Honey was eaten directly from the comb; he only saw bottled honey many years later. Now in adulthood, despite his success in life and his insight into the politics of today (and the past), our friend has retained his childhood happy wholesomeness.

Our conversation drifted to a recent media release that had crossed my screen. The release told the story of Peter Tshisevhe, also from rural Venda, who is the founder and chair of the very successful TGR Corporate and Commercial Attorneys in Johannesburg, and who has recently been named one of the best mergers and acquisitions lawyers in the Best Lawyer’s International 2014 listing. This peer-reviewed listing of excellence is produced in the United States of America and is published worldwide in more than 65 countries. To be included in this listing is considered an absolute honour by the global legal profession.

Our friend looked at the media release on my screen which expanded on Peter’s story: Peter had also sat through junior primary school under a tree in rural Venda. His hardworking parents — a domestic worker and a farm hand — could barely afford even the most basic necessities. Peter was 16 already when he received his first pair of shoes, and with that very same pair of shoes he went to Johannesburg after matriculating, found himself part-time work as a packer and cleaner in a supermarket (where he was soon promoted to cashier) to fund his studies. He had set his sights on becoming a lawyer. He enrolled at the University of the Witwatersrand in 1990 at the age of 23, and through sheer determination and a vision of a better life, obtained a BProc in 1995, an LLB in 1997 and an MLaw in 1999. While studying, he continued supporting his parents and siblings from his part-time earnings, and in later years built his parents a decent home in their Venda village.

Our friend’s admiration was obvious, because “Eish, he was less privileged than me.”

Less privileged?! Someone else had been less privileged than you who had your schooling under a tree, with no water and no electricity? Is that because he only got his first pair of shoes when he was 16 and you had shoes earlier than that?

I was touched by our friend’s guilelessness.

What do these two men have in common? Not only long-term vision, clear focus, sheer determination, unbelievable courage, and preparedness to sacrifice and work extraordinarily hard to realise their dreams, but also true integrity, real kindness and empathy, and the drive to move on without dwelling on justifiable feelings of aggrievedness about the injustices of the past. Our friend, for one, is far too busy living life and getting his daily work done to linger in the past.

With such inspiring people we can build a world-class country!
ON THE COVER
Cyril Gamede, president of the Engineering Council of South Africa, seen here at the Maphumulo Water Treatment Plant, says the interests of the country and the public can only be served properly if a profession is thriving, which is why registering with ECSA is central to maintaining a strong engineering profession.

THE WORLD ACCORDING TO SAICE

FORWARD WITH CIVILUTION
Credo of the African Engineer

FOCUS ON SAICE NETWORKING

ON THE COVER
ECSA’s Engenus initiative participated in the recent UNESCO Africa Engineering Week
The benefits of registering with the Engineering Council of South Africa

FROM THE EDITOR’S DESK
Less privileged

RISK MANAGEMENT
B4Risk: Integration of strategy, management systems and risk solutions

INFRATESTRUCTURE
A brief history of transport infrastructure in South Africa
Chapter 10: The dynamics of the South African transport infrastructure at the end of the 20th century
Sub-Soil Stability is Non-Negotiable

Kaytech has the widest range of drainage and filtration products, to meet your specific sub-soil drainage needs.

From reservoirs to retaining walls, from paving and paths to highways and high rises and from steep slopes to sports fields, Kaytech has the products and professional engineering support to give you the complete solution.

For more information, contact Kaytech today.

- Pre-manufactured panel drains and drainage nets
- Extruded drainage pipes
- Underground drainage chambers for storm water and waste water soak-aways
- Recycled and sustainable products

Johannesburg 011 922 3300
Port Elizabeth 041 453 0755
East London 043 727 1055
Cape Town 021 531 8110
Durban 031 717 2300

www.kaytech.co.za
Credo of the African Engineer

I am an engineering practitioner and in my profession I take deep pride.

To it I owe solemn obligation.

Since the origins of humanity,

human progress has been spurred by engineering genius.

The engineering profession has made nature’s vast resources

of material and energy usable for humanity’s benefit.

Engineering practitioners have vitalised,

and turned to practical use,

the principles of science and the means of technology.

Were it not for this heritage of accumulated experience,

my efforts would be feeble.

I pledge to practise integrity and fair dealing,

tolerance and respect,

and to uphold devotion to the standards

and the dignity of my profession,

conscious always that my skill carries with it

the obligation to serve humanity by making

the most sustainable use of Earth’s precious resources.

I shall participate in none but honest enterprises.

When needed,

my skill and knowledge shall be given without reservation.

In the performance of duty and in fidelity to my profession,

I shall give the utmost.

(Introduced to SAICE members by our 2011 president, Seetella Makhetha)
Esor is one of South Africa’s benchmark civil engineering and construction companies providing a wide range of services including civils, building, developments, pipelines and pipejacking.

35 years of setting pipejacking records, years of expertise and experience in roads, earthworks, building, development and specialists in welded steel pipelines is

what makes Esor

MASTERS OF CONSTRUCTION

civils  building  developments  pipelines  pipejacking

30 Activia Road, Activia Park, Germiston  Tel: +27 11 776 8700  Fax: +27 11 822 1158  www.esor.co.za
The benefits of registering with the Engineering Council of South Africa

INTRODUCTION
The Engineering Council of South Africa (ECSA) has reiterated its call to all engineering practitioners to register with the Council.

“The nature of engineering and related fields is such that regulations and guidelines have been put in place to govern the industry,” says the president of ECSA, Cyril Gamede Pr Eng. “It is a process that has seen the South African engineering profession being recognised locally and abroad, and that assures stakeholders of verified credentials and a commitment to continuing professional development.

“ECSA, in partnership with government and academic institutions, seeks to promote a high level of education and training of engineering practitioners to facilitate full recognition of professionalism in engineering, both locally and abroad.”

REGULATORY BODY
ECSA is the only recognised engineering regulatory body in South Africa, and in this capacity it is also accountable to the public for fair and transparent administration of its operations. The recognition by other professions, locally and abroad, gives a wide spectrum of stakeholders a measure of protection and peace of mind. Hence registration with ECSA is paramount, with individual and business benefits including the following:

Peer recognition of qualification and experience
Professional registration is based on peer recognition by members of the appropriate ECSA committee, where committee members assess whether the minimum requirements necessary for registration are met (the various ECSA committees cover all the recognised engineering professions, such as civil, mechanical, electrical, chemical, etc).

Public confidence in professional competence
Professional registration assures the public that an engineer’s competence has been assessed by other professionals, who are knowledgeable in their fields of expertise.

Membership of professional societies
Professional registration is a prerequisite for membership of the various voluntary associations (VAs) recognised by ECSA (of which SAICE is one), thereby offering access to international best practice in the various engineering fields, as well as certain financial benefits, such as a reduced annual ECSA fee if membership of a VA can be demonstrated.

International recognition
ECSA is a signatory to the Washington, Sydney and Dublin Accords (respectively for the education of engineers, engineering technologists and engineering technicians). These agreements provide for mutual recognition of graduates by the registering bodies in the signatory countries, for example Australia, New Zealand, the United Kingdom and Ireland.

“With South Africa’s increasing globalisation, it is critical for our country to be competitive at an international level. Registration contributes substantially to the preservation of professional standards, and ECSA’s continued international recognition is crucial for the maintenance of high standards,” adds Gamede.

Employability
More and more employers require registration with ECSA as a prerequisite for appointment to certain engineering positions. From an employer’s perspective, confidence in the professionalism of staff is crucial. Since not all employers have
been educated and trained in engineering, registration is widely regarded as an additional and objective indication of an engineer’s competence. Hence registration with ECSA works in favour of an engineer who is seeking employment.

Statutory empowerment
Legislation holds employers responsible for the safety of their employees, so appointing ECSA-registered engineers assists employers to comply with this legislation, and serves as an additional safeguard against unsafe practices, thereby also ensuring the public’s safety. This is the engineering profession’s contribution towards promoting public health and safety – the environment which distinguishes ECSA’s sole existence and activity in the engineering domain.

The ECSA president emphasises that, “The interests of the country and the public can only be served properly if a profession is healthy and thriving, which is why registering with ECSA is central to maintaining a strong engineering profession.”

Legislation holds employers responsible for the safety of their employees, so appointing ECSA-registered engineers assists employers to comply with this legislation.

More Information
Website
Non-registered engineering practitioners are encouraged to visit the ECSA website for more information: www.ecsa.co.za

Contact ECSA
T: +27 11 607 9500
E: engineer@ecsa.co.za
P: Private Bag X691, Bruma, 2026
1st Floor Waterview Corner, Bruma Office Park,
Ernest Oppenheimer Avenue,
Bruma, Johannesburg

Engineering the Future
To address the insufficient numbers of engineering professionals available to deal with the sustained demands of our country, ECSA and its recognised engineering voluntary associations (VAs) and other stakeholders have committed themselves to an initiative called Engenius. Engenius was established primarily to grow and transform the engineering profession through the following key objectives:

■ To promote national collaboration, coordination and support amongst organisations involved in advancing the engineering profession, e.g. statutory bodies, government departments, SETAs, higher education institutions, schools, FET colleges, the public and private enterprises.
■ To promote the engineering profession to primary and high school learners in order to attract sufficient numbers of suitably educated learners representative of the demographics of South Africa.
■ To manage a range of support activities, such as marketing and fund-raising.

Since its founding, Engenius has reached many learners throughout the country, even in some of the remotest areas. Recently Engenius was involved in the UNESCO Africa Engineering Week, the National Engineering Week, and the Eskom Expo for Young Scientists at the University of KwaZulu-Natal.

Engenius is continually living up to its aim of providing learners with an understanding of the role of the engineering profession in their lives, and it is hoped that the Engenius message – “Engineering makes it happen!” – will keep on inspiring learners to make engineering a career of choice.

Engenius is dependent on assistance from professionals in the VAs and the industry, engineering students and career guidance facilitators, all of whom take the time to interact with learners about engineering. In addition, students and young professionals are actively involved in assisting high school learners with Mathematics and Science in various schools and study centres. The Engenius website (www.engenius.org.za) is also used to drive its methodology, encouraging learners to:

■ Explore engineering by showing them real engineering projects and professionals across economic sectors.
■ Try engineering by referring learners and educators to stakeholder activities, such as competitions, exhibitions and school projects.
■ Consider engineering by providing information on where to study, subject choices, bursaries, etc.
■ Identify engineering challenges by encouraging learners to log an engineering challenge in their communities which may be solved by engineering students as part of their community-based projects.
■ Find help by referring learners to supplementary education programmes in Mathematics, Science, Technology and English.

INFO
Sandisa Maqubela
+27 11 607 9500
sandisa@ecsa.co.za

Through its Engenius initiative ECSA is reaching learners all over South Africa.
THE ICONIC NISSAN NP300 HARDBODY.
WITH OVER 25 YEARS OF PROVEN EXPERIENCE.

Becoming the proud owner of South Africa’s ultimate 1-tonne workhorse just became that much easier. We’ve slashed prices on the iconic Nissan NP300 Hardbody, now starting from only R158 800. And with a variety of service plans and accessories to suit your every need, as well as the peace of mind provided by a national dealer network, you can rest assured the Nissan NP300 Hardbody will never let you down, no matter the task.

Class-leading 6-year/150 000km warranty | Proven reliability

Test drive the Nissan NP300 Hardbody today at your nearest dealership or visit nissan.co.za for more info.
We’ve evolved.
We’ve become Tekla.

Our world looks a little different, but our focus is still on creating innovative software.

CSC has always been about pioneering software and responding to the real world challenges of structural engineers. Joining forces with like minded people, like Tekla, is the next step in our evolution.

Find out how we’ve evolved at www.tekla.com

Contact Cadex SA
Tekla’s Partner for Southern Africa
www.CadexSA.com
FOCUS ON SAICE NETWORKING

1 – The world according to SAICE

Introduction

THE NOVEMBER 2013 edition of our magazine was the fifth attempt at presenting the formidable network of engineering bodies that SAICE liaises with on behalf of its members. Again the response from our readers was so encouraging that we decided to continue publishing an updated version every year. For this year we have updated the information where necessary, and where possible, and retained the list of all the tertiary institutions in South Africa where civil engineering can be studied (this list seems to be very popular with our readers).

As time goes by more and more bodies and affiliations will be added to the different sections comprising this set of articles, and we also invite readers to let us know of relevant bodies that we might have overlooked.

The feedback from our readers so far seems to indicate that the November magazine is becoming a handy keep-on-the-desk reference edition, which is understandable, considering that SAICE continually liaises, networks and affiliates with many groupings across a broad engineering and related playing field.

There are many reasons why SAICE interacts with these related bodies. As the voice of the civil engineering profession in South Africa, the Institution has a responsibility not only to represent the interests of every one of its approximately 11 000 members, but also to promote the value that civil engineering adds to the economy and the smooth running of the country, and thereby to the daily lives of communities and individual citizens.

Explaining to our colleagues and fellow citizens what SAICE and the profession stand for is no simple task. Creating a network involves hours and days and weeks, even years, of liaising, and of building trust and credibility. Fortunately engineers are passionate about what they do, and this enthusiasm goes a long way towards getting the message across, but it nevertheless remains a complex task.

One could summarise the reasons why such interaction is so valuable:

■ An understanding of the role of the civil engineering profession promotes informed decision-making at all levels of interaction. To mention but one example — informed decision-making facilitates effective service delivery at local government level.
■ Knowledge and insight gained through interaction encourage appropriate membership groupings, and eventual professional registration for individuals, which have long-term positive effects for the engineering profession in particular, and for the country and its citizens in general.
■ Meaningful interaction results in the integration of effort and the alignment of objectives, which in turn broaden the skills and knowledge base, facilitating capacity building, again with obvious benefits to the country as a whole.
■ Interaction on an international level exposes the Institution to global thinking, while at the same time offering SAICE the opportunity to contribute to the global debate. It also ensures that our members are enabled to practise engineering across a wide front, thereby gaining valuable experience that can be ploughed back into our own country and our own continent. What should also not be underestimated is that our African experience furnishes us with extremely valuable knowledge that we can share with and contribute towards other African countries and other developing countries elsewhere in the world. The value of our contribution, however, goes beyond developing countries and is highly appreciated in developed countries with similar problems and challenges.

The bodies that SAICE networks with can be grouped into:

■ Statutory bodies and associated structures (see page 15)
■ Discipline-specific bodies (see page 24)
■ International bodies (see page 37)
■ Tertiary institutions (see page 45)

There are overlaps in this method of grouping, but for the sake of clarity the various bodies will be discussed under these headings.

This set of articles attempts to describe and illustrate the scope of SAICE’s network. We have gone to great lengths to ensure that the information presented here is as accurate as possible. However, should any inaccuracies have slipped through, we apologise for those.
<table>
<thead>
<tr>
<th>BODIES DISCUSSED IN NETWORKING ARTICLES</th>
<th>PAGE/S</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACPM Association of Construction Project Managers</td>
<td>36</td>
</tr>
<tr>
<td>AfDB African Development Bank</td>
<td>23</td>
</tr>
<tr>
<td>Agrément SA Agrément South Africa</td>
<td>22</td>
</tr>
<tr>
<td>ASCE American Society of Civil Engineers</td>
<td>39</td>
</tr>
<tr>
<td>ASOCSA Association of Schools of Construction of Southern Africa</td>
<td>34</td>
</tr>
<tr>
<td>ASPASA Aggregate and Sand Producers Association of Southern Africa</td>
<td>27</td>
</tr>
<tr>
<td>BEPEC Built Environment Professions Export Council</td>
<td>23</td>
</tr>
<tr>
<td>CBE Council for the Built Environment</td>
<td>15</td>
</tr>
<tr>
<td>CEC Commonwealth Engineers’ Council</td>
<td>38</td>
</tr>
<tr>
<td>CESA Consulting Engineers South Africa</td>
<td>25</td>
</tr>
<tr>
<td>CETA Construction Education and Training Authority</td>
<td>18</td>
</tr>
<tr>
<td>CIB International Council for Research and Innovation in Building and Construction</td>
<td>43</td>
</tr>
<tr>
<td>CIDB Construction Industry Development Board</td>
<td>18</td>
</tr>
<tr>
<td>CIOB Chartered Institute of Building</td>
<td>43</td>
</tr>
<tr>
<td>CMA Concrete Manufacturers Association</td>
<td>27</td>
</tr>
<tr>
<td>CSIR Council for Scientific and Industrial Research</td>
<td>22</td>
</tr>
<tr>
<td>CSSA Concrete Society of Southern Africa</td>
<td>27</td>
</tr>
<tr>
<td>DBSA Development Bank of Southern Africa</td>
<td>22</td>
</tr>
<tr>
<td>DPW Department of Public Works</td>
<td>20</td>
</tr>
<tr>
<td>EAP Engineers Against Poverty</td>
<td>42</td>
</tr>
<tr>
<td>ECSA Engineering Council of South Africa</td>
<td>7/8/15</td>
</tr>
<tr>
<td>FAEO Federation of African Engineering Organisations</td>
<td>40</td>
</tr>
<tr>
<td>FIDIC International Federation of Consulting Engineers</td>
<td>38</td>
</tr>
</tbody>
</table>
ROCLA’s Rubber Ring Joint Pressure Pipe is a watertight pipe for use in low pressure (2 to 8 Bar) applications.

The Spigot and Socket type joint is formed with a widening of the wall of the pipe on the one end, with the joint sealed with a rubber ring.

ROCLA is Southern Africa’s leading manufacturer of pre-cast concrete products for infrastructure, including pipes, culverts, manholes, roadside furniture, retaining walls, stock troughs, poles and other related products.
PROFESSIONAL TRAINING

Product Training in our modern facility.
View course schedule at www.technocad.co.za

WHAT WILL YOU DESIGN TODAY

AutoCAD® 2015
World-Leading CAD Software

WaterMate
Water Reticulation Design

SurfMate
Survey & Digital Terrain Modelling

AeroTURN
Aircraft Movement & Space Analysis

RoadMate
Urban & Rural Road Design

ParkCAD
Automated Parking Area Layouts

Infrastructure Design Suite®
Premium & Ultimate

PipeMate
Sewer & Stormwater Design and Analysis

RebarMate
Reinforced Concrete Detailing & Scheduling

AutoCAD Civil 3D®
Site development & Transportation

AutoTURN
Vehicle Manoeuvre Simulation & Analysis

DatumMate
Datum Conversion of Drawings

TEL: +27 11 803 8834
www.technocad.co.za
sales@technocad.co.za

TECHNOCAD
Civil Engineering Software

AUTOodesk
Authorised Developer
THE ENGINEERING profession approached government in the 1960s to request legislation to regulate the profession. The result was that the South African Council for Professional Engineers (SACPE) was established in 1969.

Although this structure served the profession very well, it became clear that the changing world and the changing political dispensation in South Africa would necessitate substantial modifications. In 1992 SAICE approached SACPE to suggest a way forward in the new democratic dispensation that would be coming about in 1994. The main thrust was to ensure that South African engineering education and professional status would be recognised in subsequent years.

The Institution of Civil Engineers UK (ICE) was extremely helpful, and a delegation visited South Africa to facilitate understanding of the international professional engineering world of that time. ICE indicated that they would be willing to sign reciprocity agreements with SACPE if South Africa would accept the standards and models that they were using in the UK.

SAICE took the lead in providing input, and by the year 2000 a brand-new, modern set of Acts was promulgated, which enabled South African built environment professionals to be compared to and compete with the best in the world.

In the process two new additions also came about. In the first place an overarching Council for the Built Environment was established, and in the second place a new profession saw the light, namely that of the Project Managers and the Construction Project Managers.

CBE - THE OVERARCHING STATUTORY COUNCIL
The Council for the Built Environment (CBE) is the umbrella body for the six statutory councils for professionals discussed below. The Act according to which the CBE came into being (Act No 43 of 2000) mandates the Council to, among other tasks:

■ Ensure uniform implementation of mandated policy amongst the six councils that regulate the various built environment professions.
■ Advise government on issues relating to the built environment based on relevant research, knowledge and information.
■ Support government’s National Development Plan, specifically in the infrastructure delivery program.
■ Drive transformation by prioritising skills development and equity implementation in the built environment.
■ Act as an appeal body on matters of law regulating the built environment professions.
■ Promote and protect the interest of the public by supporting work by appropriately registered persons.

CBE
CBE, PO Box 915, Groenkloof, 0027
T: 012 346 3985, F: 012 346 3986
E: info@cbe.org.za, W: www.cbe.org.za
121 Muckleneuk, cnr Middel & Florence Ribeiro Streets, Nieuw Muckleneuk, Brooklyn, Pretoria

THE SIX STATUTORY COUNCILS FOR PROFESSIONALS
The six statutory councils listed below were established through Acts of Parliament to regulate the various built environment professions. Generally speaking, the main statutory function of each of these Councils is to protect the public by effectively controlling the education and practising standards of the particular profession that it represents. Hence these Councils all have Codes of Conduct that registered persons have to abide by.

In this article all six statutory councils are discussed, with emphasis on those that have particular significance to the civil engineering profession.

ECSA (Engineering Council of South Africa)
ECSA regulates the entire engineering profession, including civil engineering, mechanical engineering, electrical engineering, industrial engineering and related engineering disciplines. For more information on ECSA see the ECSA cover article on pages 7 and 8 of this edition.

Three Fellows of SAICE have so far served as presidents of ECSA.

ECSA
ECSA, Private Bag X691, Bruma, 2026
T: 011 607 9500, F: 011 622 9295
E: engineer@ecsa.co.za, W: www.ecsa.co.za
1st Floor Waterview Corner, Bruma Lake Office Park,
1 Ernest Oppenheimer Ave, Bruma, Johannesburg

SACPCMP (South African Council for the Project and Construction Management Professions)
In order to protect public interest and advance construction and project management education, the SACPCMP provides professional certification, registration and regulation of project
and construction management professionals. The SACPCMP was established by Section 2 of the Project and Construction Management Act of 2000 (Act No 48 of 2000).

The SACPCMP is mandated by this Act to, among other tasks:

- keep a national register of registered professionals and candidates in Construction Management and Construction Project Management
- identify the type of project and construction work which may be performed by registered persons
- conduct accreditation visits to tertiary institutions that offer Construction Management and Construction Project Management
- consult with the South African Qualifications Authority (SAQA) and Voluntary Associations to determine competency standards for the purpose of registration
- investigate charges of improper conduct by registered persons.

**SACPCMP**

SACPCMP, PO Box 6286, Halfway House, 1685
T: 011 318 3402/3/4, F: 011 318 3405
E: admin@sacpcmp.org.za
W: www.sacpcmp.org.za
International Business Gateway, 1st Floor Gateway Creek, cnr New Road & 6th Road, Midrand

**SACAP (South African Council for the Architectural Profession)**

SACAP, established under the Architectural Profession Act 44 of 2000, is responsible for the regulation of the architectural profession, thereby protecting the public. It is the vision of SACAP to develop highly competent architectural professionals compliant with international best practice and serving the special needs of developing economies.

SACAP’s mission is to ensure excellence in performance and service delivery and to foster collaborative relationships with role players in order to:

- be responsive to the needs of the public
- maintain a quality and sustainable skills base in the profession
- ensure good governance which results in a positive impact on built environment practice
- grow the information and knowledge hub
- promote transformation and diversity within the built environment.

Through the Act, SACAP is mandated to:

- keep and maintain a national register of professional and candidate categories of registration
- accredit higher learning institutions offering architectural qualifications
- investigate complaints and violations of the Code of Professional Conduct by registered persons
- facilitate renewal of registrations through Continuing Professional Development (CPD)
- provide professional fees guidelines
- identify the scope of work and competencies of each of the categories of registration.

**SACAP**

SACAP, PO Box 408, Bruma, 2026
T: 011 479 5100, F: 011 479 5100
E: registrar.ru@sacapsa.com
W: www.sacapsa.com
1st Floor Lakeside Place, cnr Ernest Oppenheimer Ave and Queen Street, Bruma, j ohannesburg

**SACLAP (South African Council for the Landscape Architectural Profession)**

SACLAP evolved from the Board of Control for Landscape Architects which had functioned under the previous Council of Architects (now SACAP – see afore-mentioned). It performs functions similar to those of SACAP, but with a specific focus on landscape architectural professionals. Registering categories are: Professional Landscape Architects, Professional Landscape Technologists, Professional Landscape Technicians, and Professional Landscape Assistants. New registration categories in the disciplines of Landscape Construction Managers and Ornamental Horticulturists are currently being developed.

**SACLAP**

SACLAP, PO Box 868, Ferndale, 2160
T: 011 061 5000, F: 086 688 7005
E: registrar@saclap.org.za
W: www.saclap.org.za
4 Karen Street, Bryanston, j ohannesburg

**SACQSP (South African Council for the Quantity Surveying Profession)**

The SACQSP came into being through Act 49 of 2000. Broadly speaking, quantity surveyors are the financial consultants of the construction industry whose training and experience qualify them to advise on budgeting, costs and contractual arrangements and to prepare contract documents, from concept to completion. They act in liaison with architects, consulting engineers and contractors to safeguard the client’s interests. The Council performs similar functions to those of the afore-mentioned councils, obviously with its focus on the quantity surveying profession.

**SACQSP**

SACQSP, PO Box 654, Halfway House, 1685
T: 011 312 2560/1, F: 011 312 2562
E: admin@sacqsp.co.za
W: www.sacqsp.org.za
Unit C27, Block C, Lone Creek, Waterfall Office Park, Bekker St, Vorna Valley, Midrand

**SACPVP (South African Council for the Property Valuers Profession)**

The SACPVP registers persons operating in the property valuers profession according to the Property Valuers Profession Act 47 of 2000. Generally speaking this Council’s function and modus operandi are the same as those of the afore-mentioned five statutory councils. Registering categories are: Professional Valuers, Professional Associated Valuers, Single Residential Property Assessors, and Candidate Valuers.

**SACPVP**

SACPVP, PO Box 114, Merlyn, 0063
T: 012 348 8643, F: 012 348 7528
E: info@sacpvp.co.za, W: www.sacpvp.co.za
77 Kariba Street, Lynnwood Glen, Pretoria

**Voluntary Associations associated with Statutory Councils**

Each of the afore-mentioned six statutory councils has jurisdiction over groupings of voluntary associations that fall within its frame of reference. Those voluntary associations with which SAICE has closest ties, and which are recognised by and fall under ECSA’s jurisdiction, are listed below. These associations are covered in more detail in the section dealing with discipline-specific bodies (page 24).

- IMESA  Institution of Municipal Engineers of Southern Africa
- CESA  Consulting Engineers South Africa
- SAFCEC  South African Forum of Civil Engineering Contractors
- SAIMechE  South African Institution of Mechanical Engineering
From our engineers to you.

As a member of the Engineering Council of South Africa, you could qualify for exclusive offers* from South Africa’s number 1 car brand**, a guaranteed 3-day service booking as well as PremiumDrive, our 6 year/100 000km maintenance plan. To take advantage of this outstanding opportunity, inform your nearest dealer of your ECSA status.

*Not in conjunction with other Mercedes-Benz Fleet Programmes/Offers. Excludes AMG and Limited Edition models.
**As voted by SA in the Sunday Times TOPBRANDS Awards 2014.
Vehicle specifications may vary for the South African market.
SAIEE  South African Institute of Electrical Engineers
IPET  Institute of Professional Engineering Technologists
WISA  Water Institute of Southern Africa
SAISC  Southern African Institute of Steel Construction
CSSA  Concrete Society of Southern Africa
SARF  South African Road Federation
SASTT  South African Society for Trenchless Technology
SAIE  Southern African Institute for Industrial Engineering
SAIMM  Southern African Institute of Mining and Metallurgy
ITC  Institute of Timber Construction
NSBE  National Society of Black Engineers
SAIAE  South African Institute of Agricultural Engineers
SAID  South African Institute of Draughting
SAIW  South African Institute of Welding

ASSOCIATED STATUTORY BODIES
The statutory bodies discussed below were also established through Acts of Parliament. These bodies regulate and guide various construction and related engineering activities. This list includes only some of the associated statutory bodies related closely to the civil engineering profession.

