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President's Corner



The Sharpest Pencil

As with every New Year, we start very positive, setting new resolutions. I found that I need to set goals for myself to ensure that I stay focussed and determined to achieve my goals in the anticipated time period. These include personal, work, academic and fitness goals.

As motivation, I entered for the Cape Argus cycle tour (now Cape Town cycle tour) to ensure that I HAVE to get on the bicycle and start training for the event, taking place in March. However, on my first ride out on the 2nd of January, I found myself out of breath and my body suffering to complete a short route which I have ridden on so many occasions. Again, I realised just how quickly one's fitness deteriorates when not training. When I got on the bicycle that morning, my mind was of the opinion that this was going to be an easy ride, remembering the level of fitness I was at in November. However, the holidays are not kind to one's body. Research showed that strength loss occurs within approximately 2 ½ – 3 weeks, and cardio loss even more rapidly, if you are not training. Therefore, my mind and body was really disjointed from reality, and so much for the "muscle memory" myth. There is only one hard truth; I need to start with basic training, condition myself and train my body to again increase my strength and level of fitness if I am planning to ride the Argus and my intended intensity.

We need to stay at the top of our game if we expect to perform and be the sharpest pencil. In our work environment, we study hard to pass the various examinations. However, as with cycling, if we do not continue to condition our minds through continuous studying and gain experience through work exposure, our minds also become unfit. Essentially the "use it or lose it" principle applies. Very few candidates, who wrote the Paper 1 Exam five years ago, will be able to do a stress transformation calculation. However, as Engineers, we have to remain sharp. We are the next generation responsible for developing new initiatives, methodologies and design criteria. You are only as good as your last exam. If you do not continue to sharpen that pencil, you will sink into a dark hole and lose focus. By challenging ourselves, our bodies and minds remain fit.

Michael du Plessis - SANIRE President

RockBowl 2017

WELL DONE to all the teams that took part in the first ever **SANIRE** Rockbowl last year. The Event was well attended by members and contestants, with teams taking each other on in a knock out format.

The event was hosted at the Sibanye Kloof Training Centre on the 18th November 2017. A total of 7 Young Members teams entered and participated with the overall Winners being the **#ROCKSMUSTNOTFALL** team from **SRK Consulting**.

The **Golden Oldies** division consisted of two teams namely **Madala's** (Lonmin) and **Fubarite** (SRK Consulting) Once again the winners of the round was **SRK**. **WELL DONE SRK Consulting**. Young Members and Golden Oldies 2016 Champs.

Young Members Teams

Amandelbult/ Union

#ROCKSMUSTNOTFALL

Rock Avengers

Free State Brekers

Kamikaze Pirates

Anticline Restrictors

OHMS Juniors

Anglo Platinum

SRK Consulting

Lonmin Platinum

Brentley, Lucas and Associates—Free State

Brentley, Lucas and Associates—Gauteng

Lonmin Platinum

Open House Management Solutions

Golden Oldies

Madala's

Fubarite

Lonmin Platinum

SRK Consulting









Free State Brekers



Kamikaze Pirates







Young Members and Golden Oldies RockBowl 2016 Champions
#ROCKSMUSTNOTFALL and Fubarite—SRK Consulting



WELL DONE everyone for surviving 2016! It was one very busy year for the Western Bushveld mines, with everyone in the Rock Engineering Departments just trying to stay afloat – but we all managed to scrape through still intact.

SANIRE still remains very active in this region. At the Western Bushveld Branch meeting for 2016, a new committee and chairperson were elected. This truly was a challenge, as the previous chairperson, Naomi Ayres, had left big shoes to fill!

Over 2016, the branch went from strength to strength. Our aim was to increase the **SCO** level base, as they are essentially the future of the branch. The progress has been slow, but there has definitely been progress.