CIDB (Construction Industry Development Board)
The CIDB was established by Act No 38 of 2000 to provide leadership to stakeholders and to stimulate sustainable growth, reform and improvement of the construction sector for effective delivery and the industry’s enhanced role in the country’s economy.

The Board of the CIDB comprises private and public sector individuals appointed by the Minister of Public Works on the strength of their industry knowledge and expertise. Board members represent the following sectors:
- public and private sector clients
- public entities
- contractor and employer associations
- professions
- financial institutions
- materials suppliers
- organised labour
- academic institutions.

Board members are non-executive and rely on the executive capacity of the CIDB to implement the Board’s mandate, which include the following:
- the establishment of a national register of contractors and construction projects to systematically regulate, monitor and promote the performance of the construction industry for sustainable growth, delivery and empowerment
- the improvement of the uniform application of procurement policy throughout all spheres of government
- the improvement of performance and best practice by public and private sector clients, contractors and other participants in the construction delivery process
- the promotion of sustainable participation by the emerging sector.

CETA (Construction Education and Training Authority)
CETA, which was established through the Skills Development Act of 1998 to develop and improve the skills of the South African workforce, is accredited by the South African Qualifications Authority (SAQA). CETA’s prime objective is to influence training and skills development in the construction sector by initiating skills development projects and learnerships which will empower construction workers with skills recognised by the National Qualifications Framework (NQF). CETA does not do any training itself, but accredits and monitors the delivery of training by accredited training providers. CETA also ensures that people who have acquired construction skills, but who do not have the necessary qualification, are included in the Recognition of Prior Learning assessment process.

CETA, CETA, PO Box 1955, Halfway House, 1685
T: 011 265 5900, F: 011 265 5925
W: www.ceta.org.za
563 Old Pretoria Main Road, 1st Floor, Unit 5, Midrand Business Park, Midrand

NHBRC (National Home Builders Registration Council)
The NHBRC as we know it today came into being on 26 March 2001 through the Housing Consumer Protection Measures Act No 95 of 1998. Its main function is to protect the interests of housing consumers, and to regulate the home building industry. It does this by:
- monitoring quality standards in the home building industry
- providing assistance to housing consumers in circumstances where major structural defects occur and where homebuilders fail to meet their obligations in terms of the Act
- building the capacity of home builders through a national training programme with specific emphasis on the historically disadvantaged
- providing technical and management support to provincial housing departments and local authorities
- educating housing consumers and home builders alike about their rights and obligations
- growing and sustaining the warranty reserve.

NHBRC
NHBRC, PO Box 461, Randburg, 2125
T: 011 317 0000 / 0800 200 824
W: www.nhbrc.org.za
5 Leeukop Road, Sunninghill, Johannesburg

RSR (Railway Safety Regulator)
The RSR is an agency of the Department of Transport and was established through the National Railway Safety Regulator Act No 16 of 2002. This Act stipulates that railway operators are responsible for managing safety, while the RSR is responsible for overseeing safety. To this end the mandate and activities of the RSR throughout the life cycle of a railway operation include the following:
- promoting improved safety performance in the railway transport industry in order to promote the use of rail as a mode of transport
- managing the safety permit process
- developing regulations and standards
- monitoring compliance with the Act, regulations, standards, and the operator’s safety management system through the conducting of audits and inspections
- conducting investigations into occurrences to determine the root causes
SABS (South African Bureau of Standards)
SABS was established through the Standards Act No 24 of 1945. The Act has passed through many amendments, and SABS is currently governed by the Standards Act 8 of 2008 that took effect simultaneously with the NRCS Act (see below) on 1 September 2008. SABS is the national institution for the promotion and maintenance of standardisation and quality regarding commodities and the rendering of services.

The main functions of SABS, from an engineering perspective, include the following:

- facilitating the preparation of national standards (SANS, i.e. SA National Standards) through a consensus process within various specific technical committees made up of industry representatives and technical experts
- providing information on the national standards of other countries
- providing information on international standards.

SABS aligns its activities with seven different industry sectors (chemicals, electrotechnical, food and health, mechanical and materials, mining and minerals, services, and transportation), which each house the full range of SABS services, such as standards, testing and certification. Representatives from the different engineering disciplines serve on the various technical committees within these SABS industry sectors.

NRCS (National Regulator for Compulsory Specifications)
The NRCS was established by the National Regulator for Compulsory Specifications Act No 5 of 2008, whereby the Regulatory Division of SABS and all regulatory functions of SABS were transferred to the NRCS. The NRCS is an autonomous institution of the DTI (Department of Trade and Industry) that administers technical regulations (compulsory specifications) based on national standards in the interests of human health, safety and protection of the environment. The regulated products include cement and treated structural timber, and a wide range of automotive, electrical and food products. NRCS also administers the Legal Metrology regulations governing measurements used in trade.

Sections 4–7 of the National Building Regulations and Building Standards Act (Act 103 of 1977) empower local authorities to administer the National Building Regulations. Building control officers are empowered and required to review and approve building plans and designs, including rational designs. The Act requires the Board and CEO of NRCS to perform a number of statutory functions, including advising the Minister regarding building regulations, inspections, the appointment of building control officers, and acting as secretariat to a Review Board that provides a dispute settlement service for the benefit of owners, developers and local authorities.

WRC (Water Research Commission)
The WRC operates in terms of the Water Research Act 34 of 1971. This Act mandates the WRC to, among other tasks:

- promote coordination, cooperation and communication in the area of water research and development
- stimulate and fund water research according to priority
- promote effective transfer of information and technology
- enhance knowledge and capacity building within the water sector.

GOVERNMENT AND OTHER STRUCTURES ASSOCIATED WITH THE BUILT ENVIRONMENT
SAICE has a unique position in the sense that it represents individual members of the civil engineering profession whilst many other bodies represent a focused vocational or industry-specific sector and often have only company membership. This means that SAICE is seen mostly as an organisation that has a broad and independent constituency and can operate from a particular viewpoint and/or independent basis. This aspect is highly valued.

In order to promote the profession, create understanding and facilitate credible and trustworthy relationships and support systems, SAICE has since 1994 engaged extensively with government structures on a scale that has never been seen before in the long history of the Institution. Regular meetings with Ministers and Departments have been a feature of the SAICE annual calendar since the middle 1990s. SAICE liaises mainly with the following government departments:

- Department of Public Works
- Department of Cooperative Governance and Traditional Affairs (previously the Department of Provincial and Local Government)
- Department of Transport
- Department of Water Affairs
- Department of Water and Sanitation
- Department of Environmental Affairs
- Department of Trade and Industry
- Department of Human Settlements (previously the Department of Housing)
- Department of Basic Education
- Department of Higher Education and Training
- Department of Science and Technology

SAICE representatives have also made meaningful presentations to the Portfolio Committees of a number of these government departments, not only to explain the contribution that the civil engineering profession can make, but also to alert the various Committees to the current state of conditions within those particular sectors.
government sectors, as seen from an engineering perspective. SAICE’s liaison with government departments is of extreme importance to the future of the profession and the country alike.

For the purposes of this article we will very briefly discuss only the Department of Public Works, as this department has direct bearing on many aspects of the built environment, and hence on the civil engineering profession.

**DPW (Department of Public Works)**

Broadly speaking the DPW’s mandate is to be the custodian and manager of the national government’s fixed assets for which legislation does not make another department or institution responsible. This includes the rendering and maintenance of built environment services.

In recognition of this mandate, as well as of the current poor state in which public assets are, the DPW developed the National Infrastructure Maintenance Strategy (NIMS), which has to ensure the adequate maintenance and operation of infrastructure, with the aim of sustained service delivery, growth and job creation. This approach in turn contributes to the goals of AsgiSA (Accelerated and Shared Growth Initiative for South Africa) and the EPWP (Expanded Public Works Programme).

By way of a brief background – the aim of AsgiSA is to address unemployment and poverty in South Africa. Shortly after the launch of AsgiSA in 2006, JIPSA (Joint Initiative on Priority Skills Acquisition) was established to address the scarce and critical skills needed to meet the AsgiSA objectives. The EPWP, on the other hand, provides relief to the poor and unemployed through temporary, but useful work, which has the added benefit of transferring of skills. The civil engineering profession is increasingly involved in particularly the EPWP.

The DPW also provides strategic direction for the development of the construction sector in partnership with its sector entities (see further down, as well as the CIDB already discussed above), and seeks to engage with institutions of higher learning to ensure a constant supply of suitably qualified built environment practitioners.

Readers are encouraged to visit the DPW website, as space limitations prohibit us to expand further on this department’s importance to the civil engineering profession and the construction industry.

| **DPW** |
| DPW, Private Bag X229, Pretoria, 0001 |
| T: 012 310 5192 |
| E: molatele.mohwasa.gov.za |
| W: www.publicworks.gov.za |
| AVN Building, cnr Skinner & Andries St, Pretoria |

| **NPC (National Planning Commission of South Africa)** |
| The NPC is tasked with developing a vision for South Africa in 2030 and a road map to take the country there. The commission is chaired by Cyril Ramaphosa, with Jeffrey Radebe as deputy. Two SAICE Fellows – past president Trueno Goba and Prof Mike Muller – were appointed as commissioners to offer insight on the engineering challenges facing the country and to guide the development of solutions. |

| **HRDCSA (Human Resource Development Council of South Africa)** |
| In response to South Africa’s continuing low skills base, government established the HRDCSA, led by the then Deputy President Kgalema Motlanthe, and managed by the Minister of Higher Education and Training, Dr Blade Nzimande. The HRDCSA is responsible for setting the Human Resource Development Strategy for South Africa (HRDSA). |

The HRDCSA comprises social partners from all segments of society, including government, organised labour and business, academia and civil society, and provides a platform where social partners can discuss and mutually agree on solutions to the skills crisis and the human resource development challenges facing the country. The HRDCSA is supported by a Technical Working Group (TWG) that provides technical expertise and strategic advice. A secretariat located within the Department of Higher Education and Training (DHET) provides strategic, technical, administrative, logistic and management support to the HRDCSA and its committees. At the end of 2010, the Council approved the following five-point plan:

- Strengthening and support of Further Education and Training (FET) colleges to increase access
- Production of intermediate skills (artisans in particular) and professionals
- Production of academics and stronger partnerships between industry and higher education and training institutions in research and development
- Worker education
- Foundational learning. Originating from the five-point plan, the following nine Technical Task Teams (TTT) were established:
  - FET colleges TTT
  - Artisan and Technician Development TTT
  - Production of Professionals TTT
  - Production of Academics and Stronger Partnerships Between Industry and Higher Education and Training Institutions TTT
  - Worker Education TTT
  - Foundational Learning TTT.

The following Technical Task Teams were established as a result of the needs identified by Council (they also will be addressing cross-cutting issues):

- Enabling Entrepreneurship
- Alignment of the HRDSA with the New Growth Path (NGP)
- Skills System Review.

Task teams have been constituted to reflect the nature of the HRDCSA’s social partnership and comprise experts across the social partner spectrum. Approximately 18 months into the HRDCSA’s existence, it was agreed that the HRDCSA, its operations and structures should be reviewed to determine whether or not it was appropriately structured and resourced to deliver on its mandate.

The review established that, even though much had been achieved in the 18-month period, some challenges still existed with regard to the role of the HRDCSA and its social partners, the need to better prioritise its work and to ensure that structures were sufficiently resourced to deliver on its mandate. As a result of these findings, steps are being taken to develop a national, integrated human resource development plan for the country as a matter of priority.

The establishment of the HRDCSA reflects government’s commitment
The Smart Roof People

In the fast moving, competitive world of construction, you only have one chance to get it right. So it’s a smart idea to choose quality products that won’t let you down. With over 50 years of technical know-how and practical experience, GRS is one of the largest manufacturers of quality metal roofing products in southern Africa, exporting to over 20 countries worldwide. State-of-the-art machinery and stringent quality checks ensure a superior product manufactured for ease of installation and a perfect fit. Through ongoing research and testing, GRS continually develops groundbreaking improvements. Our ingenious Klip-Lok and Klip-Tite systems have introduced transverse stiffeners (a first in South Africa) designed to achieve a more balanced system and a significantly higher wind uplift resistance. It’s smart. Really smart.

SUPPLIERS OF CONCEALED FIX, PIERCED FIX, DECKING SYSTEMS, GRIT COATED METAL TILES AND VENTILATION SOLUTIONS

So when you’re looking for roofing solutions, get smart with GRS. The smart roof people. Talk to us, THE SMART ROOF PEOPLE on 011 898 2900 or visit www.globalroofs.co.za or email info@globalroofs.co.za
to partnerships. It is an acknowledgement that, in order to deal with the human resource and skills crisis facing South Africa, all stakeholders need to jointly take ownership of the challenge and collectively work together and develop solutions to identify human resource and skills bottlenecks.

CSIR (Council for Scientific and Industrial Research)
The CSIR regards infrastructure and the entire built environment as crucial to the development of South Africa, which will help with poverty alleviation. SAICE reported in its 2011 Infrastructure Report Card that serious problems are experienced with South African infrastructure, particularly in the areas of health infrastructure, water infrastructure and sanitation, as well as secondary and tertiary roads.

These problems are due to a number of factors, including constrained funding to manage, plan, design, construct and maintain the infrastructure assets; a shortage of skilled resources; and a lack of appropriate technological solutions for the problems experienced. The importance of infrastructure is recognised by government, as is evident in the investment of more than R800 billion (government only) into infrastructure such as roads, energy generation, water infrastructure and public buildings over the next number of years.

The CSIR reports under the Department of Science and Technology (DST), through which a parliamentary grant is provided to the CSIR. This comprises about 30% of its income, with the rest earned in collaborative R&D efforts with other appropriate government departments and the private sector, as well as work with international partners.

The CSIR has a strong focus on and expertise in the built environment, collaborating with multidisciplinary colleagues within and outside the organisation. The broad areas that are addressed by built environment experts at the CSIR are:

- Building science and technology (building materials, construction innovation, and architectural engineering including public facilities such as schools and health facilities)
- Hydraulic infrastructure engineering (coastal engineering and port infrastructure, water supply and wastewater treatment infrastructure)
- Spatial planning and systems (urban dynamics modelling and integrated planning, housing options and urban development, land and housing market analysis, environmental criminology, and statistical and systems modelling)
- Transport infrastructure engineering (pavement design and construction, accelerated pavement testing, and advanced materials development and testing)
- Transport systems and operations (transport economics, transport infrastructure management systems, public transport system design, logistics system analysis and supply chain engineering).

Given South Africa’s unique built environment, the country cannot simply import technologies from abroad and expect them to solve our problems. The CSIR views the character of the built environment (such as urban, peri-urban and rural areas) as distinct on account of, for instance, the apartheid legacy, our specific conditions in terms of climate, geographical location and geology, availability and nature of materials, and our African heritage.

Agrement South Africa
Agrement South Africa is an independent and internationally recognised technical assessment organisation. It was established in 1969 and operates under a ministerial delegation of authority from the Minister of Public Works. The organisation is managed by and located at the Council for Scientific and Industrial Research (CSIR) in Pretoria. The organisation establishes performance criteria and assesses the fitness-for-purpose of innovative and non-standard construction products and systems. Agrément certification, which lists uses and conditions where necessary, offers assurance to specifiers including engineers, regulators, financial institutions and end users of fitness-for-purpose and quality assurance, thereby facilitating the introduction of new products into the market. Certification is also deemed-to-satisfy the requirements of the National Building Regulations. The organisation is a founder member of the World Federation of Technical Assessment Organisations.

IDT (Independent Development Trust)
As one of the country’s leading development agencies, the primary function of the IDT is to add value to the national development agenda of government. It does this through its business model that is grounded in the delivery of innovative and sustainable development programmes that will make a measurable difference to the levels of poverty and underdevelopment. The IDT works and interfaces with government and communities to alleviate and eradicate inter-generational poverty, provide social infrastructure, meet empowerment targets, create employment opportunities and build capacity in core areas. Generally the IDT works in rural areas, especially those characterised by high levels of poverty and unemployment. A key challenge, due to decades of under-development, remains the high levels of poverty, especially amongst women and the youth. The IDT has made a strategic shift to ensure that all development initiatives cater for women and their beneficiaries, and has women organisations as primary target groups.

DBSA (Development Bank of Southern Africa)
The DBSA is one of the leading Development Financial Institutions
(DFIs) in South Africa, and indeed in southern Africa. The DBSA provides financing, project preparation and implementation support in South Africa and the rest of the African continent to improve the quality of life of people in support of economic growth and regional integration. The DBSA is integrated across product markets, sectors and clients, and delivers synchronised infrastructure solutions.

The DBSA, wholly owned by the government of South Africa, is one of several development finance institutions in South Africa and southern Africa. Its vision is for a prosperous and integrated region, progressively free of poverty and dependency.

Its mission is to advance the development impact in the region by expanding access to development finance and effectively integrating and implementing sustainable development solutions. Its values are:

- High performance
- Shared vision
- Integrity
- Innovation
- Service orientation.

The World Bank Group comprises the following five institutions managed by their member countries:

- International Development Association (IDA)
- International Bank for Reconstruction and Development (IBRD)
- International Finance Corporation (IFC)
- Multilateral Investment Guarantee Agency (MIGA)
- International Centre for Settlement of Investment Disputes (ICSID).

These support a wide array of investments in areas such as education, health, public administration, infrastructure, financial and private sector development, agriculture, and environmental and natural resource management.

**DBSA**

DBSA, PO Box 1234, Halfway House, 1685
T: 011 313 3911, F: 011 206 3437, E: webmaster@ dbsa.org, W: www.dbsa.org
Headway Hill, 1258 Lever Road, Midrand

**BEPEC (Built Environment Professions Export Council)**

BEPEC is a not-for-profit membership-based organisation in a Public Private Partnership (PPP) with the Department of Trade and Industry (DTI), and which supports built environment companies to export their professional services into Africa and beyond.

BEPEC offers a one-stop-shop for international clients who are in the market to employ South African built environment professionals.

BEPEC membership is currently conditional on membership of one of five supporting bodies or Voluntary Associations: Consulting Engineers South Africa (CESA), Association of South African Quantity Surveyors (ASAQS), South African Institute of Architects (SAIA), Association of Construction Project Managers (ACPM), and Institute of Landscape Architects of South Africa (ILASA). BEPEC is also looking to broaden its membership base to include other professional services companies/bodies related to the built environment.

BEPEC’s main value proposition to its members is to facilitate exposure and access on an on-going basis to relevant and strategic projects and project opportunities in Africa, as well as to the project funding programmes of the major Development Finance Institutions (DFIs). Supporting initiatives to this value proposition include: facilitation of market access, early intelligence on projects and project opportunities, networking capability, formation of engineering and technology grouping of export councils, PPP between the DTI and export councils, missions/pavilions/trade fairs, “show me the money project” workshops, creation of business facilitation agencies, removal of trade barriers, and north–south corridor platform for public and private sector collaboration in respect of projects along this development corridor.

**AFDB (African Development Bank)**

The African Development Bank is a regional multilateral development bank, engaged in promoting the economic development and social progress of its regional member countries (RMCs), thus contributing to poverty reduction. As the continent’s premier development finance institution offering a knowledge and research centre, it is the preeminent voice for African development issues. The bank mobilises and allocates resources for investment in RMCs, and provides policy advice and technical assistance to support development efforts.

**SANRAL (South African National Roads Agency Limited)**

SANRAL is registered in terms of the Companies Act as an independent statutory company, belonging to the South African government and represented by the Minister of Transport. SANRAL’s mandate is to maintain, develop and manage the national road network of South Africa. Prime examples of SANRAL’s execution of this mandate is the Maputo Development Corridor, and the extensive Gauteng Freeway Improvement Project. The CEO of SANRAL, Nazir Ali, is a civil engineer and a Fellow of SAICE.

**CREDITS**

We acknowledge with appreciation that some of the information in this article was taken from the websites of the various bodies discussed. Please see the contact details underneath each body for the relevant website address. We also acknowledge with thanks the assistance received from senior staff members of these bodies.
Discipline-specific bodies

This article concentrates on a number of discipline-specific bodies that SAICE liaises with, including the discipline-specific voluntary associations that were listed on pages 16 & 18.

SAICE (South African Institution of Civil Engineering)

WE PLACE OURSELVES in this group of bodies for the sake of completeness, and also for the benefit of those readers who are not familiar with our Institution and would like to read about us in context. SAICE, whose forerunner was established in 1903, represents the civil engineering profession in South Africa, and is a voluntary association with approximately 11 000 members. The Institution provides technical leadership in support and enhancement of poverty alleviation, sustainable development, and the development and maintenance of infrastructure. Its specialist divisions include water engineering, transportation engineering, railway and harbour engineering, geotechnical engineering, structural engineering, environmental engineering, municipal engineering, information technology, and project and construction management. SAICE has a worldwide liaison network and links with many international bodies. There are also numerous local and international bodies that are specifically associated with our various technical divisions, such as the Geosynthetics Interest Group of South Africa (GGSGSA), the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE), the Institute of Waste Management of Southern Africa (IWMSA), the International Commission on Large Dams (ICOLD), and so forth. More information on these bodies is available via our technical divisions, but we also expand on these and similar bodies in this edition.

SAICE also distributes the GCC 2010 (General Conditions of Contract), which now also covers electrical and mechanical works, the ECS (Engineering Contract Strategies), and acts as agent for books from Thomas Telford and ASCE (American Society of Civil Engineers).

SAIMechE (South African Institution of Mechanical Engineering)

SAIMechE, which was established in 1892, is the senior body representing the discipline of mechanical engineering in South Africa. It covers all fields of application as diverse as automobile, energy generation, process engineering, heavy manufacture, design, management, research, mining and education. SAIMechE is a voluntary association of mechanical engineers, technologists and technicians who have access to various grades of membership and the associated benefits. The SAIMechE objectives are:

- to serve the needs and interests of its members
- to advance the science, art and practice of mechanical engineering
- to promote and maintain high standards in the profession of mechanical engineering.

The SAIMechE motto is 'Scientia Progredimur' – ‘By Knowledge We Advance’.

SAIEE (South African Institute of Electrical Engineers)

SAIEE, formed in 1909, has grown to the extent that there are approximately 6 000 members on its membership roll. Members are professionally engaged in the full range of engineering activities, including academic research, manufacturing, electronics, telecommunications, measurement and control, mining, and power infrastructural services.

The Institute contributes to the common interests and welfare of the whole engineering fraternity through close cooperation with the Engineering Council of South Africa (ECSA).

SAIEE strives to be a leading and respected learned society of electrical engineers through:

- promoting electrical science and its applications for the benefit of its members and the southern African community
- close contact with appropriate national and international organisations
- recognising achievement by advancement of individual members to higher grades of membership within the Institute and thereby enhancing the status of the profession
- being apolitical and non-discriminatory.

All members are required to uphold the dignity of the profession of electrical engineering. In whatever capacity they may be engaged, they must conduct themselves in a strictly fiduciary manner towards their client, employer, fellow member or other with whom they may be connected, and consistent with the established traditions of the Institute.

SAIA (South African Institute of Architects)

SAIA and its regional institutes are committed to maintaining the highest standards of professionalism, integrity and competence in architecture. Members of the Institute, as defined in the Constitution, are required to:

- continually enhance their professional skills
- ensure that their work promotes sustainable development goals to the benefit of the South African community and the natural environment
- improve the standards of health and safety for the protection and welfare of all members of society.
Members of the Institute, registered as professional architects, subscribe to a Code of Ethics with established principles which remain core as members conduct their business.

To continually elevate the architectural profession and support members as they strive to attain the highest standards of workmanship, SAIA ensures they are educated and trained appropriately, equipping them to provide leadership and critical judgement, while also exercising their specialist knowledge, skills and aptitude for the betterment of design and development in the built environment.

SAIA
SAIA, Bouchef (Ground Floor), 31 Robin Hood Road, Robindale, Randburg
T: 011 782 1315
E: admin@saia.org.za, W: www.saia.org.za

SAIEG (South African Institute of Engineering Geologists)
SAIEG is a national voluntary group which represents natural scientists practicing in the field of engineering and environmental geology. It has gained recognition as a Natural Scientific Association from the South African Council for Natural Scientific Professions (SACNASP). Its aims include:
- The promotion and advancement of the profession of engineering geology
- The adherence to the principles of integrated environmental management
- The adherence to the principles of sustainable development.

SAIEG
SAIEG, PO Box 1603, Houghton, 2041
T: 011 483 1861, F: 086 653 7108
E: secretariat@saieg.co.za, W: www.saieg.co.za

GIGSA (Geosynthetics Interest Group of South Africa)
GIGSA is a non-profit organisation dedicated to the scientific and engineering development of geosynthetics and associated technologies in South Africa.

GIGSA was founded in 1994 by a group of suppliers, installers, consultants, a regulator and an academic at the Faculty of Engineering of the University of the Witwatersrand. The founding of GIGSA coincided with the publication of the first edition of the Minimum Requirements Series by the then Department of Water Affairs and Forestry. The intention of the Minimum Requirements was to regulate waste management as a whole, but also waste disposal by landfill in South Africa, which made the use of geomembranes mandatory. This reinforced the need for an organisation like GIGSA, as geosynthetics were, at that time, largely unknown construction materials.

GIGSA was furthermore founded as the South African Chapter of the International Geosynthetics Society (IGS). The IGS was established in 1984 with, in broad terms, the same objectives as GIGSA. The IGS became the first non-founding member of the Federation of Geo-Engineering Societies (FedIGS) in 2011. The founding members of the FedIGS are the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE), the International Society of Rock Mechanics (ISRM) and the International Association for Engineering Geology and the Environment (IAEG).

The aim of the FedIGS is to facilitate collaboration and provide means of structured and formal communication between the organisations.

GIGSA is actively involved in the development of geosynthetics specifications within the working groups of the SABS sub-committee on geosynthetics, with the ultimate goal to provide a complete set of national standards. This will aid in standardising the specification and use of geosynthetics in South Africa. Given that the use of geosynthetics is likely to increase significantly with the promulgation of the National Standard for Disposal of Waste to Landfill, such standardisation will be beneficial to clients, engineers, suppliers and installers involved in geosynthetics projects.

GIGSA
GIGSA, PO Box 8720, Edenglen, 1613
E: inyirenda@gseworld.com
W: www.gigsa.org

CESA (Consulting Engineers South Africa)
CESA is a voluntary association representing consulting engineering firms of all disciplines. It is also a member of the International Federation of Consulting Engineers (FIDIC). CESA promotes the business interests of some 520 firms which employ in excess of 23 700 staff members and which approximate a fee income of R24 billion. The association therefore represents considerable capacity and probably accounts for 80% of the consulting engineering sector in South Africa. It promotes the interests of its members and their clients by (among other things):
- publishing documents relevant to the profession
- acting as agent for FIDIC publications
- providing advisory notes and guidelines on professional practice matters
- organising relevant seminars, workshops and conventions.

CESA
CESA, PO Box 68482, Bryanston, Johannesburg, 2021
T: 011 463 2022, F: 011 463 7383
E: general@cesa.co.za, W: www.cesa.co.za

IPET (Institute of Professional Engineering Technologists)
IPET strives to improve the image and status of professional engineering technologists of all disciplines by representing them, and promoting matters affecting them, on a national and international basis. IPET determines the standards for the registration and education of professional engineering technologists through its representation at the Engineering Council of South Africa, consulting with and providing ECSA with information and advice.
on all matters affecting engineering technologists. IPET members get a discount on their ECSA registration fee higher than their annual IPET membership fee.