We have had numerous interesting guest speakers in the meetings which we held. These ranged from Tony Guthrie (former CEO of De Beers, Canada), Prof Dick Stacey, Peter Terbrugge (SRK Principal Rock Engineer), and Friedemann Essrich, just to name a few. Each speaker was asked to present a topic from his or her own experience, which is different from the Platinum and Chrome environment that we on the western limb are very familiar with. From the feedback we received, the speakers were thoroughly enjoyed and got many people thinking and asking questions.

To make sure we ended the branches' successful 2016 with a bang, we held our year-end function at the Mooinooi golf course. Every year, we like to make sure the non-golfers are taken care of – mountain biking, safe archery, bull riding and soccer were included in the day's activities, as well as four-ball golf. As usual, everyone just let loose, relaxed and had a good time to close a very hectic 2016 for the RE Departments!

Generous contributions of dog food as an “entrance fee” to the year-end function resulted in a large amount of dog food being donated to various needy animal organisations via Santa Clause for Paws.

In 2017, we still aim to increase our **SCO** base, take full advantage of networking, and have many more interesting speakers as well as new REs/SCOs to present the projects they are working on. So, on behalf of the Western Bushveld Branch, I would like to wish everyone a prosperous and successful new year!



Carol Hunter

Chairperson - **SANIRE** Western Bushveld Branch







The SANIRE Coalfields branch held its year-end function on the 02nd of December 2016 at the Tweefontein Recreation Club, in eMalahleni. This marked one of the very first events since the new branch committee was elected in February. A number of delegates, consisting of practitioners, consultants and suppliers, came from various parts of the country to enjoy this prestigious event. The total number of delegates in attendance was 47 and the event was sponsored by Videx and Robolt technologies.

As a norm of the branch, the essential part of an event of this magnitude comprises the technical presentations which always expose the practitioners to an opportunity to keep abreast with the latest developments. The highlight of this year's technical presentation was from Professor Nielen van der Merwe. His presentation was simply a summary of the ground breaking work that he has done thus far on the Probability of pillar survival (POS) and Pillar Life Index (PLI). A takeaway from this presentation is the link between these concepts through the safety factor. "Requirements can now be set for the POS of a pillar system, coupled with a required POS at any time in the future" said Nielen. He further emphasized that the acceptable limits of probabilities of failure for various categories of protection should be determined by agreement between different stakeholders. This three-tier method of stability evaluation for coal mines brought some sense of relief to the coal practitioners on how to integrate and implement these concepts. This work has since been published in the December 2016 SAIMM journal.

Mr Prince Mulenga from SRK Consulting brought yet another interesting topic when he presented on the Coal Squat Pillar design using numerical modelling. This included a detailed comparison of the different pillar strength formulae available in the industry with the numerical modelling results of the squat pillar and highlighted very crucial aspects for future research in this area. The following conclusions were drawn from his research:

- Pillar peak strength is dependent on the peak and residual friction angle used in the model.
- The strain at which the peak friction angle is dropped to residual friction has an effect on the strength of the pillars.
- The brittle-ductile transition was found to depend on the residual friction angle.

Coal-based researchers are in agreement that there is a need to expand the life of the Highveld and Witbank Coalfields, respectively. One other method to do this is the extraction of the old coal pillars through an opencast mining method, but this is not without its own challenges.

Dr Michael van Schoor from CSIR captivated the delegates with his presentation that was aimed at introducing various ways of locating the Old Shallow Coal Pillars, which was one step towards resolving some of the challenges inherent in mining of the old coal pillars. It was to the delegates' disappointment that there is currently no surface technique available for locating these old pillars. He however suggested a number of other possible options for locating pillars, such as Robots.

Mr Lance van Steel from MapTek left the delegates wanting more when he touched on the technological side of Rock Engineering. His presentation was on the Geotechnical Stability Solution for Open Pit and underground, which was more on the geotechnical data derivation and analysis, as well as monitoring of the workings.

After such an intriguing event, the delegates departed for a mouth-watering sit-down barbeque lunch, with anticipation for the great year ahead. Needless to say, some remained for beers and networking.