IPET promotes the education and training of engineering technologists through liaison with educational institutions and employers, and encourages continuing professional development amongst its members. It promotes and rewards academic achievement among B Tech students of all engineering disciplines by annually awarding IPET medals to the highest academic achievers at all the universities of technology in South Africa, also encouraging gender equity with special medals for the highest achieving female students.

Because IPET strives towards a unified engineering profession, the Institute actively pursues communication and liaison with other societies who have engineering technologists amongst their members. IPET is the home for professional engineering technologists of all engineering disciplines in South Africa.

IPET
IPET, PO Box 1824, Randburg, 2125
T: 011 787 9706, F: 011 787 9706
E: engineer@netactive.co.za, W: www.ipet.co.za

SAAE (South African Academy of Engineering)
The South African Academy of Engineering is a non-profit, independent institution which promotes excellence in the science and application of engineering for the benefit of the South African nation. The Academy comprises South Africa’s most eminent engineers of all disciplines, and related professionals with proven ability and achievement, and draws on their wealth of knowledge and experience to achieve the Academy’s main objective – providing expert advice on matters pertaining to global competitiveness and quality of life for the nation. Election to the Academy is by invitation. The activities of the Academy include:

■ Promoting the recruitment, education and training development of engineering and technical persons from previously disadvantaged groups to increase the technological base of the nation
■ Enhancing excellence and innovation in the South African industry by participating in the Annual Technology Top 100 President’s Awards
■ Establishing and maintaining relations with overseas engineering academies and the International Council for Engineering and Technological Sciences (CAETS).

SAAE
SAAE, PO Box 12071, Halfield, 0028
T: 012 361 6721, E: office@saae.co.za
W: www.saae.co.za

SAFCEC (South African Forum of Civil Engineering Contractors)
SAFCEC uses its various areas of expertise to promote quality civil engineering construction. The Forum’s legal and economic expertise, for example, ensures that members not only remain informed about matters such as procurement, industrial relations, and contractual obligations, but also stay abreast with legislative developments affecting the civil engineering construction environment. SAFCEC’s ability to provide economic and market forecasts is extremely valuable to civil engineering contractors.

SAFCEC
SAFCEC, PO Box 644, Bedfordview, 2008
T: 011 409 0900, F: 011 450 1715
E: admin@safcec.org.za, W: www.safcec.org.za
3rd Floor, SAFCEC House, 12 Skeen Boulevard, Bedfordview

MBSA (Master Builders South Africa)
The MBSA is a national organisation speaking on behalf of its members, which are the various Master Builder Associations and Affiliate members. The MBSA operates as a federation of registered employer organisations, representing contractors and employers in the building industry.

MBSA
MBSA, PO Box 1619, Halfway House, 1685
T: 011 205 9000, F: 011 315 1644
E: info@mbsa.org.za, W: www.mbsa.org.za
CMA Office and Conference Park, No 1, 2nd Road, Midrand

SABTACO (South African Black Technical and Allied Careers Organisations)
SABTACO was founded in 1990 and has grown into a body currently representing thousands of members (students, graduates, practitioners, technicians) country-wide in the engineering and science disciplines. SABTACO’s vision is to be a leader in advocating and ensuring the advancement of black professionals in the built environment and allied fields, and the optimal realisation of the skills potential in South Africa. It is therefore the mission of SABTACO to:

■ Lead the transformation of the built environment and related technical fields in such a manner as to reflect the commitments of the relevant charters and the BBBEE codes
■ Facilitate the creation of an environment that is conducive to the development of science and engineering skills in the historically disadvantaged communities
■ Increase the level of participation of black professionals and service providers in the mainstream economy.

SABTACO
SABTACO, PO Box 30960, Braamfontein, 2017
T: 011 403 2165, F: 011 447 8704
E: madishjo@iafrica.com, W: www.sabtaco.org
2nd Floor, Norvic House, 93 De Korte Street, Braamfontein, Johannesburg

NSBE (National Society of Black Engineers of South Africa)
The NSBE is a voluntary organisation which was established to ensure full participation of black engineers in the mainstream economy, and its wealth creation and distribution within South Africa. Its purpose is to transform the professional engineering sector by promoting the profession amongst the black people of South Africa by recruiting aspiring and prospective people into the profession and retaining them in the industry.

The NSBE boasts a membership base of over 1 000 qualified black engineers (Africans, Indians and Coloureds), and has student chapters at various institutions of higher learning and at some affiliated companies nationally. Through its collective orientation and national footprint, the NSBE seeks to continuously identify programmes aimed at achieving its mandate and objectives, through which it partners with various spheres of

November 2014  Civil Engineering
government, parastatals and the private sector. Its mission involves:

- Promoting public awareness of engineering and the opportunities for black people in the profession
- Striving to increase the number of black students studying engineering at both undergraduate and postgraduate levels
- Functioning as a representative and supportive body on issues and developments that affect the careers of black engineers.

NSBE
NSBE, 181 Hoosen Haffejee Street, Pietermaritzburg, KwaZulu-Natal, 3201
T: 033 345 0778, F: 033 345 1856,
E: admin@nsbe.org.za, W: www.nsbe.org.za

TCI (The Concrete Institute)
The Concrete Institute is a technical support organisation that provides professional technical solutions through advice, education, information, publications, and regulatory and consulting services to all interested in concrete in South Africa.

TCI intends playing a role in bringing together other representative bodies in the built environment to present a more united front to government, thereby ideally enabling faster delivery of infrastructure projects at all levels – municipal, provincial and national.

As the central authoritative organisation for the South African concrete industry, TCI aims to assist anyone involved in design and construction to realise the full potential of concrete.

Information Centre
TCI’s Information Centre, based in Midrand, Johannesburg, serves all South Africans, wherever and whenever, through its user-friendly online catalogue. This valuable, unique and extensive collection of more than 100 000 items unlocks a world of information about cement and concrete. It provides free enquiry, lending and online request services, and sells technical publications catering to all levels of expertise. Many of the publications currently in print can be downloaded from the website free of charge whilst there is a charge for the larger, more detailed publications, such as the 9th edition of Fulton’s Concrete Technology.

School of Concrete Technology
The CETA-accredited School of Concrete Technology offers training countrywide and has a portfolio of courses ensuring that the quality of concrete produced is of the highest standard. With more than 19 scheduled courses and three internationally recognised courses on offer, anyone – from site staff to experienced concrete technologists – can find the right course to enhance their knowledge and skills. In addition, special onsite and tailor-made courses can be arranged.

The Institute is also involved at tertiary level with departments of civil engineering throughout South Africa, through research funding and lectures.

Specialist Technical Services
TCI offers a free advisory service for general concrete technology queries. A consultancy service focused on concrete and related issues is also offered, including onsite investigation, trouble shooting and reporting. The technical team is available for consultation on construction sites anywhere in southern Africa.

The Institute also oversees the review of existing concrete-related standards and the introduction of new standards where necessary.

The Concrete Institute is proudly supported by AfriSam, Lafarge and Sephaku.

CMA (Concrete Manufacturers Association)
The CMA is the primary representative of the precast concrete industry. Now in its 43rd year, it initiates standards in close cooperation with StanSA and collaborates with its members in developing new products and services.

The CMA’s promotional activities target architects, engineers, developers, contractors and property owners, and the pooled knowledge and expertise of its members foster an environment which encourages the development of innovative, environmentally- and community-friendly products.

The Association’s prime focus is on ensuring that its members’ products are applied correctly. A CMA mark serves as a guarantee of quality and the CMA takes responsibility should a problem arise.

Members are encouraged to hold accredited product certification, such as the relevant SANS standard, or to manufacture to specifications laid down by the CMA. Should a problem arise, the CMA will carry out an investigation, and, if the product does not conform to the required standard, the member company is obliged to rectify the situation.

Down the years the CMA has published numerous manuals, brochures and audio visuals on the practical application of precast concrete, and this material is available at a nominal charge. It also runs refresher courses and holds seminars to introduce new technology and methodology, often featuring overseas experts.

CMA
CMA, Postnet Suite B612, Private Bag X32, Kempton Park 1620
T: 011 805 6742, F: 086 524 9216
E: admin@cma.org.za, W: www.cma.org.za
16 Horn Street, Chloorkop Ext 1, Kempton Park

CSSA (Concrete Society of Southern Africa NPC)
The CSSA, a voluntary association recognised by ECSA, promotes excellence and innovation in the use of concrete and related products and services. The Association also provides a forum for networking and technology transfer between its members and international affiliates. It hosts the well-known Fulton Awards every second year to reward excellence in concrete construction.

CSSA
CSSA, PO Box 75364, Lynnwood Ridge, Pretoria, 0040
T: 012 348 5305/1319, F: 012 348 6944
E: info@concretesociety.co.za
W: www.concretesociety.co.za
Suite 301, The Hillside, 318 The Hillside Street, Lynnwood, Pretoria

ASPSA (Aggregate and Sand Producers Association of Southern Africa)
ASPSA is a voluntary producers association that helps to improve the quality of aggregates produced by its member companies for construction projects around the country, building our country one stone at a time, so to speak.

ASPSA’s role is critical considering that almost every structure made by man relies on aggregates for strength and stability. Construction aggregates are in fact the primary ingredients of all concrete structures and foundations (80% of
For the past 120 years, The Southern African Institute of Mining and Metallurgy, has promoted technical excellence in the minerals industry.

We strive to continuously stay at the cutting edge of new developments in the mining and metallurgy industry. The SAIMM acts as the corporate voice for the mining and metallurgy industry in the South African economy. We actively encourage contact and networking between members and the strengthening of ties. The SAIMM offers a variety of conferences that are designed to bring you technical knowledge and information of interest for the good of the industry.

Benefits of joining the SAIMM

- Membership includes the SAIMM Journal on a monthly basis.
- As a member you will be granted access to the OneMine.org website and all its publications.
- You will be invited to technical excursions, conferences and social events.
- SAIMM members are provided the opportunity to positively contribute to the Mining and Metallurgy Industry.
- You will have the chance to network with a wide cross-section of professional people in the Mining and Metallurgy Industry.
- You will be able to access the output from international industry-related organizations.
- Active participation in the Institute will result in higher peer recognition.
- If you are registered with the Engineering Council of SA (ECSA) as a SAIMM Member you will qualify for a discount on your ECSA fees.
- Members of the Institute are able to contribute to the development of young talent through our mentoring program.
- Attending SAIMM conferences and Branch Events will allow you to collect Continuing Professional Development (CPD) points.
- You will be able to attend the SAIMM Conferences at discounted rates.

The SAIMM has made career guidance and education in the mining and metallurgy industries in Southern Africa a priority!!

For further information contact:
SAIMM, P O Box 61127, Marshalltown 2107
Tel: (011) 834-1273/7
Fax: (011) 833-8156 or (011) 838-5923
concrete is aggregate), as well as being the single most important ingredient used to build roads (94% of a road is aggregate).

Aggregates and sands used in construction projects are naturally occurring minerals that are mined by a specialised sector of the mining industry in South Africa mainly from quarries. Government strictly regulates sand and aggregate quarries due to the importance of obtaining a reliable supply of quality materials. It also aims to ensure that the minerals and materials are removed in a manner that is sustainable and protects the rights of workers, as well as the environment and surrounding communities.

ASPASA’s focus remains largely on creating an environment that is fair and equitable, and gives their members space to manoeuvre and make a good living. On the other hand ASPASA requires its members to comply with all relevant legislation, as well as to uphold the strictest standards in quality, health, safety and environmental issues. Annual audits are in place to assist members to achieve set requirements, and also to ensure that they comply with the relevant legislation.

The quarries represented by ASPASA (around 130) work closely with the government and with the Chamber of Mines, and are able to give input on a wide spectrum of legislation that affects the industry, including input on critical issues surrounding the environment, and health and safety matters.

These important issues are represented through expert committees with senior and knowledgeable specialists serving to give informed input on all matters. Through these committees programmes are developed to assist the industry to meet development objectives and improve the overall standards on member mines.

ASPASA

ASPASA, PO Box 1983, Ruimsig, 1732
T: 011 791 3327, F: 086 647 8034
E: nico@aspasa.co.za, W: www.aspasa.co.za

WISA (Water Institute of Southern Africa)

WISA keeps its members informed about the latest national and international developments in water technology and research, and provides a forum for the exchange of information and views to improve water resource management in South Africa.

WISA

WISA, PO Box 6011, Halfway House, 1685
T: 011 805 3537, F: 011 315 1258
E: wisa@wisa.org.za, W: www.wisa.org.za
1st Floor, 5 Constantia Park 546, 16th Road, Midrand

SEWPACKSA (Small Wastewater Treatment Works Suppliers Association)

SEWPACKSA was established in 2010 and its main objectives are:

■ To provide a unified non-governmental representative body of suppliers of package plants in the country to create a sustainable and self-regulated industry.

■ To create a sustainable, self-regulated package plant industry that can treat wastewater onsite in remote areas, or where authorities do not provide sewer connections, or where additional capacity to the wastewater treatment facilities of various government bodies is required, whilst complying with legislative requirements for discharged water quality.

■ To enable the supply of compliant package plants and management services of such package plants on the basis of best corporate governance practice and a code of ethics as adopted by the Association.

SEWPACKSA

Contact: Debbie Besseling (PR and Administration)
T: 084 371 7190, E: liaison@sewpacksa.co.za
W: www.sewpacksa.co.za

SANCOLD (South African National Committee on Large Dams)

SANCOLD was established in 1965 to represent South Africa on the International Commission on Large Dams (ICOLD). Since then it has broadened its activities to create and promote an awareness and understanding amongst South Africans of the role of dams in the beneficial and sustainable development of South Africa’s water resources. Its primary technical role is to advance the knowledge and skills relating to the science and art of the planning, design, construction, management, operation, maintenance, rehabilitation and decommissioning of dams amongst its members in a safe, financially sound, ecologically and socially sustainable manner. SANCOLD provides forums for local and regional interaction between interested participants in the dam industry. SANCOLD has one of the four reserved positions on ICOLD’s Management Committee. SANCOLD is also hosting the ICOLD Annual Meeting in May 2016 in South Africa where over 1 200 international delegates are expected to attend.

SANCOLD

SANCOLD, 158 High St, Ashlea Gardens, Pretoria, 0081
T: 012 460 9100, E: secretary@sancold.org.za
W: www.sancold.org.za

SAIMM (Southern African Institute of Mining and Metallurgy)

After 115 years the SAIMM continues to serve its members. This learned society started in 1894, a few years after the invention of the cyanide process had saved the gold mining industry in South Africa – the previously used technology of gravity separation could not economically recover gold from the fine-grained ores of the Transvaal gold fields. The Institute’s Journal recorded this process and other major developments in the industry, and has disseminated the Institute’s knowledge ever since.

SAIMM is a professional institute with local and international links aimed at assisting members to source news and views about technological developments in the mining, metallurgical and related sectors, as well as embracing a professional code of ethics. SAIMM also attempts to fulfil what it sees as its obligations to the various communities and the environment in terms of the SAIMM Charter. In addition, the Institute is active in bringing together the mining and metallurgical fraternity in terms of research, shared experiences, education, personnel and students.

SAIMM

SAIMM, PO Box 61127, Marshalltown, 2107
T: 011 834 1273, F: 086 585 2901
E: sam@saimm.co.za, W: www.saimm.co.za
5 Holland Street, Marshalltown, Johannesburg

SANCOT (South African National Committee on Tunnelling)

SANCOT is an interest group within the South African Institute of Mining and Metallurgy (SAIMM). Members of the Committee collate information on both civil and mining tunnelling. SANCOT...
was originally established as a result of the extensive infrastructure developments during the late 1960s, such as the Orange River Project and the Hex River Valley Tunnels. SANCOT was also a founding member of the International Tunnelling Association. Due to the decrease in tunnelling in South Africa from around 2003, SANCOT reformed first into a committee of the SAIMM, and later into the current interest group within the SAIMM.

SANCOT
SANCOT, c/o SAIMM, PO Box 61127, Marshalltown, 2107
T: 011 834 1273/7, F: 011 838 5923
E: julie@saimm.co.za, W: www.saimm.co.za/sancot
5th Floor, Chamber of Mines Bldg, 5 Holland Street, cnr Sauer & Marshall Streets, Johannesburg

SAPPMA (Southern African Plastic Pipe Manufacturers Association)
Launched in 2004, SAPPMA is an association of leading companies in the plastic pipe manufacturing industry in South Africa. The vision of the Association is to create absolute quality, trust and integrity throughout the value chain of the southern African plastic pipe industry, hence all its objectives are in line with this. Pipes produced by member companies carry the registered SAPPMA logo. SAPPMA is a voluntary association registered as a Section 21 Company and is affiliated to Plastics SA.

SAPPMA
SAPPMA, Private Bag X68, Halfway House, 1685
T: 011 314 4021, F: 086 550 7495,
E: admin@sappma.co.za, W: www.sappma.co.za
18 Gazelle Avenue, Corporate Park, Midrand

SAPMA (South African Paint Manufacturers Association)
SAPMA, established more than 70 years ago, has as its objective the promotion of the coatings industry as a responsible supplier of products and services beneficial to the country. SAPMA’s manufacturing members produce more than 90% of the volume of paints and coatings manufactured in South Africa. In its quest to remove all harmful leaded paint from South Africa, SAPMA is now also attracting an increasing number of retailers and contractors as members. The Association, through its training arm, SA Paint Industry Training Institute (SAPITI), provides a wide range of paint technology courses.

SAPMA
SAPMA, PO Box 751605, Gardenview, 2047
T: 011 455 2503, F: 086 623 5121
E: sapma@sapma.org.za
W: www.sapma.org.za
Building No 1, AMR Office Park, 201 Concorde Road East, Bedfordview

SAISC (Southern African Institute of Steel Construction)
The main aim of SAISC is to promote the effective use of steel in construction, thereby contributing to the development of the steel construction industry in South Africa. For more than 50 years now the Institute has been involved in education, industry development, market development, sponsoring research, export promotion and disseminating information. As a centre of knowledge it is the principal source of advice on all aspects of the use of steel in construction.

The Power Line Association of South Africa is also being formed under the auspices of SAISC to represent the interests of transmission and distribution line fabricators and contractors, including everybody with an interest in the provision of power lines in South Africa, covering all equipment and materials used in the entire network between generator and final user. The purpose of the association will be to speak on behalf of the industry, especially towards ensuring that South African-based companies achieve the maximum possible share of extending the power network in South Africa and the rest of the continent.

SAISC
SAISC, PO Box 291724, Melville, 2109
T: 011 726 6111, F: 011 482 9644,
E: info@saisc.co.za, W: www.saisc.co.za
1st Floor Block C, 43 Empire Road, Parktown West, Johannesburg

SEIFSA (Steel and Engineering Industries Federation of Southern Africa)
SEIFSA is a national employer federation representing the metal and engineering industry, and acts as the umbrella body for 27 leading independent employer associations in this diverse field. For more than 70 years, SEIFSA has provided active support for employer associations and lobbied for policies that have improved the business environment in which its members operate.

SEIFSA is the recognised voice of the metals and engineering industry, and its management team represents employers’ associations, and a number of organisations that are critical to the success of the industry. Through its membership of these national bodies, SEIFSA has over the years strived to positively influence legislation and policy affecting labour relations, skills development, and economic and trade matters.

At industry level, SEIFSA negotiates collective agreements covering wages and conditions of employment with the trade unions. The federation also represents employers on the boards of the Engineering Industries Pension Fund, the Metal Industries Provident Fund, the Metal and Engineering Industries Permanent Disability Scheme, the Metal and Engineering Industries Bargaining Council Sick Pay Fund, the Metal and Engineering Industries Bargaining Council and the Manufacturing, Engineering and Related Services Set (merSETA).

As one of the largest and most influential employer federations in South Africa, SEIFSA has a combined membership of 2 000 companies employing over 210 000 workers. The SEIFSA membership employs more than 50% of the industry’s workforce, and over 77% of all employees represented by the employer organisations party to the Metal and Engineering Industries’ Bargaining Council.

SEIFSA is a non-profit-making body that supports its member associations with products and services offered by its five specialist divisions, namely: Economic and Commercial; Health, Safety, Environment and Quality; Legal; Industrial Relations; and Skills Development and Human Capital. The range of services and products includes advice, assistance, consultancy (covering labour legislation, dispute resolution, employment conditions, health and safety, broad-based black economic empowerment, contract price adjustment and skills development), publications, training courses, seminars and conferences.

According to the New Growth Path, South Africa has to train 50 000 new artisans by 2015 and at least 30 000 additional engineers by 2014 to meet skilled labour demands.

The state-of-the-art SEIFSA Training Centre (established in 1982) is geared to provide apprenticeships in ten key trades for a career in the sector, and offers basic,
intermediate and advanced training in both apprenticeships, and learnerships, as well as up-skilling of artisans. Apprenticeships include electricians, fitters and turners, instrument mechanics, boilermakers, welders, millwrights, toolmakers, fitters and turners, to name a few.

Awarded the best practice artisan training programme in the country, the SEIFSA Training Centre is fully accredited by merSETA, CHIETA and EWSETA and hosts more than 30 private companies with every intake. This year the SEIFSA Training Centre topped an intake of more than 300 apprentices.

SEIFSA continues to support this vital training need and provides 10 bursaries each year to applicants from disadvantaged communities. Intake dates for 2015 are on 6 January, 31 March, 22 June and 14 September respectively.

SEIFSA
SEIFSA, PO Box 1338, Johannesburg, 2000
T: 011 298 9400, F: 011 298 9500
E: info@seifsa.co.za, W: www.seifsa.co.za
Metal Industries House, 42 Anderson Street, Johannesburg

ITC (Institute of Timber Construction)
The ITC-SA was established more than 40 years ago to regulate the timber roof structure industry, and to provide inspection and certification for compliance with SANS 10400 where engineering rational designs are applicable.

ITC-SA manufactures, erects and inspects timber roof structures ensuring rationally designed, safely erected and inspected, structurally stable timber roofs.

The vision of the ITC-SA is to create and maintain the highest standards in the engineered timber construction industry, and uplift through its members the standards of engineered timber construction in the building industry for the benefit of the consumer by:
- monitoring its membership
- continually improving standards
- promoting and marketing engineered timber structures
- overseeing the training and development of its members.

ITC
ITC, PO Box 686, Isando, 1600
T: 011 974 1061, F: 011 392 6155
E: enquiries@itc-sa.org, W: www.itc-sa.org
SAFCA Building, 6 Hulley Road, Isando, 1600

IMESA (Institute of Municipal Engineering of Southern Africa) IMESA is a voluntary association of engineering professionals and associates who aim to better the quality of life of all citizens through infrastructure engineering excellence at local government level. IMESA also advises municipal councils on municipal engineering matters and serves the broader community through representation on various bodies where it provides input from the municipal engineer’s perspective.

IMESA
IMESA, PO Box 2190, Westville, 3630
T: 031 266 3263, F: 031 266 5094
E: admin@imesa.org.za, W: www.imesa.org.za
IMESA House, 2 Derby Place, Westville

SASTT (South African Society for Trenchless Technology) Trenchless technology (TT) is technology for the servicing, rehabilitation and replacement of existing, and the construction of new, public utilities and other services underground without the digging of trenches. It also includes the development of all kinds of underground condition-assessment and mapping techniques, tunnelling devices, specialist machinery, materials and equipment.

SASTT’s mission is to promote, from an ethical and neutral base, the use of trenchless technology for providing and maintaining underground services with a minimum of surface and environmental disruption. SASTT encourages its members to arrange their professional and business affairs in accordance with the objectives of SASTT’s mission statement and is aware of the necessity for maintaining a healthy environment while addressing the changing needs of the community. This is promoted by issuing press releases, arranging promotional activities, advising on available solutions, providing technical literature and supporting research for the benefit of the public, authorities, designers and specifiers, suppliers and contractors.

SASTT
SASTT, PO Box 13981, Sinoville, 0129
T: 012 567 4026, F: 086 668 4026
E: director@sastt.org.za, W: www.sastt.org.za

IWWSA (The Institute of Waste Management of Southern Africa) IWWSA is a multi-disciplinary, non-profit association that is committed to supporting professional waste management practices.
The organisation comprises voluntary members who promote environmentally acceptable, cost-effective and appropriate waste management practices. It strives towards protecting the environment and people of southern Africa from the adverse effects of poor waste management by supporting sustainable best practice environmental options.

The Institute contributes to the improvement of waste management standards and legislation, supports international, national and regional trends in best environmental practices, promotes the science and technology of waste management, and practices affordable, cost-effective waste management. Education and training in the realm of effective and efficient waste management is also a key focus for the IWMSA.

When the IWMSA was established over 30 years ago, it was the vision of the founders to provide South Africa with a clean and healthy environment. Today this vision is still at the core of the organisation.

SABITA (Southern African Bitumen Association)

SABITA is a non-profit organisation that represents producers and applicators of bituminous products, consulting engineers and educational institutions. SABITA promotes best practice in the use and application of bituminous materials, as well as inworker safety and environmental conservation. SABITA has an education and training role through the Asphalt Academy, and also liaises with government on the value of road provision and preservation.

SABITA

SABITA, Postnet Suite 56, Private Bag X21, Howard Place, 7450
T: 021 531 2718, F: 021 531 2606
E: info@sabita.co.za, W: www.sabita.co.za
5 Lonsdale, Lonsdale Way, Pinelands, Cape Town

SARF (South African Road Federation)

SARF is an organisation dedicated to the promotion of the road industry in South Africa through the dissemination of information, the promotion of sound policies and by education and training. As such it provides a representative forum for the provision and management of roads, and the road sector.

The Federation is a point of contact for South Africa’s various road industry sectors, and facilitates the distribution of expertise throughout the diverse disciplines, which impact and have application on the industry.

SARF is linked to the International Road Federation (IRF), and by liaising with this organisation’s programme centres in Geneva and Washington, the latest developments in road technology, policy and management worldwide are made available to the local industry. SARF’s objectives include:

- The promotion of roads, road transportation and road safety
- The provision of education and training to all those engaged in the road transportation industry
- The promotion of the economic, social and environmental benefits derived from developing and maintaining road networks, road transport systems and road traffic control
- Supporting and encouraging the design and construction of environmentally sound road networks and allied systems
- Disseminating information to members and other stakeholders
- Promoting an effective road transport policy at all levels of government
- Originating and promoting improvements in road transport policy
- Gaining support by cooperation with the IRF
- Advancing the southern African economy by means of a sound road transport industry
- Holding road-related seminars and conferences
- Providing SARF bursaries and administering IRF Fellowships
- Presenting courses that offer CPD points and which are ECSA-accredited.

SARF

SARF, PO Box 8379, Birchleigh, 1621
T: 011 394 5634/1459,
E: operations@sarf.org.za, W: www.sarf.org.za
48 Gladiator Street, Rhodesfield, Kempton Park

SARMA (Southern African Readymix Association)

SARMA represents reputable readymix concrete companies and promotes readymix concrete in order to establish it as the preferred construction material. Established to regulate the readymix industry, SARMA aims to advance industry technology through research and participation, and develops industry standards that promote the use of readymix concrete.

The advent of readymix concrete several decades ago has transformed the construction industry, making widespread use of concrete more viable than ever before. Construction is easier and far faster now, with better quality, more workable concrete being available on site whenever and wherever it is needed. Construction firms have therefore become increasingly reliant on suppliers to provide concrete for everything from waterways, to roads and a wide variety of other construction projects.

All SARMA members are subject to stringent annual plant audits to ensure compliance with the SARMA Health and Safety, Quality and Environmental Standards. Considering the size and number of mixer trucks, road safety standards also form an integral part of the annual audits.

To counter unscrupulous producers who supply inferior quality readymix, engineers are urged to work with SARMA to formulate strategies which will ensure access to the highest quality concrete.

As yet there is nothing stopping construction firms from using non-SARMA accredited suppliers, but moves are afoot for the formulation of formal agreements which would specify that readymix concrete may only be supplied by companies accredited by SARMA.

SARMA

SARMA, PO Box 1983, Ruimsig, 1732
T: 011 791 3327, F: 086 647 8034
E: johan@sarma.co.za, W: www.sarma.co.za
Unit B Coram Park, Ferero Road, Randpark Ridge

NSTF (National Science and Technology Forum)

The NSTF is a non-governmental organisation that was established in 1995 with the cooperation of the Department of Science and Technology. Its membership mainly consists of organisations, and it represents wide-ranging expertise and experience in the SETI (Science, Engineering, Technology and Innovation) community. SAICE has been a member for many years, and has been particularly active in proSET, which was preceded by SETAG (Scientific, Engineering and Technological Societies and Allied Professions Group of South
Africa) – SAICE chaired this group for a number of years.

The main aims of the NSTF are to deliberate and share information and to provide a common platform to:
1. Influence the development and implementation of public SETI policies.
2. Contribute towards the renewal of SETI systems through youth interventions.
3. Celebrate, recognise and reward excellence within the SETI sector.

The NSTF comprises the following sectors:
- Science councils and statutory bodies
- Small, medium and large business and state utilities
- Civil society and labour
- Higher education sector
- Government sector
- Professional bodies and learned societies.

The professional bodies and learned societies are represented by proSET (Professionals in Science, Engineering and Technology), a sector of the NSTF consisting of professional bodies and learned societies. proSET represents more than 40 organisations, institutes and associations who themselves represent professionals in various specialised science, engineering and technology (SET) fields. Notable amongst the membership are professionals in various branches of engineering, as well as educators specialising in science, technology and mathematics education and research.

proSET has a particular interest in the issues listed below, and engages in discussion and debate around these, playing a role by lobbying among stakeholders:
- Regulatory issues affecting professionals in SET, including the Green Building Environment
- Setting and maintaining standards of safety, health, environmental sustainability, and quality
- Opportunities for Research and Development and Innovation in industry
- Opportunities for support and funding of research in SETI
- Career development and career paths for science/engineering graduates and professionals
- Accreditation of professionals – professional registration, including Codes of Ethics
- Encouraging mobility of professionals from other countries to study and work in South Africa and vice versa
- The quality, accessibility and promotion of school-level education in Science, Technology, Engineering and Mathematics.

NSTF

NSTF Secretariat, PO Box 9823, Pretoria, 0001
T: 012 841 3987, F: 012 841 3025
E: enquiries@nstf.co.za, W: www.nstf.org.za
Room S-140, Building 33, CSIR Campus,
Meiring Naude Road, Brummeria, Pretoria

PROTEC (Programme for Technological Careers)

PROTEC is a national, independent, non-profit educational service provider that was started in 1982, in Soweto, in order to help school learners from disadvantaged communities to prepare for and successfully embark on careers in science, engineering and technology. The early success of the project soon led to its expansion into a national programme, and by 1990 there were PROTEC programmes running in 26 disadvantaged communities throughout South Africa, providing supplementary education for Grades 10, 11 and 12 learners, as well as teacher training and curriculum support in the targeted subjects of Mathematics, Physical Sciences, English and World of Work (life orientation).

This model is unique in that it is made up of both learner and teacher development components, and also entails developing material for teaching and learning that is additional to what learners receive as textbooks at their schools. Through these efforts, more and more disadvantaged students are being adequately equipped to enter technological careers, thereby potentially easing the country’s skills shortage.

PROTEC is an active member of the National Science and Technology Forum (NSTF), and is also recognised as a UNESCO cooperating organisation. (Please also see page 76 for a full article on PROTEC’s activities and the significant role SAICE played in the establishment of this successful venture.)

PROTEC

PROTEC, PO Box 32767, Braamfontein, 2017
T: 011 339 1451, E: fannie@protec.org.za
W: www.protec.org.za
3rd Floor Forum III, 33 Hoofd Street, Braampark,
Braamfontein, Johannesburg
ASOCSA (Association of Schools of Construction of Southern Africa)

ASOCSA was officially launched in 2006 at the culmination of the first Built Environment Conference which saw a broad spectrum of South African and international construction industry stakeholders, including academics and practitioners, attend. The concept and launch of ASOCSA was supported by industry, demonstrated by substantial sponsorships from prominent stakeholders, such as Group 5, the Development Bank of Southern Africa (DBSA), PPC Cement, PeriWiehan and the Council for the Built Environment (CBE).

ASOCSA is not the first attempt to form a body that addresses, *inter alia*, matters of construction education and training. In the days of the Building Industries Federation South Africa and the National Development Fund there were regular annual meetings of heads of departments that offered construction-related programmes. Recognising the two-tiered higher education sector in South Africa, there were separate meetings for universities and the former technikons. In the more recent past, the Chartered Institute of Building (Africa) initially convened annual educators’ forums that did not quite fulfil the same function as the previous forums. However, during 2005 the very first meeting of university heads of departments drawn from all higher education institutions in South Africa met for the very first time since the re-landscaping of the sector to discuss matters affecting construction, and particularly construction education in the country. This meeting was repeated in 2006 where the need was expressed for the establishment of a formal forum/association of universities to engage in discussion, debate, collaboration and promotion of matters of mutual interest.

ASOCSA aims to be the professional association for the development and advancement of construction education in southern Africa, where the sharing of ideas and knowledge inspires, guides and promotes excellence in curricula, teaching, research and service. To achieve this aim ASOCSA is partnering with the construction industry to find ways to effectively represent the interests of both construction academics and industry practitioners. ASOCSA will offer a variety of programmes and services designed to help its members serve their customers more effectively and succeed in an increasingly challenging environment of construction information management and technology. To this end ASOCSA provides a forum for the debate and discussion of issues of mutual interest to all industry stakeholders. For example, one of the tasks of ASOCSA will be supporting the development of curricula that address the needs of the construction sector in the southern African region.

With respect to the southern African region, ASOCSA is committed to the following:

- To be the custodian of construction-related higher education.
- To promote, facilitate, develop and monitor the relevance and quality of construction-related curricula, research and graduates in conjunction with higher education institutions, industry and government.
- To promote and facilitate the development of curricula for construction-related programmes.
- To facilitate accreditation of construction-related programmes.
- To hold an annual conference that acts as a forum for multidisciplinary interaction between academics and practitioners.
- To publish an accredited research-based journal and contribute to the built environment body of knowledge (BEBOK).
- To disseminate information dealing with construction education and related matters.
- To develop and maintain closer links with industry and government.
- To represent the collective views of its members.
- To liaise with other organisations and persons to promote the interests of its members.
- To promote and support relevant postgraduate research.
- To provide bursaries to postgraduate students in accordance with set criteria. The *Journal of Construction* is the official journal of ASOCSA, and the production and distribution of practice notes and technical papers is a further endeavour to grow the partnership between academia and industry.

ASOCSA continues to seek opportunities to promote both academic and industry employment opportunities, and intends to play a significant role in the accreditation of construction-related academic programmes.

The Association also convenes an annual conference where construction academics and practitioners can interact relative to practical experience and the findings of relevant research, and from 31 May – 2 June 2015, ASOCSA’s 9th Built Environment Conference will take place with the theme *Reflections of Directions in Infrastructure Delivery and Sustainability*. The conference will seek responses to questions related to current conversations and debates on infrastructure delivery and sustainability.

ASOCSA

Ferdinand Fester (President)
T: 011 559 6050, E: ffester@uj.ac.za
W: www.asocsa.org

SAPI (South African Planning Institute)

SAPI is a recognised voluntary association which seeks to promote planning as a discipline, advance planning in society, and promote the interests of its members, who are persons engaged in the planning profession. It provides town and regional planners, and the planning profession with a profile, identity and voice in South Africa and internationally. It provides a platform for planners to share knowledge and debate critical issues affecting planning and development, and offers the opportunity for cooperation between planners and other disciplines to achieve an effective contribution to the wellbeing of society and the creation and shaping of transformed, sustainable settlements.

The Institute is made up of members from all regions of South Africa, and from all sectors, including all three spheres of government, private practitioners, academia, and civil society bodies. Members are served via regional branches and directly from the SAPI National Office.

SAPI

Private Bag X15, Halfway House, 1685
T: 011 655 7369, F: 086 514 9673
E: info@sapi.org.za, W: www.sapi.org.za
4 Birchwood Court, Montrose Street, Vorna Valley, Midrand

SAGi (South African Geomatics Institute)

SAGi is a voluntary organisation for registered persons working in land surveying, engineering surveying, town planning, photogrammetry, remote sensing, digital photogrammetry, photogrammetry, remote sensing.
QUALITY ELECTRICAL PRODUCTS AT YOUR FINGERTIPS!

We have a range of SHORT FORM CATALOGUES, packed with information to assist you in finding the right solution.

- INDUSTRIAL LIGHTING, LAMPS AND ACCESSORIES CATALOGUE
- POWER TRANSMISSION AND DISTRIBUTION CATALOGUE
- MOTOR CONTROL AND DISTRIBUTION SOLUTIONS CATALOGUE
- TOOLS, TESTERS AND METERS CATALOGUE
- POWER OPTIMISATION CATALOGUE
- POWER GENERATION CATALOGUE

View these 3D catalogues or ORDER your copy online now!

facebook.com/VoltexSA  |  twitter.com/voltexsa

www.voltex.co.za
Contact us on info@voltex.co.za

Proudly
Bidvest
geographical information systems (GIS) and land management, and supports the constantly evolving dynamics in the surveying industry.

**SAID (South African Institute of Draughting)**

The South African Institute of Draughting is an independent, professional body which was established in 1953 with the objective of improving the academic and technical qualifications of draughts persons in all disciplines of technical drawing and design.

Its aims are to improve the status of its members within commerce, industry, and national and local government services.

The Institute undertakes to promote the career of draughting as a specialised occupation that may rightfully claim the privilege of professional status. It also endeavours to ensure that the integrity of the profession is adhered to by its members with a strict Code of Conduct.

The Institute is proud to be recognised as a Voluntary Association by both the SA Council for the Architectural Profession (SACAP) and the Engineering Council of South Africa (ECSA). This is an achievement which has not been attained by any other Institute in South Africa.

The Department of Home Affairs also recognises the Institute as a Professional Accreditation Body.

SAID works in close liaison with technical and distance learning colleges, as well as private training providers in order to promote the standard of technical education in South Africa.

As drawing standards are of paramount importance to the Institute, it has had representation on the South African Qualifications Authority’s (SAQA) Consultative Panels and the Standard Generating Bodies (SGBs) in the fields of building construction, civil and generic manufacturing engineering and technology.

**SAIW (South African Institute of Welding)**

SAIW is a non-profit technical organisation dedicated to furthering standards in welding fabrication and related technologies. Established in 1948, it is a founder member of the International Institute of Welding (IIW).

SAIW provides training programmes, consultancy and industry support services. Based in Johannesburg, with branches in Cape Town and Durban, it is active throughout southern Africa and also has experience further afield, predominantly in central Africa, the Indian Ocean Islands and the United Arab Emirates.

An Authorised National Body (ANB) of IIW since 2003, SAIW offers the full range of IIW qualifications – engineer, technologist, specialist, practitioner, welder and inspector. It also has strong affiliations with leading training organisations such as the universities of the Witwatersrand and Pretoria. An SAIW qualification has long been regarded as the industry standard in South Africa and also enjoys international recognition.

In 2008 SAIW became an IIW Authorised National Body for Company Certification (the first outside Europe), enabling implementation of the IIW Manufacturer Certification Scheme. In terms of the Scheme, welding and fabrication companies are certified for compliance to ISO 3834 (Quality Requirements for Welding).

SAIW also administers personnel certification programmes for a number of inspection activities, including non-destructive testing (NDT), and for South African regulatory categories of pressure vessel inspectors. Certification programmes are based on the ISO 17024 standard (General Requirements for Bodies Operating Certification of Persons) and is accredited for these activities by SANAS, a South African member of the International Accreditation Forum.

In 2005, SAIW formed SAIW Certification, a separate Section 21 not-for-profit company, to administer examinations and certification programmes. The separation of these activities is in line with international best practice.

Appointed a Regional Designated Centre for NDT by AFRA, the African Regional Cooperation Agreement of the International Atomic Energy Agency (IAEA), SAIW also conducts training for IAEA-funded fellows and takes a lead in regional scientific cooperation to promote self-sufficiency in the field of nuclear science and technology.

Other SAIW activities include hosting workshops, seminars and conferences, the latter including IIW regional assemblies.

**SAGI**

SAGI, PO Box 201446, Durban North, 4016
T: 031 563 9481, F: 031 563 5254
E: admin@sgi.co.za, W: www.sagi.co.za

**ACPM (Association of Construction Project Managers)**

The ACPM is a voluntary association of specialist project management professionals working in the built environment. It has various categories of membership, with membership not automatically granted to applicants. The purpose of the ACPM is to define the service and performance levels expected from project managers and to recommend an appropriate fee scale.

**SAIAE (South African Institute of Agricultural Engineers)**

SAIAE represents the discipline of agricultural engineering in South Africa and applies engineering science and technology to agricultural production and processing. Agricultural engineering combines the disciplines of mechanical, civil, electrical and chemical engineering principles with a knowledge of agricultural principles.

**SAIW**

SAIW, PO Box 527, Crown Mines, 2025
T: 011 298 2100, F: 011 836 4132
E: reception@saiw.co.za, W: www.saiw.co.za

**SAID**

SAID, PO Box 4424, Durbanville, 7551
T: 021 975 5191, F: 086 579 1337
E: SAIDraughting@global.co.za
W: www.saidraughting.com

**CREDITS**

We acknowledge with appreciation that some of the information in this article was taken from the websites of the various bodies discussed. Please see the contact details underneath each body for the relevant website address. We also acknowledge with thanks the assistance received from senior staff members or office bearers of these bodies.
International bodies

INTRODUCTION

The history of SAICE’s international involvement is worth repeating briefly.

The Institution’s networking on an international level took off in 1994 during the ASCE (American Society of Civil Engineers) convention in Atlanta when a SAICE delegation was invited to attend the annual ASCE International Round Table. During that visit SAICE’s President and Executive Director at the time, Brian Bruce and Dawie Botha respectively, not only had the opportunity to network with engineering institutions from across the world, but for the first time ever they met African colleagues.

They returned inspired and eager to start an African Round Table, similar to the ASCE model. From this idea sprung the Africa Engineers Forum (AEF) as it was known until recently (now FAEO – see page 40). During subsequent years ASCE and SAICE have liaised on various matters and have developed a strong and fruitful relationship that benefits both institutions.

Other relationships with other international engineering bodies followed, to the extent that SAICE is today not only contributing meaningfully to the world engineering scene, but receiving international visitors on a regular basis, all to the benefit of SAICE’s members. In addition, those first steps into the global engineering village created the platform for a strong African voice and led to SAICE being utilised by a number of organisations and initiatives to roll out internationally funded programmes on behalf of the then AEF, also to the benefit of the South African Development Community (SADC).

SAICE’s International Panel guides the Institution’s involvement in international activities. During 2013/2014 SAICE’s networking on an international level was indeed developed to further heights, and information about events, activities and new developments is included under the relevant headings below. Also look out for the January/February 2015 edition of our magazine – the first edition of the year customarily focuses on international issues.

SAICE’s International Panel has budgeted to participate in the following international events in 2014/15:

■ WECSI (World Engineering Conference on Sustainable Infrastructure): Abuja, Nigeria from 2 to 7 November 2014. The Nigerian Society of Engineers has invited the SAICE President-Elect, Malcolm Pautz, to be the keynote speaker on the topic The Nigerian 2014 Infrastructure Score Card.

■ WFEO World Engineers’ Convention: Paris, December 2014. This will be attended by Dr Martin van Veenen and Manglin Pillay, respectively President of FAEO and CEO of SAICE. Meetings will also be arranged with SAFEFO, ASCE, IEI, ICE and the SA Embassy. Our CEO will focus on possible business and networking opportunities. The discussions will revolve around e-business, the SAICE bookshop and courses in the member countries.

■ IEI 29th Indian Engineering Congress: Hyderabad, India, December 2014. The event will be attended by Dr Martin van Veenen and Manglin Pillay. This will be an ‘International Meet’ attended by dignitaries from overseas organisations, including WFEO, Engineers Australia, the Czech Association of Scientific and Technical Societies, the Korean Institute of Electrical Engineers, the Nepal Engineers’ Association, and the Institution of Engineers Sri Lanka.

■ ICE and IStructE in the United Kingdom will host a visit by Manglin Pillay and Malcolm Pautz in February 2015.

WFEO (World Federation of Engineering Organisations)

This multi-disciplinary engineering organisation was established in 1968 and was formed under the auspices of the United Nations Educational, Scientific and Cultural Organisation (UNESCO). A close relationship still exists. It currently represents engineering organisations from approximately 90 nations, and as such around 15 million engineers. Over the past 10 years or so the WFEO has gained considerable acceptance and status, thereby facilitating as a strong and united voice for engineering. It promotes communication and cooperation, develops internationally agreed policies, and promotes interaction with the United Nations. It plays a major role in issues concerning sustainability and anti-corruption, and a series of committees have been addressing issues such as education and training, the environment, information technology, energy, capacity building and technology.

The WFEO membership includes National Members, in terms of which ECSA (Engineering Council of South Africa) represents the South African engineering profession, International Members, like the FAEO (Federation of African Engineering Organisations) that represent regional engineering groups, and Associate Members, who have no voting rights.

The current President of the WFEO is Eng Marwan Abdelhamid.

Yashin Brijmohan, Head of School: Engineering CoE Eskom Holdings SOC Ltd, chairs the WFEO Committee on Engineering Capacity Building (CECB).

SAICE contributed hugely to a guideline book and a compendium of programmes for capacity building, which were launched in October 2010 at the WFEO Executive Meeting in Buenos Aires, and distributed further during 2013/14 (available on the various websites of the WFEO family of organisations).
At the WFEO Convention in Geneva in September 2011, it was decided that ECSA would host the CECB workshop in South Africa for the next few years, with the assistance of SAICE – indeed a big scoop for the South African engineering community.

**WFEO**

Ms Tahani Youssif  
Executive Director: WFEO  
Maison de l’UNESCO, 1 rue Miollis, 75015 Paris, France  
T: 33 1 45 68 48 46/47, F: 33 1 45 68 48 65  
E: executivedirector@wfeo.net  
W: www.wfeo.net

**UNESCO (United Nations Educational, Scientific and Cultural Organisation)**

UNESCO was founded on 16 November 1945 and, in addition to dealing with the issues described in its name, sees itself as striving towards a higher purpose, namely “building peace in the minds of men”. After World War II this goal was obviously of great importance. UNESCO currently promotes cooperation among its 190-odd member nations by mainly focusing on respect, values and the dignity of each civilisation and culture. The organisation is actively pursuing the Millennium Development Goals by means of its strategic activities.

SAICE has been contracted several times by UNESCO to execute programmes in the form of workshops aimed at issues like “Engineers and the Alleviation of Poverty”. A further initiative concerns a feasibility study to ascertain whether a mini ‘Numbers and Needs’ study would be appropriate for selected African countries, following the example of the SAICE Numbers and Needs publication by Allyson Lawless and her team. This initiative has the support in principle of the South African Minister of Science and Technology, Naledi Pandor.

Rovani Sigamoney, Programme Specialist: UNESCO Engineering Initiative, Natural Sciences Sector, has played a major role in facilitating interaction with SAICE. Prof Brian Figaji of South Africa has, in addition, been playing an important and valuable role as the chair of the National Commission for UNESCO.

The UNESCO Engineering Report, which was published in 2010, contains views from engineers in approximately 50 chapters. SAICE contributed to important sections of this publication.

Moves are under way towards the establishment of the UNESCO Engineering Initiative that will focus on building capacity in various formats to bring together engineering capacity from all of the existing organisational units, and to mobilise partnerships with engineering bodies such as the WFEO.

UNESCO hosted the first ever Africa Engineering Week in Johannesburg, South Africa, from 1–4 September 2014. The inaugural event was hosted by the University of Johannesburg, with the aim of educating the youth and general public about the engineering profession through strategic outreach activities, such as educational workshops, public awareness events, mentoring and university events. SAICE, SAFEIO, FAEO and WFEO played a major role in the conference by providing international guest speakers and setting up exhibition stands to display the CECB Compendium and the SAICE water and bridge building competitions.

**UNESCO**

7, place de Fontenoy, 75352 Paris 07 SP, France  
T: 33 1 4568 1000  
W: www.unesco.org

**CEC (Commonwealth Engineers’ Council)**

The CEC promotes cooperation among the engineering organisations situated in the former British colonies. It has recently been transformed into a virtual organisation that is facilitated by the provision of a secretariat by the ICE. ECSA is the South African member of the CEC and SAICE interacts with the CEC from time to time.

**WCCE (World Council of Civil Engineers)**

The WCCE was established in 2005. Prof José Medem, a former WFEO President, was one of the first presidents of the WCCE, and has visited South Africa on several occasions, building a lasting relationship with SAICE. The civil engineering profession represents around 50% of engineering professionals and plays a vital role in delivering essential services worldwide. The WCCE goal therefore is to address issues specifically related to civil engineering on a global scale.

**FIDIC (International Federation of Consulting Engineers)**

The members of FIDIC comprise consulting engineering organisations from various countries. FIDIC plays a leading role in addressing sustainability, organising anti-corruption campaigns, setting standards in consulting engineering, and interacting with the World Bank and other funding organisations and structures regarding procurement issues.

**ICE (Institution of Civil Engineers)**

ICE, the UK-based equivalent of SAICE, was established in 1818, and as such set the norm for learned societies in engineering. It currently has 80 000 members around the world. Since the early nineties ICE and SAICE have been cooperating on many issues.

The most important achievement to date has been that ICE facilitated international reciprocity agreements between itself,
ECSA and SAICE, in terms of which South African civil engineering qualifications and professional status are recognised. ICE also facilitated the entry of ECSA into various international accords, including the Washington Accord and the Engineers Mobility Forum. Learned society activities between ICE and SAICE are currently managed by means of an agreement of cooperation. Regular meetings between the two institutions, facilitated by the ICE-SA Division, form part of their annual activities, and on several occasions the Brunel lecture has been presented in South Africa.

ICE
One Great George Street, Westminster, London, SW1P 3AA, United Kingdom
T: 44 20 7222 7722
E: secretariat@ice.org.uk
W: www.ice.org.uk

IStructE (Institution of Structural Engineers)
IStructE was originally established in 1908 as the Concrete Institute. Its focus is primarily on structural engineering and public safety within the built environment. It has more than 27 000 members in 105 countries around the world. SAICE and IStructE cooperate by means of an agreement, and through the Joint Structural Division of SAICE. In addition, courtesy visits to the IStructE management in London by the SAICE CEO take place on an annual basis.

IStructE
47-58 Bastwick Street, EC1V 3PS London, United Kingdom
T: 44 20 7235 4535, F: 44 20 7235 4294
E: pr@istructe.org
W: www.istructe.org

ASCE (American Society of Civil Engineers)
ASCE was founded in 1852 and currently has a membership of more than 140 000 worldwide. It is a typical learned society for civil engineering professionals. In 1994 ASCE was the first international organisation to offer SAICE an agreement of cooperation. Its International Round Table (IRT) has over the years provided SAICE with a valuable platform for communication and networking. SAICE has been attending these IRTs over many years and participated in several initiatives, including the ASCE Vision 2025 strategic planning exercise, where SAICE’s input was mainly in terms of sustainability and providing a developing world perspective. Currently a number of initiatives between SAICE and ASCE, like ExCEEd (Excellence in Civil Engineering Education), are either under discussion or envisaged.

At the 2010 ASCE annual conference in Las Vegas, the Agreement of Cooperation was renewed for a fourth term of four years. SAICE attended ASCE’s 142nd conference in Montreal, Canada, during October 2012, which focused on “Civil Engineering in the Global Economy” and where delegates could learn of and discuss the changes that are shaping the civil engineering profession worldwide.

ASCE
ASCE, 1801 Alexander Bell Drive, Reston, Virginia, VA 20191, USA
T: 703 295 6300 / 800 548 2723 toll free
W: www.asce.org

PRECISION ENGINEERING THAT GIVES YOU TOOLS FOR LIFE.

When strength and safety are your greatest concerns, choose industrial quality hand tools with a lifetime guarantee. Gedore products are hot forged and precision crafted for longevity, and include everything from spanners, pliers and torque wrenches to workshop equipment and artisan toolsets. Our tools have been designed with safety and toughness in mind, to give you the best value that money can buy.
FAEO (Federation of African Engineering Organisations) and SAFEO (Southern African Federation of Engineering Organisations)

In order to achieve engineering excellence and to create a better quality of life for all in Africa, leaders and representatives of engineering institutions in Africa held a General Assembly on 8 May 2012 at the Kenyatta International Conference Centre, Nairobi, Kenya, and unanimously agreed to establish a central united home for African engineering organisations in solidarity under the name Federation of African Engineering Organisations (FAEO). The organisational model of FAEO comprises:

- Central African Federation of Engineering Organisations (CAFEO)
- Eastern African Federation of Engineering Organisations (EAFE0)
- North African Federation of Engineering Organisations (NAFEO)
- Southern African Federation of Engineering Organisations (SAFE0)
- West African Federation of Engineering Organisations (WAFEO).

These various regional groups will work under the FAEO, which will then represent Africa at the WFEO, AU and any relevant international organisation. SAFE0 represents southern Africa in COMESA, SADC, NEPAD and other regional bodies with engineering and sustainable development interests in southern Africa.

FAEO is therefore a young organisation and faces many challenges, but its members’ commitment and will to succeed are sure to let it grow into a strong and unifying organisation for all engineering practitioners in Africa.

Africa has huge economic potential, but it needs the necessary infrastructure to develop and sustain this potential. Infrastructure development should not only be inward-looking, but should be done on a regional basis, and eventually on a continental basis. In unity is strength, and it is engineering practitioners who must make sure that we develop an integrated road network, rail network, power network and telecommunications network for the continent. One requirement for such integrated networks is that there are compatible standards and design codes. This will not be easy to achieve, as the countries in Africa have a legacy from many different countries in Europe, and it will be a challenging task to align these codes and standards with one another.

For this purpose we need wise engineering practitioners. During tertiary studies an engineer or technician acquires knowledge. Knowledge is information that is retained in the mind. Once working, an engineering practitioner gains the ability to apply the knowledge in practice, and thereby becomes competent to practise his/her profession. When experience is added to competence, then wisdom is achieved.

Training of engineering practitioners starts at school where they must gain sufficient competency in maths and physics to enter university. It then becomes necessary to ensure that the training at university is at a high level. However, all this knowledge comes to nothing if there is not a proper training and mentoring programme in place. The FAEO recognises that capacity building is the key to producing competent, experienced and wise engineering practitioners who will plan, design and build the required infrastructure that will make Africa great.

Engineering practitioners must conduct themselves with integrity and honesty. This is not always easy in an environment where corruption has become entrenched and almost institutionalised. Notwithstanding this unpalatable fact, it is only when engineering professionals stand together that this can be overcome. The FAEO stands for integrity, and expects all its members to adhere to honourable conduct.

The FAEO has an African vision and must therefore be above national and regional interests. The intention is to facilitate the establishment of an engineering corps that can truly serve the peoples of Africa.