While trying to scout for something a little more unconventional for the year-end event, and thinking of the wealth of mining source material at our fingertips in Gauteng, we stumbled upon the **KLOOFENDAL NATURE RESERVE** where the **Friends of Kloofendal** happen to be none other than Steve and Karin Spottiswoode with Rod Kruger, so naturally the decision was made for itself!

In spite of a Saturday morning time slot, there were stalwart enthusiasts as well as newbies (thanks to our SAICE and SAIEG communication channels) who all trekked together for a geological, nature and mining history adventure. The local geology comprises somewhat disturbed quartzites, sandstone and shale (yes, indicating promises of gold-bearing reefs!). Steve was our conductor here while Karin revealed the magic of fauna and flora. Rod then gave us a tour into the early diggings of the Struben brothers, amazingly excavated by hand drills, pickaxes, shovels and explosives, and are largely still intact. Being intelligent rock engineers, we all assessed the safety of the strata and decided it was perfectly acceptable to enter and exit unscathed. Which is what we did!



Kloofendal is located in the suburb of Kloofendal in the Roodepoort area of Johannesburg's west Rand (cf. <http://kloofendalfriends.yolasite.com/>). This 150-hectare ecotourism and cultural heritage reserve hosts the intersection of two major faults, the Rietfontein and Witpoortjie faults. The resulting forces caused by these two faults moving together resulted in great structural complexity and contributed in large part to the gold placement in the Struben Mine, one of the oldest mines

in the country.

The Confidence Reef was discovered on 18 September 1884 by F. P. T. Struben, giving the first payable gold to be discovered on the Witwatersrand. The discovery led to a rush of prospectors to the area and the eventual discovery of premier conglomerate "Main Reef" in 1886 that led to the birth of Johannesburg. Kloofendal is not only endowed with the rich mining history, but also pristine Highveld vegetation, small mammals and different kinds of birdlife, thus making it a perfect trail to explore nature. We experienced a lovely, peaceful, family friendly atmosphere, highly recommendable for a day picnic out.

Visit the website <http://kloofendalfriends.yolasite.com/> or get in touch with Joburg City Parks for more information on the Kloofendal Nature Reserve and the exceptionally





generous efforts that the friends of Kloofendal put into maintaining and protecting the resource, together with providing an education centre for scholars who come regularly for outings. It's our heritage, ours to protect, cherish, enjoy and pass on to future generations.

A hundred 'Thank You's go to our sponsors, **TIMRITE**, **Geo-Explore Store** and **ROCBOLT technologies**, for the funding to cover our entrance fees and the grub, and to the Gauteng Branch team for all the effort in making the day memorable.



Keep following the Gauteng Branch on Facebook, "like", "share" and suggest posts. Looking forward to our next evening of networking and new ideas!



(P.S. – if members have gone "missing" or new members need to be added, please contact Prince at PMulenga@srk.co.za).

Jeanne Walls
SANIRE Gauteng Branch Committee





Full Name: Dr. Rudiger Welf Olgert Kersten

Designation: Independent Consultant

Qualifications: M.Sc Geology, Ph.D

SHORT HISTORY OF PREVIOUS EXPERIENCE

Rudi Kersten, rock mechanics consultant, has more than 45 years experience in the mining industry. As consultant to Anglovaal he has been involved in the design and maintenance of both open pit and underground mines. The underground mines included shallow, intermediate, deep and ultradeep operations of archean and Witwatersrand type mines. Also included are manganese, copper, chrome, platinum, andalusite and silica operations. Consultancy work was also done on copper, gold and manganese mines in Brazil, Kazakstan, Uzbekistan, Zambia, Zimbabwe, DRC, United States of America, Australia, United Emirates and Tanzania. Experience covers the evaluation of borehole core to selection of mining method and detail planning and commissioning thereof. He has also been actively involved in designing and installing backfill plants at a number of mines. Rudi has been an independent mine consultant with South African and overseas clients since 1994 and has been involved in a number of due diligence and resource evaluations. He gained his MSc degree in geology at the University of Pretoria, currently busy with a PhD degree and, throughout his career, he has been involved in the guidance and evaluation of the research activities of the Chamber of Mines research organisation.

AfriRock 2017



ISRM International Symposium 'Rock Mechanics for Africa'

2-7 October 2017

Cape Town Convention Centre, Cape Town



Keynote Speakers

Nick Barton
Sergio Fontoura
Luis Lamas
Dick Stacey
Nielen van der Merwe

BACKGROUND

The 2017 ISRM International Rock Mechanics Symposium is to be held in Cape Town. The conference theme is 'Rock Mechanics for Africa'. Mining has traditionally been a mainstay of African economies, while Oil and Gas industries are rapidly growing throughout Africa. Infrastructure is being developed to support these industries. Rock engineering design is and therefore will continue to be essential for the growth of the continent. Prior to the conference, the ISRM Board, Council and Commission meetings will take place. Technical visits are being arranged for after the conference.

EXHIBITION/SPONSORSHIP

Sponsorship opportunities are available. Companies wishing to sponsor or exhibit should contact the Conference Co-ordinator.

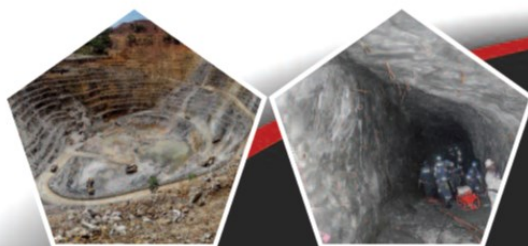
WHO SHOULD ATTEND

- Rock engineering practitioners
- Researchers
- Academics
- Mining engineers
- Civil engineers
- Petroleum engineers
- Engineering geologists.

TECHNICAL VISITS

The following technical visits are confirmed for the conference:

- Phalaborwa Mine
- Tau Tona Mine



TENTATIVE PROGRAMME

Saturday 1/10/2017	Sunday 2/10/2017	Monday 3/10/2017	Tuesday 4/10/2017	Wednesday 5/10/2017	Thursday 6/10/2017	Friday 7/10/2017
ISRM Board Meeting	ISRM Board Meeting	ISRM Commission Meetings Workshop	Technical Session Morning Refreshments Technical Session Lunch Technical Session Afternoon Refreshments Technical Session			Technical Visits
	Board Dinner	Network Function		Conference Dinner		

For further information contact:

Raymond van der Berg, Head of Conferencing
SAIMM, P O Box 61127, Marshalltown 2107
Tel: +27 (0) 11 834-1273/7 · E-mail: raymond@saimm.co.za
Website: <http://www.saimm.co.za>



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First Announcement and Call for Papers



SAIMM
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'Rock Mechanics for Africa'