SAFE0 will promote and extend the exchange of technical, scientific and professional knowledge to better service the interests and welfare of engineering practitioners in member countries, as well as to encourage and support members to uphold and advance the integrity, honour and dignity of engineering in order to achieve the following outcomes:

- Excellence in engineering technology in Africa.
- Informal and intelligent decision-making about built environment infrastructure by all government structures and private sector entities, by utilising human capacity building orientation programmes and projects.
- A sufficient pool of competent professionals by and through:
  * offering and pursuing awareness and orientation programmes, projects and activities regarding the role of engineering and technology
  * promoting interest in mathematics and science at higher grades in primary and secondary schools
  * offering career guidance programmes and activities
  * promoting consistent investment mechanisms for infrastructure, and promoting fair and reasonable remuneration for all engineering practitioners
  * facilitating mentorship
  * offering continued professional development opportunities.
- Sustainable professional frameworks and organisational structures in Africa by:
  * creating permanent facilities and administrative mechanisms to support the built environment profession’s activities and programmes.
- An awareness relating to SAFE0 activities in order to prepare the countries, their people and their decision-makers for the challenges of the future by:
  * utilising the opportunities offered to enhance the image and raise the public awareness about the role and value of engineering and industry in particular, and engineering and the built environment in general.
- Support the development of entrepreneur-ship in the engineering environment.

Dr Martin van Veelen has completed his second year as President of the Federation of African Engineering Organisations (FAEO). The FAEO has now been firmly established and is fully functional in Sub-Saharan Africa. Of the five regional bodies, only the Northern African Federation of Engineering Organisations has not been established yet. The other four are fully functional. The FAEO’s achievements so far are:

- The FAEO constitution has been accepted by all members.
- The SAFE0, WAFE0, EAFE0 and CAFE0 are well organised and are meeting regularly.
- There is good interaction between engineering bodies in Africa.
- The FAEO has a functional secretariat.
- The FAEO has become visible as an active organisation and is accepted as the organisation representing the engineering profession in Africa.
Dr van Veelen attended the WFEO Extended Executive meeting in Paris during April 2014. This trip was partly funded by SAICE. He is now a member of the WFEO Strategic Planning Task Force. He is also a member of the group that assesses the functionality of the WFEO Standing Technical Committees.

The FAEO Executive, under Dr van Veelen’s leadership, has had continued discussions with the AU Commission for Human Resources, Science and Technology. A draft Memorandum of Cooperation was handed to the Commission, and their response is awaiting. For the first time the engineering practitioners in Africa now have a direct voice at the AU.

The FAEO is recognised by UNESCO as the representative body for engineering practitioners in Africa, and has become part of the African Engineering Initiative in which Dawie Botha, SAICE Executive Board member, also plays a significant role.

The FAEO successfully participated in the first ever UNESCO Africa Engineering Week that was held in Johannesburg. Representatives from all four Sub-Saharan regions attended the conference and actively participated in the programme.

Dr van Veelen attended conferences in Ghana, Nigeria, the Ivory Coast, Kenya, Uganda, Lesotho and Sierra Leone and has established excellent relationships with the engineering organisations in these countries. The cost was borne by various other organisations, not by SAICE. Although he attended these conferences in his capacity as President of FAEO, he is also recognised as a past president of SAICE (2012). The role that SAICE plays in continental affairs is always acknowledged with gratitude.

**FAEO**

FAEO c/o SAICE, Private Bag X200, Halfway House, 1685, South Africa
T: 27 11 805 5947, F: 27 11 805 5971
E: civilinfo@saice.org.za, W: www.saice.org.za
Building 19, Thornhill Office Park, Bekker Street, Vorna Valley, Midrand, South Africa

**SAFEO MEMBER COUNTRIES**

**Botswana**
Botswana Institute of Engineers BIE
Ms Linda Moseki - President
T: 267 312 395 7665
E: mosekilinda@yahoo.com, linda.moseki@kmprojectm.co.bw, bie@botsnet.bw

**Lesotho**
Lesotho Association of Engineers LAE
Ben Rafoneke - President
E: ben.rafoneke@mpmu.org.ls, T: 266 2231 5789 Ext 226

**Malawi**
Malawi Institution of Engineers MIE
Eng Andrew Thawe - President
E: athawe@bwb.mw, T: 256 888 564 572
Mrs Elnas Chimdima - Executive Secretary
E: mw.engineers@gmail.com, T: 265 1 871 615 / 265 999 417 609

---

**FASTEST TO MARKET. IT’S WHAT WE ARE ALL ABOUT.**

PCBS are the premier guarantee specialist in Africa. We specialise in guarantees and alternative risk transfer. Our business has grown to become one of the largest guarantee specialists in Africa through building meaningful partnerships with our clients and by delivering expedient results.

We are underwritten by Guardrisk.

For further information contact us on 011 482 2592 or info@pcbs.co.za

An Authorised Financial Services Provider - FSP19867

PCBS PERFORMANCE & CUSTOMER SATISFACTION
**Mauritius**
Institution of Engineers Mauritius IEM
Mrs N Daby-Seesaram – President
Ghunshyam Parsan – Secretary
E: iem@intnet.mu, T: 230 467 7015
W: www.ie mauritius.com

**Mozambique**
Ordem dos Engenheiros de Mocambique OrdEM
Eng Augusto de Sousa Fernando – President
T: 258 21 310 463 / 258 82 326 3740
Eng Abdul Razaque Fakir – Vice-President
E: al-jafa@ra.org.na
T: 264 61 222 313
Eunice Abreu – Secretary General
E: eumavoa@gmail.com
W: www.ordeng.org.mz

**Namibia**
Engineering Professions Association of Namibia EPA
Gunter Leicher – President
E: gleicher@knightpiesold.com, E: epa@iafricaonline.co.na
T: 264 61 307 297
Mr Al-Jaf Ako
E: al-jafa@ra.org.na
T: 264 61 307 297
W: www.epaanamibia.org

**Seychelles**
Engineering Institution of Seychelles EIS
Contact to be re-established

**South Africa**
Engineering Council of South Africa ECSA
Edgar Sabela – Executive: Strategic Services
T: 27 11 607 9500, E: edgar@ecsa.co.za
Jones Moloi Sane – Chairperson of the IAC
E: moloisanej@tut.ac.za
W: www.ecsa.co.za

**Swaziland**
Swaziland Association of Architects, Engineers & Surveyors SAAES
Rev Mcebo Sigudla – Chairman
E: mcebo@sptc.co.sz, E: profmags@hotmail.com
T: 268 7604 2161

**Zambia**
Engineering Institution of Zambia EIZ
Eng Henry Mwale – CEO & Registrar
E: henry.mwale@eiz.org.zm, E: henrycmwale@yahoo.co.uk
T: 260 211 256 205/255 161 OR 260 977 847 976
Eng Bernard Mwape Chiwala – President
E: chiwalanmwape@gmail.com, T: 260 978 263 005
W: www.eiz.org.zm

**Zimbabwe**
Engineering Council of Zimbabwe ECZ
Eng Ben Rafemoyo – CEO
E: benrafemoyo@gmail.com, E: brafemoyo@ecz.co.zw
T: 263 772 437 647 / 263 712 803 605
Eng Martin Manuhiwa – Chairman & President SAFEO
E: manuhiwalam@yahoo.com, T: 263 478 2826/29, 263 773 803 310
W: www.ecz.co.zw

**EAP (Engineers Against Poverty)**
EAP is a specialist NGO working in the field of engineering and
development. SAICE signed a cooperation agreement with the
EAP. Regular interaction therefore takes place between SAICE
and EAP, and EAP takes part in a number of joint ventures where
SAICE is represented.

**RedR International & RedR Southern Africa**
RedR was established in the UK in 1980 and its name refers
to its mission, which essentially is to maintain a Register of
Engineers for Disaster Relief and to provide training in this
field. A local chapter has been established in South Africa
and closer links between SAICE and RedR South Africa are
being explored.

**RAE (Royal Academy of Engineering)**
The Royal Academy of Engineering was established in 1976.
on their website the RAE states that, “As Britain’s national
academy for engineering, we bring together the country’s most
eminent engineers from all disciplines to promote excellence
in the science, art and practice of engineering. Our strategic
priorities are to enhance the UK’s engineering capabilities,
to celebrate excellence and inspire the next generation, and
to lead debate by guiding informed thinking and influencing
public policy.”

The RAE has strong links with the organised professions, in-
cluding ICE and SAICE. Its links with SAICE enhance the RAE’s
initiatives to facilitate the growth of professional engineering
societies in Africa.

**IEI (Institution of Engineers India)**
The IEI offers Life Institutional Membership to engineering-
related organisations and individuals throughout India. Any
public or local body, registered company, or individual may
therefore become a member of the IEI. In September 2012, while
attending the congress of the World Federation of Engineering
Organisations in Slovenia, SAICE and the IEI signed a
Memorandum of Understanding, whereby both institutions confirmed their willingness to work together on international issues whenever deemed appropriate. Both organisations agree that this was an historic event and they look forward to a long and mutually beneficial association.

CIB (International Council for Research and Innovation in Building and Construction)
The CIB was established in 1953 with the support of the United Nations as an Association to stimulate and facilitate international cooperation and information exchange between governmental research institutes in the building and construction industries, with an emphasis on those institutes engaged in technical fields of research. The CIB has since developed into a global network of over 5 000 experts from about 500 member organisations active in the research community, industry or education, who cooperate and exchange information in over 50 CIB Commissions and Task Groups covering all fields in building and construction-related research and innovation.

CIB members are universities, institutes, companies and organisations involved in building and construction research or in the transfer or application of the results of research. Member organisations usually appoint experts from their ranks to participate in CIB Commissions and Task Groups. An individual may also be a member and participate in a Commission or Task Group.

Members have immediate access to the world’s leading experts and expertise, and are facilitated to present and validate their own knowledge and technology. They are also offered opportunities for collaboration in international projects. In these, leading experts bring state-of-the-art technologies together in support of continuous improvements of building and construction systems, processes and technologies all over the world.

Currently, CIB member organisations include most of the major national building research institutes in the world, as well as many other types of organisations in the building and construction industry. While considerable attention is still given to technical topics, there are now also activities focused on topics such as organisation and management, economics of building, legal and procurement practices, architecture, urban planning and human aspects.

At present the CIB is the world’s foremost platform for international cooperation and information exchange in the area of building and construction research and innovation.

Recently, the CIB opened its Sub-Saharan regional office in Cape Town under the joint leadership of Prof Theo Haupt and Ferdinand Fester.

ISSMGE (International Society of Soil Mechanics and Geotechnical Engineering)
The ISSMGE is the pre-eminent professional body representing the interests and activities of engineers, academics and contractors all over the world who actively participate in geotechnical engineering.

The aim of the ISSMGE is the promotion of international cooperation amongst engineers and scientists for the advancement and dissemination of knowledge in the field of geotechnics, and its engineering and environmental applications.

The ISSMGE has 86 member societies worldwide representing 18 000 individual members. These include practising engineers, teachers, researchers, and equipment designers and manufacturers. The Society also has 23 corporate associates from industry.

The International Society is an affiliated member of the International Union of Geological Sciences (IUGS), which is itself a member of the International Council of Scientific Unions (ICSU).

Close relationships are maintained with ISSMGE sister societies, the International Society for Rock Mechanics (ISRM) and the International Association for Engineering Geology and the Environment (IAEG) via the Federation of the International Geo-engineering Societies (FedIGS).

CIOB (Chartered Institute of Building)
The CIOB is the world’s largest and most influential professional body for construction management and leadership. It has a Royal Charter to promote the science and practice of building and construction for the benefit of society, and has been doing that since 1834.

The CIOB accredits university degrees, educational courses and training, providing professional and vocational qualifications that are a mark of the highest levels of competence and professionalism, providing assurance to clients and other professionals who procure built environment assets.

CIOB members work worldwide in the development, conservation and improvement of the built environment.

CREDITS
We acknowledge with appreciation that some of the information in this article was taken from the websites of the various bodies discussed. Please see the contact details underneath each body for the relevant website address.
### Additional acronyms and abbreviations relevant to the engineering environment

(Also see pages 12 & 13)

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACSA</td>
<td>Airports Company South Africa</td>
</tr>
<tr>
<td>AsgiSA</td>
<td>Accelerated and shared growth initiative for South Africa</td>
</tr>
<tr>
<td>BBEEE</td>
<td>Broad-Based Black Economic Empowerment</td>
</tr>
<tr>
<td>BCEA</td>
<td>Basic Conditions of Employment Act</td>
</tr>
<tr>
<td>BEE</td>
<td>Black Economic Empowerment</td>
</tr>
<tr>
<td>CAD</td>
<td>Computer Aided Drawing</td>
</tr>
<tr>
<td>CHE</td>
<td>Council on Higher Education</td>
</tr>
<tr>
<td>CIDB</td>
<td>Construction Industry Development Board</td>
</tr>
<tr>
<td>CIETS</td>
<td>Construction Industry Education and Training Services</td>
</tr>
<tr>
<td>CMIP</td>
<td>Consolidated Municipal Infrastructure Programme</td>
</tr>
<tr>
<td>CPD</td>
<td>Continuing Professional Development</td>
</tr>
<tr>
<td>DEA</td>
<td>Department of Environmental Affairs</td>
</tr>
<tr>
<td>DoE</td>
<td>Department of Education</td>
</tr>
<tr>
<td>DoT</td>
<td>Department of Transport</td>
</tr>
<tr>
<td>DPLG</td>
<td>Department of Provincial and Local Government (now the Department of Cooperative Governance and Traditional Affairs)</td>
</tr>
<tr>
<td>DST</td>
<td>Department of Science and Technology</td>
</tr>
<tr>
<td>DTI</td>
<td>Department of Trade and Industry</td>
</tr>
<tr>
<td>DWA</td>
<td>Department of Water Affairs</td>
</tr>
<tr>
<td>EMF</td>
<td>Engineers Mobility Forum</td>
</tr>
<tr>
<td>ENERGYS</td>
<td>Engineers Now Ensuring Rollout by Growing Young Skills</td>
</tr>
<tr>
<td>EPWP</td>
<td>Expanded Public Works Programme</td>
</tr>
<tr>
<td>ESKOM</td>
<td>Electricity Supply Commission</td>
</tr>
<tr>
<td>ETQA</td>
<td>Education and Training Quality Assurance</td>
</tr>
<tr>
<td>FET</td>
<td>Further Education and Training</td>
</tr>
<tr>
<td>GCC</td>
<td>Government Certificate of Competence</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic Information Systems</td>
</tr>
<tr>
<td>HEQC</td>
<td>Higher Education Quality Committee</td>
</tr>
<tr>
<td>HSRC</td>
<td>Human Sciences Research Council</td>
</tr>
<tr>
<td>IAM</td>
<td>Infrastructure Asset Management</td>
</tr>
<tr>
<td>IDoEW</td>
<td>Identification of Engineering Work</td>
</tr>
<tr>
<td>IDP</td>
<td>Integrated Development Plan</td>
</tr>
<tr>
<td>IDZ</td>
<td>Industrial Development Zone</td>
</tr>
<tr>
<td>ITS</td>
<td>Intelligent Transport Systems</td>
</tr>
<tr>
<td>J IPSA</td>
<td>Joint Initiative for Priority Skills Acquisition</td>
</tr>
<tr>
<td>J RA</td>
<td>Johannesburg Roads Agency</td>
</tr>
<tr>
<td>LGSETA</td>
<td>Local Government Sector Education and Training Authority</td>
</tr>
<tr>
<td>MDG</td>
<td>Millennium Development Goals</td>
</tr>
<tr>
<td>MIG</td>
<td>Municipal Infrastructure Grant</td>
</tr>
<tr>
<td>MIU</td>
<td>Municipal Infrastructure Investment Unit</td>
</tr>
<tr>
<td>NABCAT</td>
<td>National Black Contractors and Allied Trades Forum</td>
</tr>
<tr>
<td>NEPAD</td>
<td>New Partnership for Africa’s Development</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Governmental Organisation</td>
</tr>
<tr>
<td>NPA</td>
<td>National Ports Authority</td>
</tr>
<tr>
<td>NQF</td>
<td>National Qualifications Framework</td>
</tr>
<tr>
<td>NSFAS</td>
<td>National Student Financial Aid Scheme</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operations and Maintenance</td>
</tr>
<tr>
<td>OHS</td>
<td>Occupational Health and Safety</td>
</tr>
<tr>
<td>PMSA</td>
<td>Project Management South Africa</td>
</tr>
<tr>
<td>PPP</td>
<td>Public Private Partnership</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>Research and Development</td>
</tr>
<tr>
<td>RDP</td>
<td>Reconstruction and Development Programme</td>
</tr>
<tr>
<td>SALGA</td>
<td>South African Local Government Association</td>
</tr>
<tr>
<td>SARTSM</td>
<td>South African Road Traffic Signs Manual</td>
</tr>
<tr>
<td>SAWIC</td>
<td>South African Women in Construction</td>
</tr>
<tr>
<td>SET</td>
<td>Science, Engineering and Technology</td>
</tr>
<tr>
<td>SETA</td>
<td>Sector Education and Training Authority</td>
</tr>
<tr>
<td>SMMEs</td>
<td>Small, Medium and Micro Enterprises</td>
</tr>
</tbody>
</table>
### Tertiary institutions where civil engineering can be studied

<table>
<thead>
<tr>
<th>INSTITUTION AND FACULTY</th>
<th>NAME OF DEPARTMENT</th>
<th>QUALIFICATIONS OFFERED</th>
<th>HEAD OF DEPARTMENT AND CONTACT DETAILS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EASTERN CAPE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Nelson Mandela Metropolitan University  
Faculty of Engineering, the Built Environment and Information Technology | Department of Civil Engineering  
North Campus | National Diploma in Civil Engineering  
B Tech Degree in:  
- Transportation Engineering  
- Urban Engineering | Mr Vincent Danoher  
T: 041 504 3077  
F: 041 504 3297  
E: vincent.danoher@nmmu.ac.za  
P: PO Box 77000, Port Elizabeth, 6031 |
| Walter Sisulu University  
Faculty of Science, Engineering and Technology  
Faculty Officer: Gwen Lindani  
T: 043 702 9257  
F: 043 702 9361  
E: glindani@wsu.ac.za | Department of Civil Engineering  
Buffalo City Campus, East London | National Diploma in Civil Engineering  
B Tech Degree in:  
- Transportation Engineering  
- Water Engineering | Mr Hatitye Pfende  
T: 043 702 9207  
F: 043 702 9320  
E: hpfende@wsu.ac.za  
P: PO Box 1421, East London, 5200 |
|  
Faculty Office:  
Mr Mbulelo Singata  
T: 047 401 6122  
E: msingata@wsu.ac.za | Department of Civil Engineering  
Ibika Campus, Butterworth | National Diploma in Civil Engineering | Mr Mbulelo Singata  
T: 047 401 6122  
E: msingata@wsu.ac.za  
P: Private Bag X3182, Butterworth, 4960 |
| **FREE STATE**          |                    |                         |                                        |
| Central University of Technology, Free State  
Faculty of Engineering and Information Technology | School of Civil Engineering and Built Environment  
Bloemfontein Campus | National Diploma in Civil Engineering  
B Tech Degree in selected sub-disciplines of Civil Engineering | Prof Yali Woyessa  
T: 051 507 3452  
F: 051 507 3254  
E: ywoyessa@cut.ac.za  
P: Private Bag X20539, Bloemfontein, 9300 |
| **GAUTENG**             |                    |                         |                                        |
| University of Pretoria  
Faculty of Engineering, Built Environment and Information Technology | Department of Civil Engineering | BEng (Civil)  
BEng (Hons) and M Eng in:  
- Geotechnical, Structural, Transportation, Water Resource Engineering  
- BSc (Hons) and MSc in: Applied Sciences  
PhD | Prof Elsabé Kearsley  
T: 012 420 2429  
F: 012 420 4722  
E: elsabe.kearsley@up.ac.za  
P: University of Pretoria, Pretoria, 0002 |
| Tshwane University of Technology  
Faculty of Engineering and the Built Environment | Department of Civil Engineering  
Arcadia Campus | National Diploma in Civil Engineering  
B Tech in seven sub-disciplines of Civil Engineering  
M Tech in Civil Engineering  
D Tech in Civil Engineering | Prof Julius Ndambuki  
T: 012 382 5225  
F: 012 382 5226  
E: ndambukijm@tut.ac.za  
P: Private Bag X680, Pretoria, 0001 |
<table>
<thead>
<tr>
<th>INSTITUTION AND FACULTY</th>
<th>NAME OF DEPARTMENT</th>
<th>QUALIFICATIONS OFFERED</th>
<th>HEAD OF DEPARTMENT AND CONTACT DETAILS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GAUTENG (continued)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| University of the Witwatersrand | School of Civil and Environmental Engineering | BSc Engineering (Civil) | Prof Mitchell Gohnert  
T: 011 717 7121 / 7125  
F: 011 717 7045  
E: mitchell.gohnert@wits.ac.za  
P: Private Bag 3, Wits, 2050 |
| Faculty of Engineering and the Built Environment | | | |
| University of Johannesburg | Department of Civil Engineering Science  
Auckland Park Kingsway Campus (APK) | B Ing (Civil Engineering) | Dr Felix Okonta  
T: 011 559 2342  
F: 011 559 2343  
E: fnokonta@uj.ac.za  
P: PO Box 524, Auckland Park, 2006 |
| Faculty of Engineering and the Built Environment | Department of Civil Engineering Technology  
Doomfontein Campus | National Diploma: Engineering: Civil  
B Tech Degree in:  
- Transportation Engineering  
- Water Engineering  
- Structural Engineering  
- Construction Management  
M Tech Degree in Civil Engineering Technology - full research option | Mr Jannes Bester  
T: 011 559 2104  
F: 011 559 6057  
E: jannesb@uj.ac.za  
P: PO Box 17011, Doornfontein, 2028 |
| University of South Africa (UNISA) | Department of Civil and Chemical Engineering | National Diploma in Civil Engineering  
B Tech Degree in:  
- Urban Engineering  
- Environmental Engineering  
- Water Engineering  
- Structural Engineering  
- Construction Management | Prof Linda Jewell  
T: 011 471 2791  
E: jewelll@unisa.ac.za  
P: Private Bag X6, Florida, 1710 |
| College of Science, Engineering and Technology | | | |
| Vaal University of Technology | Department of Civil Engineering and Building  
Vanderbijlpark Campus | National Diploma in Civil Engineering  
B Tech Degree in:  
- Transportation Engineering  
- Water Engineering  
- Structural Engineering  
- Urban Engineering  
M Tech in Civil Engineering  
D Tech in Civil Engineering | Prof George Ochieng  
T: 016 950 9420  
F: 016 950 9701  
E: george@vut.ac.za  
P: Private Bag X021, Vanderbijlpark, 1911 |
| Faculty of Engineering and Technology | | | |
| University of KwaZulu-Natal | School of Civil Engineering, Surveying and Construction | BSc Engineering (Civil) | Prof Cristina Trois  
T: 031 260 3065  
F: 031 260 1411  
E: troisc@ukzn.ac.za  
P: Centenary Building, Room 109  
University of KwaZulu-Natal  
Howard College Campus  
Durban, 4041 |
| Faculty of Engineering | Department of Civil Engineering and Surveying | National Diploma in Civil Engineering  
National Diploma in Surveying | Mr Jan van der Westhuizen  
T: 031 907 7223  
F: 031 907 7208  
E: jan@mut.ac.za  
P: PO Box 12363, Jacobs, 4026 |
### KWAZULU-NATAL (continued)

<table>
<thead>
<tr>
<th>INSTITUTION AND FACULTY</th>
<th>NAME OF DEPARTMENT</th>
<th>QUALIFICATIONS OFFERED</th>
<th>HEAD OF DEPARTMENT AND CONTACT DETAILS</th>
</tr>
</thead>
</table>
| Durban University of Technology | Department of Civil Engineering and Surveying | National Diploma in Civil Engineering  
National Diploma in Surveying | Mr Goolam Hoosen  
T: 031 373 2882  
F: 031 373 2816  
E: hoosen@dut.ac.za  
P: PO Box 1334, Durban, 4000 |
|  | Steve Biko Campus  
Durban | BTech Degree in:  
- Transportation Engineering  
- Water Engineering  
- Structural Engineering  
- Urban Engineering  
- Construction Engineering  
MTech in Civil Engineering  
DTech in Civil Engineering |  |
|  | Department of Civil Engineering  
Indumiso Campus  
Pietermaritzburg | National Diploma in Civil Engineering  
BTech Degree in:  
- Transportation Engineering  
- Water Engineering  
- Urban Engineering  
- Construction Management  
MTech in Civil Engineering  
DTech in Civil Engineering | Mr Tom McKune  
T: 033 845 8916  
F: 033 845 8941  
E: tom@dut.ac.za  
P: PO Box 101112, Scottsville, 3209 |

### WESTERN CAPE

<table>
<thead>
<tr>
<th>INSTITUTION AND FACULTY</th>
<th>NAME OF DEPARTMENT</th>
<th>QUALIFICATIONS OFFERED</th>
<th>HEAD OF DEPARTMENT AND CONTACT DETAILS</th>
</tr>
</thead>
</table>
| University of Cape Town | Department of Civil Engineering | BSc (Eng) in Civil Engineering | Prof Neil Armitage  
T: 021 650 2589  
F: 021 689 7471  
E: neil.armitage@uct.ac.za  
P: Private Bag X3, Rondebosch, 7701 |
|  | Department of Civil Engineering | BEng (Civil)  
MEng (Research) (Civil)  
MEng (Structural) (Civil)  
PhD (Civil Engineering) | Prof Gideon van Zijl  
T: 021 808 4436  
F: 021 808 4440  
E: gvanzijl@sun.ac.za  
P: Private Bag X1, Matieland, 7602 |
| Stellenbosch University | Department of Civil Engineering |  |  |
| Faculty of Engineering |  |  |  |
| Cape Peninsula University of Technology | Department of Civil Engineering and Surveying | National Diploma in Civil Engineering  
National Diploma in Surveying and Cartography  
BTech Degree in:  
- Transportation Engineering  
- Water Engineering  
- Urban Engineering  
- Construction Management  
MTech in Civil Engineering  
MTech in Cartography  
DTech in Civil Engineering | Ms Ashaadia Kamalie  
T: 021 959 6650  
F: 021 959 6660  
E: kamaliea@cput.ac.za  
P: PO Box 1906, Bellville, 7535 |
| Faculty of Engineering | Bellville Campus |  |  |

Check latest accreditation status on ECSA website: [www.ecsa.co.za](http://www.ecsa.co.za)
There is a saying that those who turn up will rule the world. Sustainability has become the modern buzzword, and we could be asking whether our civil engineering profession is in step. Is our profession leading the way in the rapidly changing world of today? The American Society of Civil Engineers (ASCE) has taken some bold steps to influence the future of their profession in terms of education and training, but where do we stand? Are we preparing our young people for a world that is, or for a world gone by? Has development overtaken our ways of teaching and education?

The annual Snape Memorial Lecture was instituted by the SAICE Western Cape Branch in 1953 as a tribute to the late Prof Alfred Snape. Prof Snape was appointed in 1910 to the Chair of Civil Engineering at the South African College, which at the time was the only institution in the country offering courses in engineering. He formulated the curriculum and for many years was the sole lecturer in the Department. The College became the University of Cape Town in 1918, after which it was able to confer degrees in its own right. Prof Snape continued in the chair until his death in 1946. Originally the memorial lectures were delivered by former students of Prof Snape, many of whom, including Dr Solly Morris, Ninham Shand, Prof Jere Jennings, Clifford Harris and Dr Henry Olivier rose to positions of prominence in the profession and were presidents of SAICE. In recent years, however, the field of invitees has been widened somewhat, with some lectures having been delivered by well-known engineers from other disciplines, as well as by Prof Snape’s grandson, David Potter, the founder of the giant Psion computer company. On 22 October this year, SAICE Honorary Fellow and former Executive Director of the Institution, Dawie Botha, delivered the 2014 lecture at the Athenaeum in Newlands, Cape Town.
ours was called Bloublasie (bluebottle), since it was blue with a white roof. I was amazed when I recently found many images of this car on the internet.