2–7 October 2017

SPONSORSHIP AND EXHIBITOR PACKAGES

**Only 1
Opportunity Left**

Package 1: (P1) Premium Sponsorship (Limited to 4 Sponsors only) Extensive branding benefits 10 Minute Sponsorship Presentation during Conference - Website Branding – Logo to appear on conference website - Logo slide between sessions - Logo on all print media advertising done to promote the event Conference benefits 2 x Complimentary delegate tickets for the conference will be made available to your company's staff or corporate guests 1 x Complimentary delegate tickets to attend Exhibition only - An A4 Insert (your corporate brochure, promotional material, etc) into all conference delegate bags Exhibition benefits 3 x 3m² of expo space in a prime position (includes basic shell scheme) Signage benefits 1 free standing banner (2m x 1m) in the conference registration area (banner supplied by sponsor) Sponsorship investment: R 60 000.00 Excluding VAT (R30 000.00 deposit)	Package 2: (P2) Exhibition Sponsorship (Unlimited Sponsorship) Extensive branding benefits - Website Branding – Logo to appear on conference website - Logo to appear on slide between sessions - Logo to appear on all print media advertising done to promote the event Conference benefits 1 x Complimentary delegate tickets for the conference will be made available to your company's staff or corporate guests 1 x Complimentary delegate tickets to attend the Exhibition only - An A4 Insert (your corporate brochure, promotional material, etc) into all conference delegate bags Exhibition benefits 3 x 2m² of expo space in a prime position (includes basic shell scheme) Signage benefits 1 free standing banner (2m x 1m) in the conference registration area (banner supplied by sponsor) Sponsorship investment: R 45 000.00 Excluding VAT (R25 000.00 deposit)
Package 3: (P3) Banner Sponsorship (Unlimited Sponsorship) Extensive branding benefits - Website branding – Logo to appear on conference website - Logo to appear on all print media advertising done to promote the event - Logo to appear on slide between sessions Conference benefits 1 x Complimentary delegate tickets for the conference will be made available to your company's staff or corporate guests - An A4 Insert (your corporate brochure, promotional material, etc) into all conference delegate bags Signage benefits - Company to brand function with 2 free standing banners (2m x 1m) in the conference registration area (banner supplied by sponsor) Sponsorship investment: R 35 000.00 Excluding VAT (R17 000.00 deposit)	Package 4: (P4) Conference Bags (Limited to 1 sponsor) Extensive branding benefits - Logo to appear on all print media advertising done to promote the event - Logo to appear on slide between sessions - Logo to appear on all Conference Bags (Provided by SAIMM). The name of the conference and the SAIMM will also appear on the bag in a secondary position. - Website Branding – Logo to appear on conference website Conference benefits - An A4 Insert (your corporate brochure, promotional material, etc) into all conference delegate bags Sponsorship investment: R 30 000.00 Excluding VAT (R15 000.00 deposit)



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'Rock Mechanics for Africa'
2–7 October 2017
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Package 5: Cocktail Function (P5) (Limited to 2 Sponsors) <u>Extensive branding benefits</u> • 10-minute presentation done by representative of the company • Website branding – Logo to appear on conference website • Logo to appear on all print media advertising done to promote the event • Logo to appear on slide between sessions <u>Conference benefits</u> • Company to brand entire Cocktail function • 2 x Complimentary delegate tickets to Cocktail Function <u>Signage benefits</u> • Company to brand entire Cocktail function Sponsorship investment: R 35 000.00 Excluding VAT (R17 000.00 deposit)	Package 6: Lanyards (P6) (Limited to 1 Sponsor) <u>Extensive branding benefits</u> • Logo to appear on all print media advertising done to promote the event • Logo to appear on the Lanyards (To be supplied by the Sponsor) • Logo to appear on slide between sessions • Website Branding – Logo to appear on conference website <u>Conference benefits</u> • An A4 Insert (your corporate brochure, promotional material, etc) into all conference delegate bags Sponsorship investment: R 15 000.00 Excluding VAT (R7 000.00 deposit)
Package 7: Pens & Pads (P7) (Limited to 2 Sponsors) <u>Extensive branding benefits</u> • Logo to appear on all print media advertising done to promote the event • Logo to appear on the event web page • Logo to appear on slide between sessions • Logo to appear on the pens and pads that will go into the Conference delegate bags (To be Supplied by the Sponsor) Sponsorship investment: R 15 000.00 Excluding VAT (R7 500.00 deposit)	Package 8: Technical Visit (P8) (Limited to 2 Sponsors) <u>Extensive branding benefits</u> • Logo to appear on all print media advertising done to promote the event • Logo to appear on the event web page • Logo to appear on slide between sessions • Logo to appear on the pens and pads that will go into the Conference delegate bags (To be Supplied by the Sponsor) <u>Signage benefits</u> • Company to brand function with 2 free standing banners (2m x 1m) in the Reception area (banner supplied by sponsor) Sponsorship investment: R 15 000.00 Excluding VAT (R7 000.00 deposit)
Package 9: Advertising (P9) <u>Conference benefits</u> • An A4 Insert (your corporate brochure, promotional material, etc.) into all conference delegate bags Sponsorship investment: R 5 000.00 Excluding VAT (R2 500.00 deposit)	