When I received this invitation, I immediately started thinking about what an appropriate subject would be to honour Prof Snape in the long line of these memorial lectures. My next step was to consult the World Wide Web, only to find that Prof Alfred Snape shares that space with a rather strange companion – the conjuring magician of Harry Potter fame.

But maybe that is not such a coincidence, since I believe that many of our educators indeed have to be magicians today to transform young people into engineering practitioners. The world that we now live in as civil engineering professionals is hugely different from the one that the older generations come from. A substantial number of current professionals, academics and mentors hail from those times, but they are constantly reminded that they should not harp on the past and not talk about the good old days, as things have changed! In South Africa there have indeed been a number of major shifts in modern times, probably the most unique of which was our democratic birth in 1994. It was like a rebirth – painful, exhilarating and challenging. This newborn baby is an unruly youngster now, and almost 21. However, in a presentation like this it is impossible to explore more than a couple of issues to try and make sense of those affecting us as a profession.

INSTANT ACCESS TO INFORMATION

It is also a mere 20 years or so since the advent of the cell phone, which many of us at the time scorned as being an earring for yuppies. We were, however, quite embarrassed when, at a SAICE meeting in 1995, Dr Bingle Kruger (at the time president of SAICE) quietly sat listening to us going on about this new fashion, and then took out his new cell phone and put it on the table. In today’s world many of our young people and students seem to have been born clutching a cell phone, and our older generations have inevitably followed the trend. Most of us, young and older, are now inseparable from our mobiles, and are often more interested in playing on our smartphones than socialising or listening to a lecturer. Hence, in the halls of education we now have severe challenges trying to hold students’ attention. But in the process we did catch up somewhat by introducing these smart technologies right into the classroom, with huge benefits that the students of yesteryear could not have imagined.

To have masses of data at one’s fingertips, and to be able to look up words and definitions and issues by merely touching a screen is indeed pure magic. The inherent dangers are, however, also present – in the wrong hands, and with the wrong attitude, all the data and information and connectivity in the world mean nothing when one is confronted with a unique situation which necessitates an approach based on tried and tested engineering logic. We can indeed flounder if we opt for easy-way-out solutions without thoroughly interrogating the alternatives. Could it be that the lure of Facebook and Twitter contributes to today’s prevalence of various forms of attention deficit syndrome, with resultant hasty decision-taking or jumping to the wrong conclusions?

Even in our profession the fixation with instant gratification and instant, real-time approaches – as often demanded by society and business – place a huge strain on the profession. Time is money and money is time, and in the workplace the imperatives are to get on with it or get left behind.

ARE WE GAINING OR LOSING?

Bob Pullen (SAICE 1989 president, and president of ECSA for a number of years) once observed that we might still become mere commodities to be bought or sold in a marketplace that cares little about anything other than a quick result obtained as cheaply as possible. Does that view actually mean that we are dying? Is this where we are heading? Do we buy and sell professionals at discount? Maybe yes. Do we now have shareholders rather looking at profits for consulting engineering firms than at the professional service that they are supposed to deliver? I do appreciate that money makes the world go round, and that profits and competition are not dirty words. But there is ample evidence that there are many employers who focus on the bottom line and billable hours to the extent that they have no empathy with the organised professions, even begrudging employees the opportunity to take part in the activities of their respective voluntary associations. This is, for example, evident in the fact that SAICE often struggles to get volunteers to serve in its structures. At the SAICE Council meeting on 16 October about a third of the members were absent. Were they busy, or would the boss not give time off?

The question is whether we are gaining or losing our profession and its legacy of excellence, humble service, pride and thoroughness, all in the name of so-called progress. Can we predict for sure that engineering solutions will not eventually come pre-packaged and standardised? We can see a little bit of this in the automotive industry when we look at standardised wind-tunnel designs dictating the shapes of Kia and Hyundai and BMW and Mercedes Benz and Audi – one now often has to look at the badge to identify the brand.

But is that necessarily a bad thing? How do we educate and mentor our young people in a world that demands discounts on professional fees, and where colleagues have to take shortcuts due to tendering and competition prerequisites? How do we get engineering capacity back into government and local authority structures, and entice young people to once more choose a career in that sector? It was interesting to hear at a meeting we (Manglin Pillay, CEO of SAICE, and I) had with Western Cape MEC Donald Grant and his staff that they are not able to attract experienced and/or young professionals to work for them.

EDUCATION ENVIRONMENT

But let us return to the education of engineers, and of engineering technologists and technicians. We simply cannot remain as we are – we have to change with the times. Novel ways have to be found without losing the essence of what we are aiming at, which should be a well-rounded sustainable profession, with insight, knowledge, understanding, respect and integrity – the same principles we aspired to 40 years ago. Some of us still remember those years as times when teachers were either heroes or people to be feared (respected), when reciting tables was the way to be drilled in adding and multiplying proficiency, and when ‘appropriately dressed’ meant no slip-slops.

My perception today, however, is that it is the teacher and the lecturer who have to adapt or die. And as such our profession will not necessarily be able to dictate changes, although we have a major role to play. How do we prepare students to face this new future in a world where many politicians and the general public have little or no appreciation for what value engineers add?
This is a world where the demise of the municipal engineer and the city engineer seems to be directly due to the modern perception that ANYONE can manage anything, and that a manager of infrastructure activities can be anyone who has one or other management qualification, or has attended some course. In meetings with SAICE, government departments have indicated that they are there to govern and that they did not need engineers. A previous minister of transport for example told us that there is no need to employ engineers in his department. In a second meeting some two years later, this very same minister asked SAICE to help him get engineers for his department. Needless to say, engineers who look at career paths and security in the workplace will not easily consider such offers which are subject to the political flavour of the day.

During that same session, an engineer from one of our sister disciplines asked us to help the department sort out the problem of different prices for roads across the country. This engineer did not even have the insight that a road in the sandy conditions of northern KwaZulu-Natal, where stone had to be transported for 60 kilometres to site, WILL be more expensive than a road in Gauteng where road-building materials are close at hand. One could question the education and training of this particular engineer. And about 12 years later that very same question was once more asked a month or so ago.

The downward spiral of poor service delivery continues and our rivers run polluted and spoilt. Traffic and commuting is a daily nightmare for millions, and rubbish and potholes have become commonplace. In some places the road signs that warn against potholes have been there so long that the steel is already rusting. The only relief is that in South Africa we are adept at making jokes about almost anything.

But are we unique in this situation? If one only reads the Cape Times and Beeld newspapers, and watches SABC-TV, one can be led to believe so. But those who read Time and get the ASCE newsletter every week, and sometimes visit overseas countries, and watch CNN and Sky News and the Dutch-Belgian BVN news will agree that there is a world out there with similar problems. I have served on the CECB (Committee on Engineering Capacity Building) of the WFEO (World Federation of Engineering Organisations) since its inception about 11 years ago, and that forum has taught us that the world is in trouble in terms of looking after its infrastructure and providing for its growing populations. The Japanese Institution of Civil Engineers, for example, conducted a survey of how society viewed the profession, and found that many young people think civil engineering is dirty, dangerous and underpaid. In a recent article Time used a novel way to express the quality of life for Americans, by showing how much time a person needs to travel to get to various destinations. The survey also showed that the average American citizen now lives no more than six minutes away from a polluted waterway or source. About ten years ago ASCE found that 500 major bridges in the USA had to be closed due to a lack of maintenance.

Did I come here to preach gloom and doom? Do we sit down and die? By no means! The engineering profession has gone far beyond its traditional ways to find solutions. In general engineers are problem solvers and philanthropists, but why do we have to defend our very existence, and why does society not always bring their side to grow the profession? We tend to walk a second and even a fifth mile, and are valuable volunteers in many places and organisations.

But let us move on.

To enable us to deal with the future we can with pride look back to those who established our profession. They were pioneers, innovators, adventurers and leaders who went out to make a difference – a long list of names could easily be compiled to illustrate this fact. And this is also where we can get some of our inspiration to remain on track as a profession. A certain Prof Sherbourne from Canada visited the University of the Witwatersrand in the mid-90s and addressed the final-year students about the world that they would soon be entering. Amongst other insights that he shared with the students, he predicted that they may not necessarily face a world of green fields any more, and that they should not frown upon the fact that maintenance and upgrading might form a bigger portion of engineers’ daily tasks than had previously been the case, although much still remained to be discovered and translated into products for everyday use.

In a water-scarce country like South Africa, the matter of sanitation remains a major challenge. It must be abundantly clear that we cannot go on building dams, pipelines, water works and reservoirs for water that will eventually be used to flush toilets, causing endless problems downstream. The Hartbeespoort Dam is, for example, severely polluted by Gauteng effluents containing anything from phosphates to hormones, floating rubbish and plastics. Engineering professionals are struggling to find solutions and have, amongst other solutions, proposed floating islands of plants that would assist with absorbing the nutrients – but what about hormones? Maybe we should start looking to the Scandinavian countries where Finland, for example, has a dry-toilet society. In Sweden there is an innovative on-site sanitation arrangement where toilets are fitted with a closed-loop system.
filled with oil. The human wastes, which are water-based, are fairly easily separated from the oil and then composted. Maybe our young people can be enticed to take this idea further and develop a South African system that would be using sustainable sunflower oil which can eventually be used as vehicle fuel when it cannot be filtered sufficiently any more.

How do we prepare our future engineers for all of this?

**INNOVATIVE TEACHING METHODS**

In the first place I believe that we will most probably become much more adept at using visual material to attract and retain the attention of learners and students. Jonas Tshikundamailema (current chairman of SAICE’s Project Management and Construction Division) recently mentioned to me that, in his lectures to technician students from deep-rural Limpopo, he has to make extensive use of pictures of graders, excavators and other pieces of equipment to ensure that they understand what he is talking about. We simply cannot any longer accept universal understanding of engineering concepts. Another example – recently a university lecturer mentioned to me that it had taken some innovation to explain inflation to his final-year engineering students.

The use of non-standard examples to get concepts understood could be a way to get the message across. I recently lectured at two Universities of Technology in the subjects of Construction Management and Documentation for a period of 18 months. At final-year level I found that the notes and the learning material in these universities were far from ideal. I was battling, for example, to get students to understand the difference between a design specification and a method specification. In the end I decided to take something from their immediate experience and environment to explain the concepts by instructing that they work together in groups to develop specifications for a mince *vetkoek*. Immediately a student stood up and asked me what a mince *vetkoek* had to do with engineering. I asked him to bear with me. When the groups presented their findings, I asked the class to give marks. A lively and quite humorous session followed and, in spite of some major errors, the students professed that they at last understood what I meant when I asked for a design specification for paint and a method specification for painting with that paint. The very same student who complained in the first place then had the courtesy to say that he now understood and that he would never forget the principles again.

Venturing into the world of measurement was less successful – when I asked them to estimate the volume of the lecture room I was told that it measured anything from 10 cubic centimetres to 10 cubic hectares. I gave up on that issue and advised that they download *Number Wise* to improve their maths. (This novel programme was developed in KwaZulu-Natal and is used quite successfully to bring first-year students from an extremely poor school standard to a numeracy level that will at least assist them to cope with lectures and learning material.)
I also experimented with humour in class and made extensive use of video clips to hold students’ attention and interest, and subsequently used the examples to pose questions. An appropriate video clip could be extremely useful in getting students to think about the real world of documents, specifications, way-leaves and other issues associated with a major project. When it comes to the motivation and orientation of engineering students, it is extremely important that one does not paint a too rosy picture and create perceptions that will be shattered sooner or later. In this instance humorous video clips are of great value.

GETTING ON WITH IT

We should wake up and seriously address the content of what we teach, since the environment that we live in demands it. And by this I do not at all believe that we should do away with the basics in terms of mathematics and science and engineering-related matters. In fact, we have to find ways to strengthen these issues, thereby effectively addressing the pre-university education standards. Getting back to tried and trusted methods will go a long way towards resolving the very poor outcomes which become poor inputs at university level. And at university and post-graduate level I feel that we can take a leaf from the ASCE book. They brought together a diverse team of civil engineering practitioners and debated the future. The result was their *Vision for Civil Engineering in 2025* and their *Body of Knowledge for the 21st Century*, which they are busy implementing so that the civil engineer of 2025 will be equipped to deal with our new role as ASCE sees it – custodians of the natural environment and its resources, and entrusted as such by society.

ASCE’s set of prerequisites/outcomes for graduates to become professional engineers can be summarised as follows:

- **Foundational outcomes** – mathematics, natural sciences, humanities, social sciences
- **Technical outcomes** – materials science, mechanics, experiments, problem-recognition and -solving, design, sustainability, contemporary issues and historical perspectives, risk and uncertainty, project management, breadth in civil engineering areas, technical specialisation, communication, public policy, business and public administration, globalisation
- **Professional outcomes** – leadership, teamwork, attitudes, lifelong learning, professional and ethical responsibility.

I strongly believe that ASCE is on the right track and that we should urgently adopt a similar approach in South Africa with its diverse needs and demands on our profession.

IN CONCLUSION

Those who turn up will rule the world. This is where the South African Institution of Civil Engineering, together with its units like the Western Cape Branch, is playing a leading role to ensure the sustainability of the profession by providing platforms and forums, and think tanks and opportunities to share information and exchange ideas, thereby constituting a home for all current and future members of the profession. But we cannot do it alone and in isolation – we have to reach out and go far beyond our self-imposed boundaries and borders, reaching out to all walks of life, and to workplaces in the private sector and the government alike.

The Chinese are said to have a curse that they wish upon their enemies: “May you live in interesting times”. I would like to turn that around by confirming that we are indeed living in interesting times, but that this is a blessing in disguise. Who would like to live in a boring place? No, rather give me the never-a-dull-moment scenario, which in any event is typical of our profession that never fails to pose new challenges.

Supermarkets have to shift around their merchandise to attract new interest. We are creating new merchandise every day in terms of the issues that we have to address, whether it be a Gautrain, refurbishing an old pump station or resurfacing a road in the middle of Cape Town – no two projects are alike. Also, in terms of our profession, we are so diverse that this in itself contributes to sustainability. We are a growing profession, and if we can succeed to penetrate the barriers into the political world like the Chinese and some other countries have done, then there is more success ahead.

John Brown, who was the first president of the Cape Society of Civil Engineers in 1903, and Prof Snape of the 1940s, would not recognise the world we live in today, and neither would our lecturers of the 1960s, but I believe that we owe them gratitude for laying the foundations that we can build on in terms of our education and orientation as civil engineering practitioners of 2014.

It is now our opportunity to turn up and rule under the beautiful southern skies. And, while the Southern Cross constellation seems to stay static, we cannot remain unchanged, because with or without us, planet earth is going where it wants to. *We have* to stand up and be counted. At the first ever UNESCO Africa Engineering Week (in Johannesburg, September 2014) Minister Naledi Pandor (Department of Science and Technology) urged us to tell our good-news stories, and improve throughput in the engineering pipeline – from cradle to professional. She quoted Intel, which has coined the slogan, “It is not what we make, it is what we make POSSIBLE”. She indicated that Intel has no factories in Africa purely because there are not enough engineers around in this part of the world. She appealed to us to transform curricula in such a manner that the humanities and the concept of social innovation are taken into consideration.

I leave you with a paraphrased version of what past President Thabo Mbeki said to us at the SAICE centenary celebrations in Camps Bay in 2003:

“You are the Leonardi da Vincis of the 21st century, but remember who you serve – not only the modern and emancipated society of today, but also those with the broken fingernails, those from the gutters of life, those who still aspire to become respected and well-to-do citizens.”

We can – thanks to individuals such as Prof Alfred Snape. —

The Chinese are said to have a curse that they wish upon their enemies: “May you live in interesting times”. I would like to turn that around by confirming that we are indeed living in interesting times, but that this is a blessing in disguise. Who would like to live in a boring place? No, rather give me the never-a-dull-moment scenario, which in any event is typical of our profession that never fails to pose new challenges.
BACKGROUND

B4Risk is a concept that describes the proactive measures an organisation should institute to mitigate the severity of an impact as a result of the risk that it realises. The underlying notion is that organisations are exposed to risks at every level – from strategic level risk, operational or technological risk, disaster risk emanating from natural hazards, to external risks such as global influences and of course the notorious ‘black swans’. This article introduces a conceptual risk mitigation model (B4Risk) centred round the well-known quote by Desiderius Erasmus: “Prevention is better than cure”. The variety of available risk assessment tools is such that there may be a number of tools potentially appropriate for a given circumstance, the choice of which to use has perhaps become more a matter of taste (Reniers et al 2005).

WHAT DOES THE CONCEPT OF B4Risk ENTAIL?

Traditional risk reduction models tend to focus on reactive measures as opposed to proactive measures. A case in point is the Chilean mine shaft collapse of 2010. On 5 August 2010 a gold and copper mine in Chile, near the northern city of Copiapó, caved in, trapping 33 miners in a chamber about 780 metres below the surface. Initially the miners attempted to escape through a ventilation shaft. However, the ladder was incomplete, leaving the miners at the mercy of emergency rescue efforts, which resulted in success only some two months after the shaft had collapsed.

Organisations of all types and sizes face internal and external factors and influences that create uncertainty around whether and when they will achieve their objectives. The effect of this uncertainty on an organisation’s objectives is defined as “risk” according to ISO 31000®. The definition of B4Risk comprises “proactive measures that are designed and implemented by an organisation commensurate with its activities, products and/or services through positive integration of globally accepted tools and processes to obviate or reduce the magnitude of risks, should they realise”. The diagram in Figure 1 was developed by Aurecon South Africa’s Risk Management professionals to depict the B4Risk concept. The B4Risk concept is illustrated as a pyramid with three legs that represent:
While it can be argued that many organisations develop and implement such 'solutions' for risk, the fact of the matter is that few organisations integrate them, which in effect creates silos diluting the synergy value. To illustrate this point, consider a hypothetical example in the South African context, of a transport organisation (referred to as Org-A) comprising rail services, that takes measures to reduce the potential impact and likelihood of risks. Org-A identifies a need to address HSEQ&A risks and therefore aligns itself with internationally recognised management systems such as BS OHSAS 180012, ISO 140013, ISO 90014 and ISO 550005, as well as local standard SANS 3000-16. Org-A decides to develop each management system as an independent project, which results in five stand-alone management systems achieving ISO/BS/SANS certification.

The acceptability of the above scenario would no doubt be supported by many readers, as Org-A can now boast that it is benchmarked against international and local standards. However, there is a disconnect here, in that management of risk is firstly managed in silos, with the added risk that impacts may be cross-cutting with no redundancy built into the 'solution', ultimately placing Org-A in a questionable position, given the resilience capacity of Org-A to proactively deal with risks that transcend multiple aspects within the organisation. To illustrate this, assume Org-A has a rail incident involving a locomotive derailing as a consequence of a collision with a maintenance crew. The impact of the collision causes fatalities, asset damage, release of diesel and the loss and contamination of the commodity that was being hauled. In this instance, Org-A has five separate emergency response procedures/protocols 7 to enable, since each management system has a specific emergency preparedness and response mechanism designed to handle either a quality impact, asset impact, environmental impact and/or health and safety impact. Because each management system was designed independently of the other systems, the execution of the emergency response procedures will inevitably happen in an uncoordinated manner.

It is such scenarios that emphasise the need to consider B4Risk solutions.

**SO HOW DOES B4Risk WORK?**

Figure 2 depicts B4Risk as a matrix based on a four-tier approach, commencing with defining the boundaries, establishing an integrated context moving through a consultative process to applying the integrated solution. The B4Risk matrix is further governed by a dual system of application vs checking. The rationale for the governing system ensures that measures are in place to achieve the centrally common principle of all the management systems, namely continual improvement.

Each of the B4Risk matrix steps involve solutions that can be tailored to an organi-
CONCLUDING REMARKS
Risk management, in the truest sense, encompasses an even greater paradigm shift from reactive measures than those which underpin the notion that ‘prevention is better than cure’ (Van Wyk & Joyce 2012). B4Risk is based on achieving a fundamental change in approach by proactively developing and implementing solutions, whether strategic, management system or risk driven. Ultimately, reducing the magnitude of a risk will rely on the mechanisms and resources that an organisation has put in place. Overwhelming evidence exists indicating that preventing incidents is best achieved by implementing a management system designed to control losses (Germain et al 1998). It stands to reason that integrating a solution, or solutions, into a practical mechanism can reduce the magnitude of a risk, as an organisation would be equipped far better than not having addressed such a risk ahead of its occurrence. B4Risk provides a proposed structured approach with a key focus on proactively developing and implementing measures to curb HSEQ&A risks.

NOTES
2. Occupational Health and Safety.
5. Asset Management.
7. As defined by each management system, noting that some management systems do not necessarily specify emergency contingencies, e.g. ISO 55000, Asset Management.

BIBLIOGRAPHY
A brief history of transport infrastructure in South Africa up to the end of the 20th century

Chapter 10: The dynamics of the South African transport infrastructure at the end of the 20th century

This is the final chapter in this very interesting series. The previous nine chapters appeared in the January/February – October 2014 editions of Civil Engineering. We would like to thank Dr Mitchell for sharing his extensive knowledge with us, and for the time he has spent preparing these enjoyable and informative articles.

LOOKING BACK

The first nine episodes in this series portrayed the history of the development of transport infrastructure in South Africa during past centuries up to the start of the 21st century. What were the dynamics of the South African transport system at the end of this period, some 200 years after the first appearance of ‘engineered’ elements in the system, i.e. what was its condition, and its ability to meet the demands imposed on it at the end of the 20th century?

At the start of the 21st century the infrastructure comprised the following:

■ A 750 000 km roads network (urban and rural) – administered by the three levels of government and the South African National Roads Agency – the tenth longest road network in the world, of which the greatest length, 590 000 km, comprises gravel roads in a generally poor condition.

■ A 20 000 km rail network (commuter and long-distance) – the general responsibility of the rail authority, then Spoornet.

■ Ten major airports – the responsibility of Airports Company South Africa and previously the Department of Transport.

■ A 3 900 km pipeline network – administered by Petronet.

■ Seven commercial ports – administered by the National Ports Authority, previously Portnet.

■ A variety of urban transport infrastructure facilities, primarily passenger transport modal-change infrastructure – administered by metropolitan councils.

However, of primary concern at that stage was the general inability of the system, with some exceptions, to meet the then current and future postulated traffic demands. Apart from national roads, pipeline infrastructure and the major airports, transport infrastructure in this country was in a state of decay and disintegration, with an inefficient long-distance rail system, unused rail branch lines, and a close-to-dangerous commuter rail system. Ports functioned inefficiently by world standards and imposed excessive...
costs on the carriage of sea freight. The metropolitan road network was unable to handle traffic demands during peak periods (and sometimes out of peak times) and the provincial rural road network was in dire straits. Added to this, much of the population had completely inadequate access to transport facilities, and the public transport system was highly inefficient and dysfunctional, depending primarily on the kombi taxi industry, to the extent of some 70% of commuter movements.

The adequacy or otherwise of a country's transport infrastructure plays a significant role in its social and economic development. Accessibility to facilities for rural communities is generally by roads of varying standards and levels of adequacy, and the extent of development of these communities is significantly affected by transport infrastructure provided. Conversely, for the business and industrial sector of the country, adequate mobility in moving its products plays a large role in the competitiveness of industry on the local and world markets. Whilst the precise linkages between transport infrastructure and development are still open to debate, there are some who suggest that good transport is second only to education in moving its products plays a large role in the competitiveness of industry on the local and world markets. Whilst the precise linkages between transport infrastructure and development are still open to debate, there are some who suggest that good transport is second only to education in the promotion of sectional interests.

In addition, and unfortunately, successive South African governments unashamedly used the provision, or non-provision, of transport infrastructure to promote particular policies or goals during the last half or more of the 20th century. Emphasis has varied over the years between promoting economic development or societal development, and promoting the interests of certain sectors of the population – using transport infrastructure as the mechanism to achieve the different aims. As an example, during the 1950s, with a new regime in power following the Second World War, the approach to transport infrastructure provision was inward looking and devoted to the promotion of sectional interests. Railway infrastructure provision was used to assist in the development of agriculture and deep rural areas (branch lines), as well as industry. Also, draconian regulations to regulate the movement of freight traffic on roads in order to benefit rail were in existence right up to the mid-1970s. Lastly, transport infrastructure was used in promoting separate development through the construction of an extensive system of commuter rail, and sometimes roads, serving 'separate development' living areas.

No coordinated, integrated or even rational approach to the provision of transport infrastructure was apparent – both between modes and between authorities. The general approach was mainly ad hoc responses to specific issues and political philosophy, and most definitely there was no overall transport infrastructure funding strategy in place.

**FORCES AT PLAY**

So then, what were the forces at play that brought about this generally (with some exceptions) parlous state of transport infrastructure at the turn of the 21st century?

In the case of roads, which only became a significant role player during the past 70 or so years, the primary cause of the situation was probably disinvestment in the road network, which started to occur during the early 1980s, and was made worse by rampant inflation in construction costs at the time. Investment, in real rand values, in the total provincial and national road network decreased from its peak in 1975 by some 40–50% two decades later, despite an annual growth in road usage of some 3–4% per annum during the same period. Also, expenditure on roads as a percentage of GDP has traditionally been well below the world average.

Whilst national roads were, to some extent, able to ‘fill the gap’ by resorting to loan financing redeemed by toll charges, provincial road authorities were not in as fortunate a position. The consequence was that capacity in the industry diminished and serious personnel shortages developed within the road authorities. A similar picture also pertained in respect of urban roads provided by local authorities.

To further worsen the situation, politics played its role. The four previous road authorities were reconstituted into nine authorities towards the end of the 20th century. Institutional fragmentation leading to loss of institutional memory, because of inadequate professional personnel resources, was a major cause of poor rural road infrastructure delivery. The multiplicity of road authorities, each with strong constitutional powers in respect of road provision, prevented central government from properly coordinating the provision of road infrastructure in the country. It is accepted that a coordinating mechanism of sorts did exist. In the absence of any powers to enforce coordination in financing, planning and delivery of roads, the Department of Transport was unable to fulfil one of the basic mandates of a central roads authority – overall road network planning and implementation.

The parlous situation in respect of the higher order roads in the network was increased by the fact that a great proportion of the population, namely rural dwellers, had very poor road access, and towards the end of the 20th century the already inadequate funds were largely diverted to providing roads to these communities, leaving the needs of the ‘economic development’ road arteries inadequately tended to. An additional burden on road funds during the second half of the 20th century was the necessity to provide road infrastructure to many ad hoc settlements and ‘separate development’ areas, which came into being without adequate coordination between land use and transport planning authorities.

**RAILWAYS, PORTS, PIPELINES AND AIRPORTS**

The need for coordination in the financing and planning of infrastructure is not only restricted to urban and rural roads, but also embraces rail infrastructure. Because the SAR&H/Transnet authority has traditionally not resorted under the Minister of Transport, coordination between the provision of road and rail infrastructure has been practically non-existent during the whole period since the time the four previous ‘states’ came together in 1910 to form the Union of South Africa. This issue was raised in both the 1976 and 1986 Transport White Papers, with a recommendation for an effective inter-modal coordinating mechanism to be put in place. Nothing significant had been achieved in this regard up to the turn of the 21st century.

The dynamics of rail infrastructure during the past 100 years has been a story of ‘rise and fall’. In the absence of navigable rivers in the country, rail played a significant role in opening up the country towards the end of the 19th and during the first part of the 20th centuries, as described in earlier episodes. However, this once ‘mighty’ element of South Africa’s
transport infrastructure has assumed a secondary role to roads for many reasons, including the absence of integrated transport infrastructure planning to meet needs in the most efficient way.