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OF MINING AND METALLURGY



'Rock Mechanics for Africa'

2-7 October 2017

SPONSORSHIP AND EXHIBITOR PACKAGES

ACCEPTANCE FORM (to be completed and returned to the SAIMM)

NOTES

- All prices include VAT
- Please complete and return the reply form to the address listed below as soon as possible
- Please ensure advertising material is submitted timeously

Preference:

P1 ☐

P2 ☐

P3 ☐

P4 ☐

P5 ☐

P6 ☐

P7 ☐

P8 ☐

P9 ☐

50% deposit is required upon acceptance

Company Name:

Postal Address:

Contact Person:

Position: Signed:

Tel : Fax :

E-mail: Cell:

**** FREE Delegates: Kindly complete the conference registration form and return to the conference organise**

Exhibition Staff Information: (Complete if applicable to sponsorship opportunity)

Exhibition Staff 1:

First Name: Last Name:

Position:

Tel : Fax :

E-mail: Cell:

Exhibition Staff 2:

First Name: Last Name:

Position:

Tel : Fax :

E-mail : Cell:



Full Name: Jan Abram Maritz

Position: Senior Lecturer

Company/Organisations: University of Pretoria

Date and Place of Birth: 5 July 1978 – Welkom

Education: MEng (Mining Engineering), COM REC, MMC

First Job: HTH Sales Rep

Personal Best Achievement/s: Advancing through all the spheres of Mining at a young age.

Philosophy of Life: Life is too short for cold coffee

Favourite Food/Drink: Good steak and beer

Favourite Sport: Athletics

1. How did your career in the mining industry begin and where are you now?

I was recruited by a gold mining company whilst still at school in Bloemfontein. On the application form, I chose CIVIL ENGINEERING as my first and only choice. At the interview they offered the Mining Bursary and I accepted. After graduating, I completed the training programme and my responsible mining contracts under the graduate programme.

Following a whirlpool of activities, I am back in academia, lecturing Strata Control and Rock Engineering and related modules in other subjects.

2. Why did you choose Rock Engineering?

I did not choose RE, it chose me. In my Production Supervisor promotion course, the vacancy opened up for a Strata Control Officer. Having had Prof Handley as my lecturer at varsity, and enjoying the challenges of the specialist field, I saw the opportunity to get out of the repetitive nature of the production cycle.

3. Please tell us a bit more about your career journey?

Started as a learner graduate, completed my production training, and moved to a Rock Engineering Department. Completed the Strata and Rock Engineering ticket exams and sat in the Shaft Rock Engineering chair for a big gold producing company. After completing my Mine Managers Certificate, I joined a mining consulting firm sub-contracted for an international firm on mining projects (all commodities) globally, with the plan of expanding the then mining-only consultancy into also delivering Rock Engineering advisory services. When the expansion idea got shot down, I started my own Rock Engineering Consultancy business. In 2010 at an alumni meeting for the Tuks Mining graduates, I noticed the vacancy for a Rock Engineering lecturer and seized the opportunity to apply and got appointed in 2011. One learns about a subject twice, while studying for it and while teaching it.

4. What are some areas that you believe will become of increasing importance in the near future of the rock engineering discipline?

Technical skills will always remain of utmost importance, although the ability to manage people and positively influence their decisions will start to step to the fore. As the Rock Engineer will in future experience more responsibility, he/she needs to learn the ability to manage people reporting to the Chair, directly and indirectly.

5. What advice would you offer people aspiring to be in your position?

You are responsible for yourself. People in your life can provide guidance and coaching, yet that is what it is – guidance. One can learn from others' mistakes, but experience is gained by living life. Having all the necessary qualifications does not guarantee success nor position – it is gained by being competent in what you do.

6. Who is your role model/mentor?

I do not follow a single person or model. My take on life is to allow the good in all to rub off and stick.

7. What is the best advice you have ever been given?

If you break a stick daily, you do not need to break them all on due date, meaning that if you do something every day, you do not have to do everything on the last day.

The **SANIRE** Committee has decided to increase the advertising opportunities for suppliers who would like to market there business and products in the Rock Talk.

The table below indicates the prices for different size advertisements as well as bookings for the future.

Please contact **Paul Couto / Alida Hartzenberg** for more details

Paul.couto@harmony.co.za / paul.coutopm@gmail.com

Alida.hartzenberg@lonmin.com

Type of advert	Rates (Excl. VAT) Solus, Casual	Availability per newsletter	Select Publication Issue (Mark with x)	
			April 2017	July 2017
Square (Not front page)	R 1 000	4		
Skyscraper (Front page)	R 4 000	1		
Full page (Middle)	R 8 000	2		



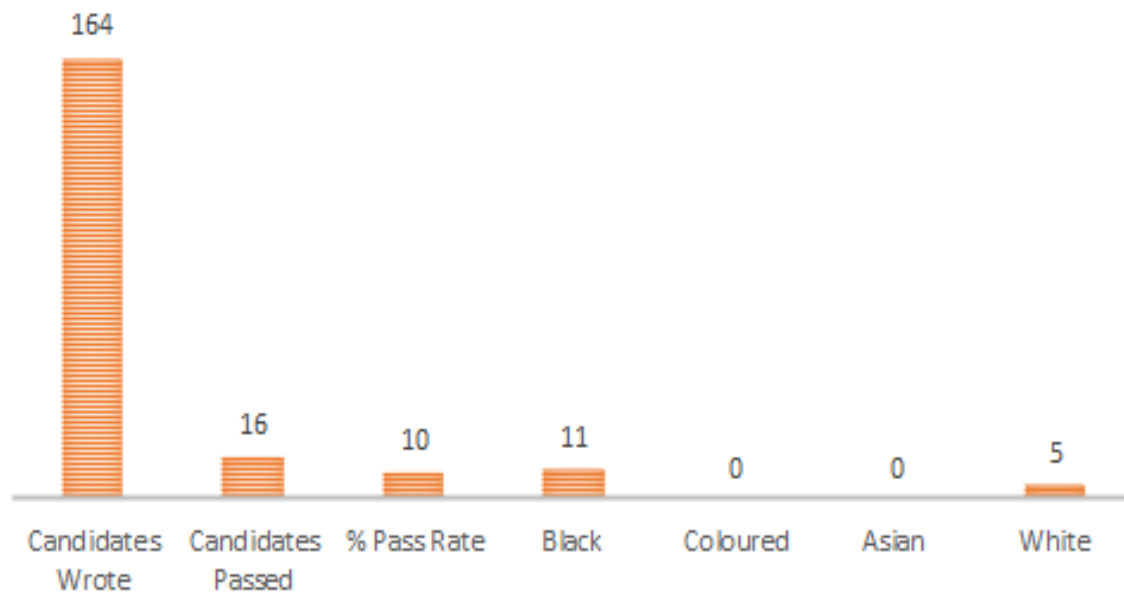
SC Goel
O Mandingaisa
RW Kersten
Dr S M Spottiswoode
KPA van Tonder
TB Stankiewicz
W M N Pretorius
CA Jermy
DMH Grave
ML Treloar
JL Campbell
MRC Kevange
I Crozier
J Bezuidenhout
JJ Engelbrecht
N Killassy
F Chiramba
M Maccelari
WL Mahne
AS Makgala
KD Mamosebo
AA Brown
H Urcan
V De Lange
MW Pretorius
P N Erasmus
EF Gouws
BI Kasongo
JJ van der Merwe
TL Matebese
M Tigere
TRE Moerane
PJ Le Roux
TN Nortje
A Mudzovaniswa
G Mc Gavigan
GP Scholtz
D Bierman
W J Marx
PF Janse van Rensburg
M Ridgway
T Madzivire
K Mathibela
LM Gezimati
AP Esterhuizen
L Rwodzi
JM Matsobane
B.B. TATI
Annerie Laurens