A further issue of great concern for the last third of the 20th century was the inadequacy of urban transport infrastructure to handle the large demands imposed upon it by peak hour commuter demands. The underutilised and dangerously run-down commuter rail system competed with bus and kombi taxis for patronage, in the absence of adequate and sufficient intermodal transfer facilities. Only at the end of the period under review, and after fifteen or so years of encouragement, had one metropolitan authority constituted a Metropolitan Transport Authority to address the public transport issues. However, to be fair to the metropolitan authorities, government’s failure to provide anywhere near the recommended financial support proposed by the Driessen Committee of Enquiry into Urban Transport Facilities some 30 years earlier, has not motivated them to act in this regard.

Turning to sea travel, ports infrastructure was not that much better at the end of the century. Whilst attention had been devoted to the development of new ports, the efficiency of the new and existing ports in handling traffic demands was not good enough. Durban, the major port on the African continent regularly had up to 20 ships anchored at sea outside the harbour, waiting to be off loaded and loaded.

Two success stories, however, were the development of pipeline infrastructure and airports. These forms of transport for people and goods only became relevant towards the end of the 300-year period under review. On the whole they have managed to meet the demands imposed on them.

DEFINING INFRASTRUCTURE NEEDS
An issue in the provision of transport infrastructure during the past has been the failure to maintain and develop the total transport infrastructure system in terms of real, identified needs, and not based on political imperatives. A fundamental consideration in reviewing the policy on transport infrastructure for any country is its appropriate size. This requires an answer to the question of how much infrastructure, and what type of infrastructure, a country needs. No studies of this nature were carried out during the entire period.

That while a real need existed for the proper definition of national transport infrastructure networks, linked to local economic activity and demographics, and also to the broader southern African networks. It is generally agreed that cost-benefit analysis — which has traditionally been used to prioritise infrastructure provision — was not sufficient on its own for infrastructure project prioritisation under South African socio-economic conditions. A policy was needed for the development and maintenance of more appropriate decision support systems for transport planning, which included multiple-criteria decision-making techniques. There was also a need to integrate transport planning with more general economic planning, e.g. through the establishment of activity corridors, both rural and urban. This has been recognised by transport planners for the past 40 or so years, but the inability of the relevant institutions to coordinate their efforts hindered the development of effective transport infrastructure during the period under review.

Past laws relating to group area influx control and homelands had a marked impact on the pattern of land uses in South Africa’s towns and cities, and indeed the whole process and pattern of urbanisation, imposing particularly high demands on the provision of road infrastructure along the main routes of oscillating migration, and the provision of rail or road infrastructure along long-distance commuter routes. In response to these demands, transport planning was highly accommodative or ‘reactive’, leading to the reinforcement of dispersed settlement and land use patterns. The issue here was the need to finance and prioritise transport infrastructure development in terms of the broad socio-economic goals of the country, rather than the disparate planning for road and rail infrastructure which pertained.

MOVING INTO THE 21ST CENTURY
It is not possible to achieve adequate transport infrastructure without appropriate funding sources. Funding levels up to the end of the 20th century were inadequate for new infrastructure, covering the whole spectrum of infrastructure from national to local level, the main-
WITH THE CONTINUED huge under-recovery in revenue by SANRAL (South African National Roads Agency), and the Gauteng Provincial Commission into the impact that e-tolls would have if people were paying them, surely it is time to reconsider the current approach to improving our transport system.

In this debate the one over-riding thing that needs to be remembered is that, since the roads are already built, it is the consumer that will end up paying for them, either directly through tolls or indirectly through taxes. In other words, whether the money comes out of your left pocket as a toll or your right pocket as part of general taxes (VAT, income tax, etc), it is still out of your pocket.

So why has South Africa got to this point and how can it move forward?

According to Emeritus Professor Tony Ridley (Transport Engineering, Imperial College London), the definition of transport is the movement of people and goods. The efficiency of a transport corridor is therefore measured by the cost of moving people and goods along that corridor, not by the method of moving them.

To illustrate the point of efficiency one only needs to consider the differences between the N1 and the Soweto Highway. In 2001, the N1 between Pretoria and Johannesburg was carrying 198 000 people in 180 000 vehicles (1.1 persons per vehicle). In contrast, the Soweto Highway was carrying 420 000 people per day in 70 000 vehicles (6 persons per vehicle). In terms of efficient use of infrastructure and vehicles (both of them constitute the cost of transport) the Soweto Highway was highly efficient and the N1 (at then three lanes) highly inefficient. It is argued that this difference in efficiency is a reflection of different world views.
To understand the world view, all that is required is to step out of a private vehicle and try walking anywhere, particularly in the newer, higher-income areas of Randburg, Sandton, Midrand, Centurion and the eastern suburbs of Tshwane. It will rapidly be found that there are no sidewalks, and where they do exist they are often used as parking lots by car drivers, and if they are dug up they are not reinstated (unlike roads). Also, trying to cross major intersections, such as Grayston and Rivonia in Sandton, is highly dangerous, even for the able-bodied pedestrian. Throw in any disability, such as partial-sightedness or a weak heart that slows a person down, and they become a complete barrier to movement.

as the users of the Soweto Highway were prepared to share cars and use minibus taxis, buses, etc, whilst the majority of users on the N1 were not.

Since it is the number of vehicles on the N1 that are causing the problem and not the number of people, the first question that should have been asked is what is causing that world view which leads to a highly inefficient use of infrastructure, and why is it being perpetuated in the Gauteng Freeway Improvement Project (GFIP)?

To understand the world view, all that is required is to step out of a private vehicle and try walking anywhere, particularly in the newer, higher-income areas of Randburg, Sandton, Midrand, Centurion and the eastern suburbs of Tshwane. It will rapidly be found that there are no sidewalks, and where they do exist they are often used as parking lots by car drivers, and if they are dug up they are not reinstated (unlike roads). Also, trying to cross major intersections, such as Grayston and Rivonia in Sandton, is highly dangerous, even for the able-bodied pedestrian. Throw in any disability, such as partial-sightedness or a weak heart that slows a person down, and they become a complete barrier to movement.

Since Section 9 of the Constitution sets out the rights of everyone to be treated equally, the pedestrian should have the same freedom of movement as a car driver and be provided for in an equal manner. The design of the infrastructure on the road reserves shows this to be patently untrue, and one can only come to the conclusion that Gauteng’s transport system has been designed from the world view of the driver of a single-occupancy car. It is this view that has been taken over into the design of the GFIP.

An examination of the arguments put forward by SANRAL and many of the opponents of the GFIP shows how both sides are in fact arguing for a continuation of the present situation, which favours themselves, rather than looking at the development of an integrated transport system that will benefit everyone equally in South Africa.

The argument that the user should pay for roads, is in fact very sound from an economic perspective, especially if the objective is to make the most efficient use of the road infrastructure and vehicles. If this had been the objective of SANRAL, then
Gauteng might have seen a very different project, which concentrated more on changing behaviour and integrating the different modes of transport, rather than building additional road space, which is then used inefficiently by single-occupancy cars.

However, the reality has been a project that simply perpetuates the current situation, and the arguments for and against e-tolling simply seek to maintain that situation.

Taking the N1 between Pretoria and Johannesburg as an example, the question needs to be asked who has it been widened for, and if that group can be identified, shouldn’t they be the ones paying for it? It is fairly clear that this stretch of the N1, which was already being used extremely inefficiently in terms of the number of people it carried, was widened to cater for the peak 2.5 hours in the morning from Pretoria to Johannesburg and the peak 2.5 hours in the evening from Johannesburg to Pretoria. The rest of the time the existing three lanes would have sufficed. So essentially each carriageway has been widened to carry a 2.5 hour peak for five days a week and probably for 11 months of the year. Since this widening has only been necessitated due to the refusal of motorists on the N1 to share cars, they should have borne the full cost of the improvements, essentially implementing the ‘user pay’ principle.

However, the structure of the tariffs does not reflect this. The roads are tolled at all hours and do not reflect the tidal flow of traffic. This essentially means that the Pretoria–Johannesburg commuters are being subsidised. The discounts for high use and capping further negate the principle of ‘user pay’ and the tariff structure simply encourages the existing behaviour patterns.

The arguments by opponents of e-tolls that the fuel levy should be used to pay for the improvements to the freeway are in fact presenting the same argument as SANRAL, as presented through the tariff structure, that the behaviour of a few should be subsidised by many. This is further heightened by OUTA’s (Opposition to Urban Tolling Alliance) insistence that public transport vehicles such as minibus taxis, which use road space highly efficiently, should pay the same toll as car drivers. Also very telling is the argument that motorists cannot afford to pay the tolls. In three years the price of fuel has doubled. If the e-tolls were that unaffordable it should have seen a reduction in the number of vehicles, or a change to cheaper-run vehicles, but neither seems to have occurred on the N1 where single-occupancy and expensive cars are still the order of the day.

When should tolls be imposed then? It seems accepted practice in rural areas that a two-lane tarred road, with no reasonable alternative, should not be subject to the ‘user pay’ principle. If this was not the case, the N7 (currently being repaired and widened) and the R384 (currently being tarred between Vosburg and Carnarvon) in the Northern Cape would become too expensive to use, as the usage is so low.

So what are the criteria in urban areas? Here there does not seem to be any consistent approach, as tolls have been imposed in certain areas where no improvements were made (N1 at Ennerdale – two lanes in both directions), whereas the N1 between Johannesburg and Pretoria was widened to three lanes (in both directions) in the same period, but remained un-tolled.

However, there must be a point when a road is no longer a basic service, and the efficiency of its use must be considered before further improvements are made funded from the tax base. The N1, which already had three lanes, meets that definition, and therefore it is not unreasonable to expect users to either change their behaviour, pay for the improvements or suffer the consequences of their decision not to share, and then sit in a traffic jam.

If the objective, therefore, had been to make the most efficient use of the road infrastructure by decreasing the number of vehicles and increasing the number of occupants per car, then it follows that a congestion charge should have been introduced first to change motorists’ behaviour. The money raised could have been used to construct parking facilities along the freeway that would enable motorists from different suburbs, but travelling to the same destination, to easily meet and share, and thus take a gradual approach to changing the current mindsets.

A congestion charge would have had numerous other benefits as well:

- Firstly, it could have been introduced gradually and set at the point where it influenced behaviour, rather than recovery of costs for new infrastructure. A gradual introduction would also have influenced spatial development patterns, as the high cost of low-density development would become unviable because the costs would no longer be externalised to others.
- Secondly, it only needs to be charged at one point and in one direction where there is a pronounced tidal flow of traffic. On the N1 this could have been for example at Samrand and at the on-ramps at Olifantsfontein, New Road and Allendale. The return trip at night would not be tolled, as the purpose of removing cars off the road had already been achieved. With only one tolling point required it could have been boom-controlled rather than open tolling, thus overcoming the problem of motorists using the road and not paying.
- Thirdly, by removing cars off the freeway it no longer becomes necessary to widen access roads into places such as Sandton, as the cars will no longer be there.

What has also been telling, has been the response to the non-payment of tolls by the proponents of the system. Why has no-one advocated taking a stretch of freeway, switching off the gantries and putting in place concrete barriers to reduce the freeway back to the original number of lanes? If there is no outcry it would demonstrate that SANRAL had completely misjudged the willingness of motorists to sit in a traffic jam rather than paying to use the roads, or if there is an outcry it would be very telling as to who the outcry is coming from and who needs the widened roads. The fact that the proponents of e-tolls insist on the current e-toll or nothing strongly suggests that they want a system that coincides with the world view of a person in a single-occupancy car, who has no regard for anyone who does not hold this privileged position.

So what is the way forward? Gauteng needs to develop a long-term vision for an integrated transport system, and it needs to be developed by people who truly understand what this means. Since the GFIP, the Gautrain, the Rea Vaya and many of the new commercial and housing developments are at odds with the requirements of an integrated transport system, and with the aims of South Africa as a developmental state and with the Constitution, it will need a completely fresh set of faces.

To illustrate what a long-term approach means, nothing highlights it better than the reaction of a consultant from Hong Kong who was taken through the Noord Street taxi rank. Instead of freaking out at the seeming chaos surrounding him, he simply said, in a very upper-class British accent, “It reminds me of Hong Kong in the 1950s”. No, South Africa is not unique. Others have been there previously and one only needs to visit Hong Kong now to see how a long-term plan for an integrated transport system has come to fruition.

When will Gauteng start?
INTRODUCTION

In this article reference will generally be made to the provisions of the FIDIC Red Book 1999 (FIDIC) and the SAICE GCC 2010 (GCC) standard form conditions of contract.

It was stated in the introductory article on DBs, that the DB is a creature of contract. Accordingly the contract includes the provisions which govern also the formal referral of disputes, hearings and DB decisions and also the employer’s and contractor’s obligations in this regard. The relevant Conditions of Contract clauses, Dispute Adjudication Agreement (CGDAA), Procedural Rules (PR) and Adjudication Board Rules (ABR) are stated in Part 1 on the operation of the DB.

The article will focus on standing DBs rather than ad hoc DBs as ad hoc DBs are akin to adjudication and therefore do not have the advantages and distinguishing features of standing DBs. Also, the international trends in connection with DBs are to specify standing DBs.

DISPUTE BOARD POWERS

As stated above, the DB derives its jurisdiction and powers from the contract. The FIDIC Red Book 1999 empowers the DB, among other things, to:

- Establish the procedure to be applied in deciding a dispute.
- Decide upon the DB’s own jurisdiction, and as to the scope of any dispute referred to it.
- Conduct any hearing as it thinks fit, not being bound by any rules or procedures other than those contained in the contract and the rules.
- Take the initiative in ascertaining the facts and matters required for a decision.
Make use of its own specialist knowledge, if any.

Decide upon the payment of financing charges in accordance with the contract.

Decide upon any provisional relief, such as interim or conservatory measures.

Open up, review and revise any certificate, decision, determination, instruction, opinion or valuation of the engineer, relevant to the dispute. The GCC 2010 bestows similar powers on the DB, while generally being more specific, but also includes powers for the DB to:

- Request and stipulate the format, the dates for submissions of and responses to disputes.
- Be more specific as to how the DB may go about ascertaining the facts.
- Set, revise and extend time periods for any act required by the parties during the proceedings.
- In the case of an ad hoc DB, wherever possible, reach its decision without conducting a hearing.
- Obtain legal or other technical advice, having first notified the parties of its intention.
- Correct a decision in order to remove any clerical mistake, error or ambiguity on its own initiative, or at the request of either of the parties.
- Settle any dispute regarding the Adjudication Board Member Agreement.
- Proceed ex parte.

The DB is also empowered to provide informal advice and opinions if requested by both parties to do so. These provisions and the role of the DB in this regard will be dealt with in detail in future articles.

It is possible to structure DB arrangements such that the DB can also act on disputes between the main contractor and subcontractors, in particular when such disputes may ultimately result in a dispute between the employer and the contractor.

**FORMAL REFERRAL OF DISPUTES**

**Contract provisions**

Under FIDIC a dispute “of any kind whatsoever” between the parties may be referred to the DB. Such disputes may relate to determinations of claims by the engineer or to any certificate, instruction, opinion, valuation or other determination of the engineer.

Under the GCC the process is initiated by the delivery of a “Dispute Notice” of “any dispute arising out of or in connection with the Contract”. The GCC 2010 Guide states that a Dispute Notice may be delivered for any such dispute, and only a dispute on whether there was ever a contract is excluded. A number of provisions (Clause 10.3) apply.

Accordingly both FIDIC and the GCC provisions allow any dispute (in connection with the contract) to be referred (subject mainly to process limitations), i.e. the disputes are not limited to those that arise from a disagreement with the engineer’s determination regarding a claim for additional payment or extension of time, brought through the claims process.

FIDIC and the GCC do not define a “dispute”. The FIDIC Guide suggests that a matter may be said to have developed into a dispute:

- after rejection of a final determination,
- when discussions have been discontinued without agreement on the matter,
- when a party declines to participate in discussions or to reach agreement (for claims, under Sub-Clause 3.5),
- when so little progress is being achieved during protracted discussions that it has become clear that agreement is unlikely to be achieved.

GCC 2010 Guide states that, to constitute a dispute, there must be a claim (in a generic sense) and a rejection of such claim. This is important, because a claim by one party that the other has no knowledge of is not formally a dispute.

It is also important for the dispute to have “crystallised” and the key issues in dispute clearly identified before referring it to the DB. Failing to do so may result in:

- a referral of a matter which could have been resolved by the parties, or
- spending valuable and expensive DB time in order to identify the issues in dispute, before it is possible to progress with resolving the matter.

The GCC provides for a “Dispute Notice” to be delivered (within 28 days of the event giving rise to the dispute) in the first instance, failing which the parties shall have no further right to dispute the matter. The FIDIC Red Book 1999 does not include such a provision, whereas the FIDIC Gold Book 2008 does.

**Dispute referral**

Either party may refer a dispute to the DB. The referral must be in writing, state that it is given pursuant to the relevant clause in the contract, and be copied to the other party and the engineer.

The DB should review the referral in terms of scope and complexity and consider matters such as whether:

- it possesses the specialised knowledge necessary in order to decide the matter,
- it can decide on the basis of its own knowledge of the contract and on the document exchanges,
- it is in possession of sufficient facts in order to make its decision,
- it would require factual and/or expert witness evidence (it may request “hot tubbing” of experts where conclusions or opinions reached are in conflict),
- it admits evidence statements (and to what extent) without the opportunity to hear and question witnesses,
- a hearing would be required,
- one or two submission exchanges would be required.

Following such considerations the DB should establish the timetable and give directions as may be necessary. For good order the DB chair should confirm the date of receipt of the reference.

**Establishing the timeline**

In FIDIC contracts the procedure has to be accommodated within 84 days of receipt of the reference.

A fair amount has to be accomplished in this period. The DB must determine a timeline that will allow:

1. at least one...
To ensure their availability, it would be prudent to warn the DB of an impending referral to assist members to plan their future activities. Although the members are the servants of the parties and have committed to be available, it is nonetheless a good idea to forewarn and so allow advance planning.

In order to focus the parties in their submissions, it is prudent for the contract to contain minimum requirements for submissions.

exchange (possibly two) of position papers, (2) the time required to request further information if necessary, (3) to conduct the oral hearing, and (4) to write and notify its decision.

The GCC requires that the DB’s decision shall be delivered within 28 days of the submission of the last document on the matter or the conclusion of the hearing. This is a more pragmatic arrangement, as the DB does not have full control over the timetable, and it would be wary of preventing a party from making reasonable submissions, lest it transgresses the rules of natural justice.

**Nature of position papers**

Other than what has been stated above, FIDIC and the GCC do not prescribe what the reference should contain. They provide that the parties shall make available to the DB all such additional information, further access to the site and appropriate facilities, as the DB may require. The referring party’s position paper should include as a minimum:

- A clear and concise description of each of the issues in dispute submitted to the DB for a decision.
- Identification of the relevant items that are not in dispute.
- A fully argued and reasoned statement of the referring party’s position on each issue in dispute.
- The allegations of fact on which the party relies.
- The contentions of contract and/or law on which the party relies.
- The relief sought under the contract (money/extension of time).
- Any other support for the referring party’s position, such as documents, drawings, schedules and correspondence (including, where applicable, a copy of the relevant certificate, determination, instruction, opinion or valuation of the engineer).

- A statement of what the referring party requests the DB to determine on each issue in dispute.

The responding party’s position paper should follow the same structure, dealing also with the matters raised by the referring party.

However, the position papers should not attempt to be legal pleadings and should avoid the “attack-defence” routine, which inevitably leads to confrontation and can result in the real issues in dispute being lost in procedural skirmishes.

Given the limited time available, the presentation of the documents and arguments should be made in a clear and logical format. It should ideally outline all aspects of the dispute without further explanation. The use of a common bundle of supporting documents, agreed by the parties, is also recommended.

**Good practice**

To ensure their availability, it would be prudent to warn the DB of an impending referral to assist members to plan their future activities. Although the members are the servants of the parties and have committed to be available, it is nonetheless a good idea to forewarn and so allow advance planning.

In order to focus the parties in their submissions, it is prudent for the contract to contain minimum requirements for submissions (see suggested content above).

It is not uncommon for parties to refer matters of principle and, on receipt of the DB decision, to aim to agree the quantum among them in the first instance.

Parties should avoid referring matters of procedure if at all possible. Such matters could be dispensed with by informal advice or an opinion. Issues of procedure which could bar a claim could also be dealt with as a motion in limine.

**HEARINGS**

It is reasonable to expect that most hearings will be undertaken during normal site visits. However, cases may arise when extended hearings or additional visits are required.

**Contract provisions**

FIDIC empowers the DB to conduct a hearing on the dispute, in which event it will decide on the date and place for the hearing and may request that written documentation and arguments from the parties be presented to it prior to or at the hearing.

The GCC provides that the DB conducts hearings at dates and venues as agreed with the parties and empowers it to follow procedures for such hearings as it sees fit.

**Prehearing requirements**

The DB should circulate an agenda for the hearing. This is usually done by the chair.

When deciding on a hearing location must be considered.

The parties should be asked for a suitable venue, but if they fail to agree the DB will decide.

The DB should require the exchange of written submissions.

that set out their positions and respond to the positions of the other party, prior to the hearing. It should also require that the parties comply with the procedural timetable.

**Site visit before the hearing**

The DB may require a prehearing site visit if, for example:

- physical conditions are the cause of the dispute,
alleged defective workmanship is the cause of the dispute.
FIDIC empowers the DB to also instruct conservatory measures. However, a standing DB is likely to be familiar with the site, unless it has not visited for some time.

Attendees
The DB may decide to limit the persons attending the hearing or require that oral presentations be made by persons familiar with or resident at the site. Some agreements limit the presence or role of lawyers and third-party experts at the hearing.

Conduct of the hearing
The DB may have issued directions for the hearing. These might include confirmation of who will attend, opening statements, timing of presentations, number of witnesses, etc. Directions are issued in order to assist the parties, and it follows they must be issued in time for the parties to respond to them.

A hearing before a DB is far less formal than an arbitration hearing or an action in court. Witnesses of fact may be called, but “cross-examination” would generally be through the DB.

The DB has discretion to proceed in the absence of any party who the DB is satisfied received notice of the hearing.

Conclusion of the hearing
The DB declares the hearing closed when it has received and understood all written submissions and is satisfied that it is in possession of sufficient factual and expert evidence (as may be required). The DB may on occasion require post-hearing submissions. Following the hearing, the DB retires to write its decision.

DISPUTE BOARD DECISIONS

Contract provisions
FIDIC requires that the decision of the DB be reasoned, and state that it is given under Sub-Clause 20.4. It also provides that the DB shall endeavour to reach a unanimous decision, failing which the decision shall be that of the majority, and that the DB may include a report of the minority member.

The GCC requires that the decision be in writing, and the facts and the provisions of the contract on which the decision is based are set out simultaneously with its publication. It also provides that the DB shall endeavour to reach a unanimous decision, failing which the decision shall be that of the majority and that the DB shall include a report of the minority member.

Unless the parties have agreed otherwise, they have not empowered to the DB to disregard any provision of the contract and make a decision on principles of fairness and equity alone. On the contrary, they have agreed to give effect to the DB's decision complying with the terms of the contract.

Elements of a decision
A DB decision should contain at least the following elements:
- Cover page with the names of the contract, the parties and the DB members.
- Contents page.
- An introductory section setting out the generalities of the contract, the names of the parties and the engineer.
- A statement establishing the DB's jurisdiction.
- A description of the issues in dispute and the background.
- The decisions requested by the parties.

The hearing – attendance, witnesses, questions and responses, as may be relevant.
- The referring party's position as to allegations of fact and contentions of contract/law.
- The responding party's position as to allegations of fact and contentions of contract/law.
- The DB's analysis and findings.
- The DB's decision on each of the issues in dispute.
- DB member signatures.
- Annexures containing a listing of the submissions and documents provided by the parties, key events/communications in the process from referral of the dispute to publication of the decision, hearing agenda (if any), the process timeline identifying original and adjusted (if any) dates, and minor member report in the event that the DB's decision is not unanimous.

Tasks may be assigned by the chair to specific DB members relative to their experience.

The DB may suggest that a number of interim decisions or a decision-in-parts may best serve the situation where complex issues may be interdependent.

Dissatisfaction with DB decision
FIDIC provides that if the DB has given its decision and no notice of dissatisfaction has been given by either party within 28 days after it had received the DB's decision, then the decision shall become final and binding upon both parties.

The GCC provides that if a party does not dispute the DB decision between 28 and 56 days from its receipt, it shall have no further right to refer such dispute to arbitration or court proceedings (whichever is applicable in terms of the contract).

The contractor is obliged to proceed with the works in accordance with the contract, irrespective of whether it agrees or not with the decision of the DB.

ENFORCEMENT OF DISPUTE BOARD DECISIONS

FIDIC provides that the DB decision shall be binding on both parties, who shall promptly give effect to it unless and until it shall be revised in an amicable settlement or an arbitral award.

Similarly the GCC provides that the DB decision shall be binding on both parties unless and until it is revised by an arbitration award or court judgement (whichever is applicable in terms of the contract).

DB decisions are immediately binding on the employer and the contractor, and they shall promptly comply with decisions.

Success in enforcing a DB decision may depend on the substantive law of the contract. However, the final authority will give significant weight to the fact that the parties have freely entered into a contract setting out the powers of the DB. In the majority of cases DB decisions have been upheld by the judicial authority.

In order for a DB to ensure it has the authority to make the decision in the first place, and to ensure its decision is enforceable, it would be well advised to consider such matters as:
- Did the DB have jurisdiction to issue the decision?
- Was the DB validly appointed?
- Were the tripartite agreements completed such that the DB was constituted?
- Was a dispute validly referred?
- Did the DB answer the particular dispute referred, and not something else?
- Did the DB answer all of the matters in dispute?
Was the DB’s decision adequately reasoned?
Were the rules of procedural fairness or natural justice complied with?
Was the decision delivered within the timetable, etc?

In South Africa the courts have not hesitated to enforce DB decisions18.
A case that has put the FIDIC provisions for enforcing DB decisions under the spotlight is that of CRW Joint Operation v PT Perusahaan Gas Negara (Persero) TBK (PGN). Following PGN’s failure to give effect to a DB decision, the matter was referred to arbitration in 2009 and, following a series of legal gymnastics, the Singapore High Court in its 2014 ruling upheld an arbitral interim award, i.e. effectively enforcing the DB’s decision.

NOTES
1. A generic term denoting various types of dispute boards.
2. DB Operation, Part 1 – appointment of the DB members, composition of the DB, its powers, remuneration and termination.
3. DB Operation, Part 2 – the site visits, site visit meetings and reports and activities between site visits.
7. The FIDIC Red Book refers to a Dispute Adjudication Board and GCC 2010 to an Adjudication Board. The generic term Dispute Boards (DB) will be used for ease of reference.
10. A DB which is only called on when a dispute has arisen and the matter is to be referred to adjudication. The ad hoc DB may be appointed at the outset or once the dispute has arisen, subject to the provisions of the relevant contract.
12. To act fairly in carrying out the decision-making process. In short, giving each party the opportunity to state its case (audi alteram partem – “hear the other side”), no one should be a judge in his own case and justice must be seen to be done.
15. To include matters such as response to the referral, exchanges of documents, any site visits and information submissions, hearings, attendance, witnesses, opening statements and decision period.
16. Initially; at the very outset.
17. The expenses for these particular visits will not be specifically accounted for in the routine payments made to members under their individual tripartite agreements. Whenever a dispute is referred to the DB the parties may be requested to provide a security of expenses which members may reasonably be expected to incur during site visits and hearings.
18. See Esor Africa (Pty) Ltd / Franki Africa (Pty) Ltd Joint Venture v Bombela Civils Joint Venture (Pty) Ltd; Stefanutti Stocks (Pty) Ltd v S8 Property (Pty) Ltd; Tubular Holdings (Pty) Ltd v DBT Technologies (Pty) Ltd.

REFERENCES
International Federation of Consulting Engineers (FIDIC) 1999. Conditions of Contract for Construction. Lausanne: FIDIC.
South African Institution of Civil Engineering (SAICE) 2010. General Conditions of Contract for construction works. 2nd Ed. Midrand: SAICE.
The fast track to road safety
Dow demonstrates why waterborne binder paints are the best for road markings

DOW COATING MATERIALS is excited to bring their FASTRACK™ technology to the attention of road traffic authorities to ensure road safety in South Africa.

FASTRACK™ waterborne binders combine a durable acrylic backbone with a patented quick-dry mechanism that resists wheel tracking and water washouts, protecting the integrity of the road stripe. Furthermore, the product contains a quick-dry technology which retains glass beads and retro-reflectance longer than solvent-borne traffic markings.

Bruno Pollet, senior chemist in R&D and technical support for road markings, explains the features of FASTRACK™: “In simple terms – it’s durable, dries faster and is less toxic than other products. This is of great benefit for the workers and road users who inhale the fumes. The quick-set technology accelerates the drying time of waterborne traffic paint, offering faster drying and faster return to service even under adverse conditions, such as low temperature, high humidity and low air movement. We developed the technology to facilitate the conversion from solvent-borne to waterborne traffic paint to help road authorities around the world improve worker safety and dramatically reduce VOC emissions. Today, FASTRACK™ is the preferred technology found at the intersection of traffic safety and more sustainable road striping.”

Carsten Larsen, Managing Director of Dow Southern Africa (Pty) Ltd, believes Africa is ready for new, sustainable solutions, and FASTRACK™ is a prime example of this.

According to the Department of Transport’s strategic and annual performance plan tabled in parliament in early July, more than 173 000 kilometres of municipal roads across South Africa are in poor to very poor condition. The cost of repairing them would amount to about R149 billion.

“We believe in providing innovative, sustainable and cost-effective solutions for our customers. Our FASTRACK™ technology may go some way to alleviating some of these costs and making the time we all spend on the road more enjoyable,” concludes Larsen.

INFO
Alexander Döll
Dow Sub-Saharan Africa
+27 11 575 1547
ahdoll@dow.com
MARKET CONTRIBUTION

RAISING THE BAR

The 1.6 million square metre mixed-use Waterfall City is being called the most ambitious commercial development undertaken in southern Africa to date. Close to the Allandale off-ramp from the N1 highway in Midrand, Gauteng, Waterfall City will be the epitome of the eat-shop-work-play integrated living environment that can already be seen at internationally acclaimed commercial hubs across the globe. At its centre will be the Mall of Africa. Set to become the largest mall ever built in a single phase in South Africa, the Mall of Africa is raising the bar for retail centres on the African continent.

Earthworks for the Mall of Africa began in October 2012, with the mall’s opening scheduled for April 2016.

It is envisaged that the 130 000 m² retail mall’s distinctive design, which was meticulously planned by MDS Architects, together with its prime location and enviable retail mix, will offer a unique shopping experience, making it a destination for both local visitors and tourists.

PROVEN INVESTMENT POTENTIAL

“Several urban studies have proven that there is an excellent business case for situating the Mall of Africa within the Waterfall City development. The mall will help the city realise its financial potential,” says Aurecon Project Director, Nicol Labuschagne.

He adds that, while involvement in such a large-scale project has been exciting, projects of this scale and magnitude present a unique set of challenges to the project team.

PRE-EMPTING MATERIAL SHORTAGE

The recent strike in the metals and engineering sector, led by the National Union of Metalworkers of South Africa (NUMSA), saw over 200 000 NUMSA members embark on what was dubbed an ‘indefinite strike’ by the local media. This could potentially have derailed a number of major deliverables on this project. “In this instance, detailed design documenta-
tion had to be fast-tracked even further to enable the contractor, WBHO/Group Five JV, to pre-order rebar and steel formwork ahead of the strike. This mitigated many of the potential delays caused by the strike,” says Labuschagne.

**GEOTECHNICAL CHALLENGES**

The underlying geological profile of the 16.5 hectare footprint of the mall site comprises soft to very hard rock granites, with intrusions of diabase in places. Residual soils have developed from the weathering of the granites and diabase bedrock, with overlying transported hillwash of varying depths and an abundance of subsoil groundwater in places.

“Geotechnical challenges to be dealt with as a result included the upfront profiling of the granite bedrock to minimise the amount of hard rock excavations, the subsoil drainage design over such a large footprint, and the varying founding conditions encountered due to the variable nature of the site geology,” explains Labuschagne. “This meant that no single founding solution could be used. Our project teams had to tailor the founding solution for each column or wall in accordance with its specific site condition, making use of either piling or conventional spread footings, or a combination of both.”

**TIME CONSTRAINTS**

The planned opening of the mall at the end of April 2016 has placed the professional team and the contractor under tremendous pressure, with a number of milestone deadlines to meet. This called for close cooperation and collaboration with the full professional team.

“For Aurecon, this meant ramping up our delivery capability by allocating additional resources to the project to ensure our construction documentation is timeously produced, peer-reviewed, approved and issued to site. The fast-track nature of the construction programme saw us using reinforced concrete flat and coffer slabs for the retail areas and post-tensioned flat slabs for most of the parking decks to speed up construction,” says Labuschagne.

**THE EPITOME OF INTEGRATED LIVING**

In terms of aesthetics, the parking areas at Waterfall City include valet parking, as well as additional parkades which, together with the entrances, will accentuate the urban planning framework and the unique identity of the mall. The development is being designed to create a pedestrian-friendly environment around the perimeter, with focus being placed on immaculately landscaped areas and aesthetically pleasing walkways.

“The Mall of Africa is much more than an economic anchor of Waterfall City; it’s also a visual and social anchor with striking features and bespoke amenities. Aurecon applauds the developers for this bold, ambitious project and is proud to be involved,” concludes Labuschagne.

---

**INFO**

Jody Boshoff
Communications Manager
Aurecon
012 427 2066
Jody.Boshoff@aurecongroup.com

---

Construction in progress on the Mall of Africa (view from one of the many cranes on site); SAICE National Office is situated in the office park that is visible in the top left-hand corner of the photo.

View from another crane on the construction site, this time towards Kyalami.
Concrete was specified for the airport runway, terminal building, air traffic control building, fire department building and permanent wharf. Chryso® Plast Omega 101 was used in all of the general concrete, as well as the concrete for the runway and the precast concrete used to construct the 700 precast Core-loc armour units and hollow blocks for the wharf. The 100 m long, 10 m high and 13 m wide wharf has a rock breakwater that had to be protected from any possible damage caused by ships.

PRODUCTS FROM CHRYSO Southern Africa have travelled 2 300 km over the South Atlantic Ocean to St Helena, one of the most remote islands in the world, to be used at the Basil Read St Helena Airport Project (BRSHAP). All of the materials used in the production of the concrete required, apart from the crushed aggregate, were sourced far away from the island. Dune sand was obtained from Walvis Bay, while the cement came from Ohorongo Cement in Namibia, the fly ash from Ash Resource’s Lethabo plant in Vereeniging and admixtures from Chryso’s plant in Cape Town.

“It was extremely important to keep quantities of materials to a minimum as there was limited space on the Basil Read cargo ship NP Glory 4,” Brenton Brouard, Chryso Southern Africa technical manager, explains. “When designing different concrete mix designs, for example, we could not use vast quantities of dune sand because that still had to be transported to the island.”

Concrete was specified for the airport runway, terminal building, air traffic control building, fire department building and permanent wharf. Chryso® Plast Omega 101 was used in all of the general concrete, as well as the concrete for the runway and the precast concrete used to construct the 700 precast Core-loc armour units and hollow blocks for the wharf. The 100 m long, 10 m high and 13 m wide wharf has a rock breakwater that had to be protected from any possible damage caused by ships.

“For when formulating the concrete mix design for the precast units, it was important to achieve a mix with optimised properties. The concrete had to fill complex mould shapes with limited bleed and settlement. Excessive bleed water would lead to unsightly voids in certain element sections, as well as increasing the risk of both plastic settlement and shrinkage cracking,” Brouard says.

Therefore 12 mm Chryso® Fibre Plus polypropylene micro fibres were used to increase the cohesiveness of the mix, while Chryso® Plast Omega 101 assisted in creating an optimised slump. Chryso® Dem Oleo SM was used on all of the moulds to ensure an easy release once the concrete had set, without causing damage to the moulds or concrete.

Concrete also had to be transported over long distances on the island, affecting the slump retention and workability, hence Chryso® Tard CE retarder was used to retard the concrete setting time. When necessary, Chryso® Rescue Pack slump revival admixture was added to the concrete in a readymix truck immediately before discharge.
“This increases workability and makes it easier to pump or discharge concrete from trucks that may have travelled long distances or been stationary on site for extended periods,” Brouard says. Chryso’s biodegradable, environmentally friendly cleaning agents Barracuda, Fusion and Truck Wash were used to clean and line the readymix trucks and keep them in good condition.

In order to reduce the need for future maintenance, it was decided to build the runway with concrete instead of asphalt. Manufactured from 27 000 m³ of concrete, the runway is 1 950 m in length, 45 m wide and has a maximum thickness of 350 mm in parts, with reduced thickness to the ‘off-keel’ sections. The runway is mostly un-reinforced.

Commenting on the complexity and size of the project, Jimmy Johnston, project director, BRSHAP, says: “The long logistical chain made planning vital, and BRSHAP needed reliable suppliers such as Chryso that can provide the correct product at the required amount on an agreed date and time.”
SAICE’S Golden Oldies

In the April 2014 edition of Civil Engineering (pp 70–73) we featured a few of SAICE’s golden oldies – those engineers who have remained active in, or associated with their profession far beyond ‘normal’ retirement. SAICE staff member Rebekka Wellmanns visited another of our inspiring golden oldies who is 96 this year.

HUGH SKINNER – PIANIST TURNED ENGINEER

David Hugh Hamilton Skinner (Hugh to family and friends) was born in Parys to Scottish parents on 3 November 1918, and grew up in a happy, humble, religious family.

His musical mother, and fitter-and-turner father, who was also a professional ventriloquist and concert entertainer, led him to discover the joys of piano playing at a relatively young age, and during his teenage years he set his heart on becoming a dance band pianist.

This love for music and the piano saw him gain an indispensable linguistic skill – fluency in Afrikaans – and led to his long-standing friendship with his secondary school Afrikaans teacher, Benedictus Kok (who would later become the Rector of the University of the Orange Free State, now the University of the Free State). This despite making Hugh write a one-page Afrikaans composition every day until it was grammatically correct (which took most of Hugh’s Standard 6 year) in his determination to make die engelse rooinek as bilingual as possible.

But to this Hugh owes his bilingualism, which would stand him in good stead later in his working life – on many occasions the simple act of bridging the language divide resulted in happier working relationships with clients.

More immediately though, his bilingualism allowed him to mix freely and easily with the Afrikaans-speaking children and, as an English-speaking boy, to be ‘tolerated’ in the
homes of the Afrikaans residents of Parys who would still on occasion begrudge the English for what had happened in the Boer War.

During this time, the railway line from Dover to Parys was extended to end at Vredefort, and the assistant resident engineer, Vic Lawrence, soon became friendly with Hugh’s sister. It was he who first kindled Hugh’s interest in civil engineering and even advised him to go to the University of the Witwatersrand (Wits) to study civil engineering. “I was well aware, however, that my parents were unlikely to be able to afford this, and thoughts of playing piano in a band still prevailed.”

NOSE TO THE GRINDSTONE

“After matriculating in 1936, the country was still in the throes of the Great Depression, and employment of any sort was extremely difficult to come by, even for a pianist. I realised then that it would probably be best to follow my father’s advice and forget about being a pianist.

“At a loss for a career, my uncle (a Springs resident), as good fortune would have it, came to hear that the Town Engineer, a Mr McComb, was looking to add two pupil civil engineers to his staff, and suggested I apply despite the fact that the sons of Springs residents would probably receive preference. I duly applied, was interviewed and on 1 August 1936 started work at the Springs Municipality.

“I was indentured to the Town Engineer for a period of five years and, apart from working for the municipality during the day, I was obliged to study for the Institution of Civil Engineers’ (ICE) association membership exams via correspondence. It took a lot of dedication and hard work, but I completed the three ICE associate membership exams before my indentured period had ended.”

Towards the end of his employment at the municipality, Hugh was put in charge of overseeing the upgrading of the railway station at Springs, which included the relocation of the municipal water mains, sewers and stormwater drains. He duly met up with the South African Railways representative, Jere Jennings (of geotechnical engineering fame), who, when he heard that Hugh had completed the ICE exams in under five years, said: “You should not be here, you should be at university”.

So with the help of Professor Bernard Knight, Jere was able to secure Hugh a scholarship to study civil engineering at Wits, with the proviso that if his end-of-year marks were above a certain grade, the tuition fees would be written off and the scholarship carried into the following year. “For the four years it took me to complete my degree, I never once paid university fees. It was tough going, though, and involved a great deal of hard work and social sacrifices.” In 1944 Hugh graduated cum laude with a BSc (Civil Engineering) degree.

THE START OF A REMARKABLE CAREER

After graduating, Hugh went to work for Mr Bisschof, the consulting engineer to the Delagoa Bay Lands Syndicate. “My first job was to carry out an extensive survey of some 2 000 acres in the Lourenço Marques (Maputo today) area for township development – where the absence of available survey data presented many difficulties.

“After completing the survey, at the request of John Schleisinger, head of the African Consolidated Investments Corporation, I designed a swimming pool for the Polana Hotel in Lourenço Marques. The pool had to have a three-fold purpose – a deep section for diving, a central section for swimming, and wide terraced steps at the sides for sitting or paddling – an unconventional design for that time.”

After seven months, it was time to move on and Hugh was employed by the Vanderbijlpark Estate Company (VESCO). “Here I was involved in the design of water and sewer reclamation systems, providing infrastructure of a municipal nature for the various township ‘zones’ which were being developed for the anticipated influx of people to the area, as well as the design of several buildings for VESCO’s own use. This, though, became very repetitive and not as interesting as I had hoped, so I enrolled in a part-time course in town planning at Wits.”

“It was at one of these lectures that I was introduced to an employee of consulting firm Stewart, Svirdov and Oliver (SSO, later Stewart Scott International and now Royal HaskoningDHV). As a result of this meeting, I forewent the town planning lecture, opting instead for an interview with one of SSO’s founders, George Stewart, and was quickly offered employment as an assistant engineer. Although I would receive a lower salary than I was then currently earning at VESCO, I accepted the job offer as I felt I would be challenged in this role.”

Hugh started work at SSO on 1 October 1947 and would spend over 30 years there, seeing the small, close-knit firm grow from 12 to over 700. With the help, guidance and encouragement of Michael Svirdov and John Stewart (George Stewart’s son), Hugh became extremely knowledgeable in water and wastewater treatment processes, and was involved in a number of large projects, including the design and construction of four dams for South Africa and new water and wastewater treatment works, or the extension of existing ones, one of which was the Windhoek Water Reclamation Works – a project which would be the first of its kind in the world.

THE WINDHOEK WATER RECLAMATION WORKS

Fondly recalling the project, Hugh explains: “The 1960s saw Windhoek running short of water – so dire was the situation that the municipality could not timeously meet the projected future water demand by building an additional dam.

“It was then that Dr Gerrie Stander (past Director of the Water Research Commission) suggested that, by using a combination of various wastewater treatment processes, sewage could, in his opinion, be converted into potable water, but this would involve extensive bench-top studies on a large scale. So willing was the Windhoek Municipal Council to find a solution to the projected water shortage, it accepted Dr Stander’s proposal and a team was set up, which included Michael Svirdov of SSO, to carry out the proposal.

“I joined Dr Stander’s team after Michael’s untimely death, and once Dr Stander, with a great deal of courage, had decided upon the process which would most likely succeed, I was given the challenging task of designing and constructing the full-scale reclamation works.”

By 1969, the reclamation works were in operation, and for the first time in the world not only had sewage been treated to potable standards, but the treated water had been introduced into the town’s normal water supply. In 1970 Dr Stander and his team won the Associated Scientific and Technical Society
Welcome to the future – a future of Mwangaza

We are all writing a part of the script which tomorrow’s society will play out. At Royal HaskoningDHV we would like the title to read: ‘Welcome to the future’ - and for our chapter in that script to read ‘Mwangaza’ - a Swahili word which means ‘light’. Together with our partners and clients we consider how we can create a welcoming future - developing efficient and smart living.

Whether switching on a light, travelling to work or drinking a clean glass of water - the solutions and work of our engineers surround us, making lives better and brighter. Our work contributes to the sustainable development of communities. Together, we deliver innovative sustainable answers to today’s challenges.

Royal HaskoningDHV is an independent, international engineering and project management consultancy.

royalhaskoningdhv.com/za
On 16 October 2014, SAICE’s Young Members Panel took its roadshow to the Steve Biko Campus of the Durban University of Technology (DUT). The event was kindly sponsored by PPS. Thanks to members of the SAICE Durban branch, who enthusiastically helped to make the roadshow a great success, students were inspired and able to learn not only about the importance of SAICE membership, but also about different aspects of the engineering industry, including the importance of ethics. And all of this happened in a truly fun environment!
When Cliff McMillan, who later (in 1988) became President of SAICE, was still a young consulting engineer, he was elected to SAICE’s Executive Committee to represent the younger members of the Institution. At one of his first EXCO meetings, Cliff raised the question: “Why does SAICE not have any black members?” He was then tasked to investigate the matter, and it did not take him long to report back on his shocking finding: With the education system under the then apartheid policies it was virtually impossible for any black student to obtain a matric certificate with the right subjects and marks to enter engineering studies at any South African university.

Cliff did not leave it at that. Technology education had become a passion with him, especially to address the consequences of the apartheid education system. It was obvious that the system would eventually end, but the real legacy would be a human resources disaster resulting from the poor education of the population, particularly in Maths and Science. Cliff submitted a proposal that SAICE should do something to address this unacceptable situation by developing an effective strategy to open the profession to potential candidates of all races. After deliberations within SAICE, and with expert help from educationists, a programme was started that enrolled its first 100 students in a three-day vacation school in Soweto in 1982. Supplementary classes in Maths and Science on Saturdays were also started,
as a fore-runner to the later very successful PROTEC Saturday Schools. Initially these classes had to be conducted as ‘covert’ operations, due to the prevailing apartheid laws.

It soon became clear that supplementary tuition in Maths and Science would not be sufficient, and had to be supplemented with the development and introduction of three additional subjects, namely English language, World-of-Work and Technology. The tuition of English in the township schools at the time was very poor, and the exposure of township students to the world of technology was also lacking in many respects, as there were, for example, no surfaced roads or any electricity distribution networks in Soweto in those years.

Very effective special tuition programmes were developed for PROTEC (Programme for Technological Careers) by a non-engineer, Lente-Louise Louw, a consultant education researcher. She also became the first Managing Director of PROTEC, and a number of Saturday Schools were started up in different towns. Members of various SAICE branches played an active role in the establishment of these Saturday Schools and in providing effective tuition on a voluntary basis. Fully fledged PROTEC branches were also established in the townships, with full-time branch managers and locally representative Branch Boards. David Kramer, a suitably qualified educationist, joined PROTEC as branch manager in Soweto and eventually succeeded Lente-Louise Louw as Managing Director of PROTEC.

During the eighties PROTEC grew to be an organisation with more than twenty branches throughout the country, in most cases strongly supported by the local SAICE branches and by local industries.

PROTEC’s main focus was on Saturday classes for promising learners in Standards 8, 9 and 10 (now Grades 10, 11 and 12), supplemented with vacation schools and camps, career guidance and appropriate exposure to the world of work and technology. Specially developed appropriate training material became an important by-product and PROTEC soon earned its reputation as a leader in this field.

Periodic strategic adjustments ensured that PROTEC remained relevant in a changing environment, such as the development of in-service training programmes for teachers during the nineties.

In his capacity as Chairman of the PROTEC Board, Cliff MacMillan continued to serve PROTEC with his strong leadership talents for the best part of two decades, including during the year when he served as President of SAICE and at a later stage as President of the SA Association of Consulting Engineers (SAACE, now CESA), until he was promoted by his employer (Ove Arup International Consulting Engineers) to a senior leadership position in the USA in 1999.

Since its inception, the impact of PROTEC has been dramatic. Even with the relatively limited stimulus that PROTEC could provide, considerable numbers of learners flourished, obtained appropriate matric results which qualified them for entry into technology-related tertiary studies and eventually following engineering and other technological careers.

**PROTEC TODAY**

The PROTEC model is unique in that it is made up of both learner and teacher development components.

The targeted subjects for the model are Mathematics, Physical Science, English and World of Work, as was mentioned above. It is particularly through World of Work (Life Orientation) that PROTEC distinguishes itself, as this module prepares learners in totality – from table manners, socialising and study skills, to exposure to the real world of work through work-related excursions. These excursions are made possible by our sponsors, who operate mainly in the engineering fields, and who take these learners on journeys of in-depth discovery of the real work environment.

PROTEC’s novel approach also entails developing material for teaching and learning that is additional to what learners receive as textbooks at their schools (and to adapt these as school curricula evolve). The PROTEC material is not presented as textbooks, but as workbooks. These workbooks are engineering focused, as they are meant to stimulate interest in engineering (technological) careers, rather than purely academic careers. PROTEC workbooks are also accompanied by teacher guides, and teacher training manuals.

PROTEC is highly indebted to SAICE for allowing it to use its monthly magazine, *Civil Engineering*, as one of the sources for the development of these workbooks and teacher guides. It is these workbooks that serve to elevate the knowledge of PROTEC learners beyond that of their peers back at their respective schools.

PROTEC is equally indebted to its current CSI (Corporate Social Investment) funders for their generous financial support, which goes a long way towards touching the lives of ordinary learners who would otherwise not have made it to matric and beyond. It is of critical importance that engineering and related companies associate themselves with PROTEC, as PROTEC remains the best conduit for feeding learners into engineering education, thereby addressing the engineering skills shortage. PROTEC is registered as an educational fund in terms of Section 18A(3) of the Income Tax Act of 1962 (reg 18/9/2/11/262) and as a non-profit organisation in terms of the Non-Profit Organisation Act of 1997 (reg 0001-335-NPO). All grants and donations are tax exempt.

PROTEC is an active member of the National Science and Technology Forum, and is also recognised as a UNESCO cooperating organisation. Thousands of high school learners have successfully participated in PROTEC activities over the last 32 years, resulting in their matric pass rates consistently being substantially higher than those of their peers. PROTEC learners are also encouraged to participate in events such as the annual National Science Expo. Through the sterling efforts of PROTEC, more and more previously disadvantaged learners are being adequately equipped to enter technological careers, thereby potentially easing the country’s skills shortage.

Space does not allow us to expand further on PROTEC’s activities, but please visit the PROTEC website for more information, or visit us for a chat and a cup of coffee at our various branches or at the PROTEC National Office.
### SAICE Training Calendar 2014

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Dates</th>
<th>Location</th>
<th>CPD Accreditation Number</th>
<th>Course Presenter</th>
<th>Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical Geometric Design</td>
<td>1-5 December 2014</td>
<td>Midrand</td>
<td>SAICElr13/01418/16</td>
<td>Tom McKune</td>
<td><a href="mailto:dawn@saice.org.za">dawn@saice.org.za</a></td>
</tr>
<tr>
<td>Reinforced Concrete Design to SANS 10100-1:2000</td>
<td>26 November 2014</td>
<td>Port Elizabeth</td>
<td>SAICEstr12/01066/15</td>
<td>Greg Parrott</td>
<td><a href="mailto:cheryl-lee@saice.org.za">cheryl-lee@saice.org.za</a></td>
</tr>
<tr>
<td>Road to Registration for Mature Candidates</td>
<td>24 November 2014</td>
<td>Durban</td>
<td>CESA484-01/2017</td>
<td>Peter Coetzee/Rob du Preez</td>
<td><a href="mailto:margie@ally.co.za">margie@ally.co.za</a> <a href="mailto:dawn@saice.org.za">dawn@saice.org.za</a></td>
</tr>
<tr>
<td></td>
<td>3 December 2014</td>
<td>Johannesburg</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In-house courses are available. To arrange, please contact:
Cheryl-Lee Williams (cheryl-lee@saice.org.za) or Dawn Hermanus (dawn@saice.org.za) on 011 805 5947
Your project partner in low cost housing

Builders has partnered with Tusk Construction Services to provide building materials, bridging finance and performance guarantees to more than 30 low cost housing projects for this year.

Over the last five years, Builders has supplied building materials to more than 200 housing projects across the country and continue to work together with Tusk and other service providers, such as Standard Bank, to offer building materials as well as value added services such as bridging finance, performance guarantees and construction support to small and medium sized contractors.

Builders, your project partner to Get It Done!
DR MARTIN SLAVIK was lost to the engineering industry, family and friends on 28 April 2014, almost eight months after he suffered a severe stroke while travelling on the Gautrain with several work colleagues. He was 77 at the time of the stroke, with a spring in his step and the word “retirement” nowhere to be found in his vocabulary.

Martin Milan Slavik was born in Czechoslovakia in 1935, experiencing World War II as a young boy of between 5 and 10 years old. He graduated as a civil engineer from the Brno Military University in 1958, and worked in the mining sector for approximately 10 years thereafter. He left Czechoslovakia in October 1969, about a year after the Warsaw Pact invasion of the country. Martin initially left for Vienna with his wife and two young sons, and about a month later he emigrated to South Africa after the South African embassy embraced him with hospitality and even paid for his flight tickets.

His career in transportation engineering started at the National Institute for Transport and Road Research at the CSIR, Pretoria, in 1969. He obtained his Master’s Degree in transportation engineering at the University of California (Berkeley) in 1976, and after taking only a short break he enrolled and obtained his Doctorate within nine months from the University of Pretoria in 1978. In 1982 he decided to move to BKS (now AECOM SA) where he remained employed until his death.

Martin will be fondly remembered as one of the fathers of electronic traffic monitoring in South Africa. Some of the very first electronic traffic data in the country was collected in bitter cold weather near Heidelberg (as part of the “Yellow Line Experiment”) in 1978, in the days when computer technology relied on strip printers and punch cards. The success of this first traffic event logger paved the way for a pilot project for electronic traffic monitoring for the National Department of Transport, which was soon rolled out on a national scale. Martin dedicated much of the last two decades of his life to calibration and quality management of weigh-in-motion (WIM) systems and overloading management. In 1997 he led the team that developed and implemented the Mantsole Traffic Control Centre on the N1 north of Pretoria, the first of its kind in South Africa.

Martin possessed an incredible ability to enhance the world around him through research and the development of sought-after engineering concepts and tools. He was a nationally recognised master of engineering statistics, he loved mathematics, science and technology, and was a self-taught software programmer. In his quest for sharing his ideas he wrote 54 technical papers (of which several won awards) for publications and conferences in South Africa and the world over. His dedication and contribution to the civil engineering profession earned him the SAICE Transportation Division Chairman’s Award in 2006.

In the office Martin was well known for his peculiar sense of humour and quirky remarks, his modesty, and perhaps above all, his high level of integrity. Those who knew him personally also appreciated his calm and organised nature, dedication, perfectionism, wisdom and respect. He loved walking long distances, listening to vinyl classical music (Mozart and Dvorak in particular), movies at Cinema Nouveau, reading, brain-teasers, astronomy, enjoying a glass of red wine and smoking a pipe. His legacy lives on in the ideas he developed, the ones that he loved, and those he empowered. He will be missed.

Kollan Pillay Pr Eng FSAICE
kollan.pillay@arup.com
“For the Bank (AfDB), the Mbabane Bypass is not just another delivery of a good infrastructure project, but a monumental showpiece, a shining example of the outcomes of the institution's focus on road infrastructure as the arrowhead of its continent-wide interventions.”
Exceptional engineers take advantage of integrated design tools of world-class excellence.

Now with the fastest and easiest road intersections

www.civildesigner.com