N Mandhaze
MA Mbongonya
A Boodoo
S Zuma
MZ Mazibuko
D Lees
T Gcuda (Munzhelele)
AG Hartzenberg
K Maketa
SS Mphago
L Vernooy
MDG Salamon
A van Schalkwyk
JV James
Prof MF Handley
TRM Molikeng
DC Oldroyd
D E Scholtz
MChatfield
JM Oelofse
JC Visagie
PM Couto
CE Smith
Werner Holtzhauzen
B van der Kevie
RIL Ferreira
W Zirima
EJ Sellers
MM Sibiya
FM Motebang
AH Olivier
JP rangwaga
DM Raby
FPJ Steenkamp
M Bester
P Mpunzi
SF Potgieter
T A Selengoane
Y Jooste
T Dlokweni
SE Ntshabele
N Nyamsi
JN Dodds
T Petzer
LL Ditlopo
T Itholeng
TW Chauke
M Coetzee
NA Nkosi

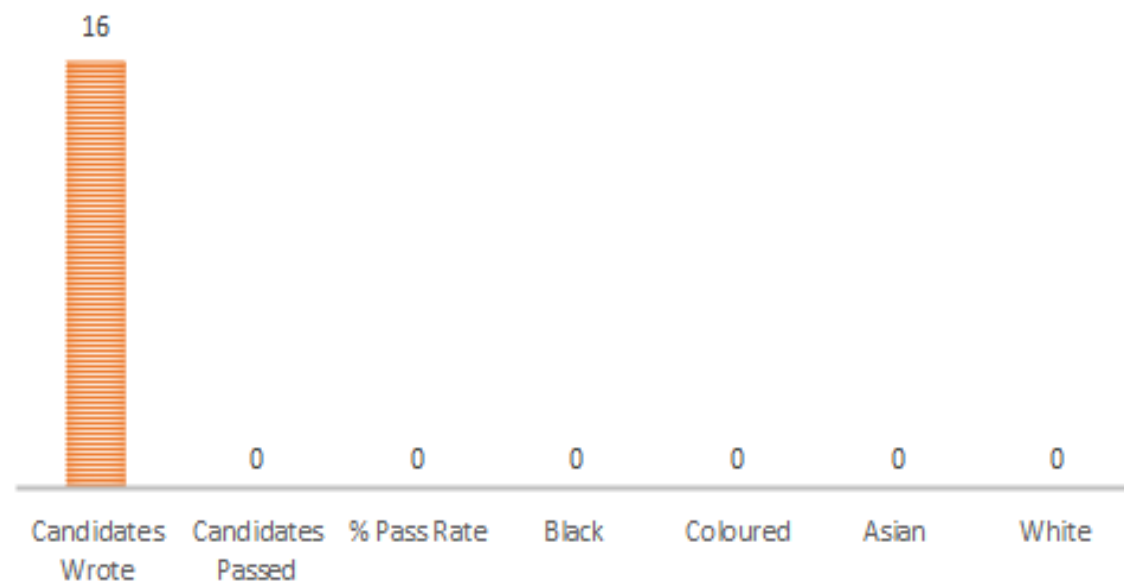
A Williams
SK Mosotho
T van Aard
SE Madonsela
H Netshifhire
LN Mtonxa
MB Kekana
R van Heerden
AP Boaduo
SP Matewe
JI Kwofie
OB Barker
GH Brinch
PJ Lotter
WA Naismith
S C Hageman
P Brenchley
JC de Villiers
ES du Toit
JC Pretorius
JD Smith
JF Chen
R M Carey
J Moller
FRP Basson
DR Fenn
JJ van Staden
P Akanyang
A W J le Roux
AV Visser
RP Matlou
CT Jooste
F Joel
SC Sibilanga
P Matjeka
JM Muaka
JP Jonker
WL van Aarde
A Lamprecht
MCB Stander
G Maphanga
IJ Smit
NK Mabaso
M Zwane
R Malogwa
FJ Rheeder
HM Mohlala
T Walsh

COM Exam Statistics October 2016

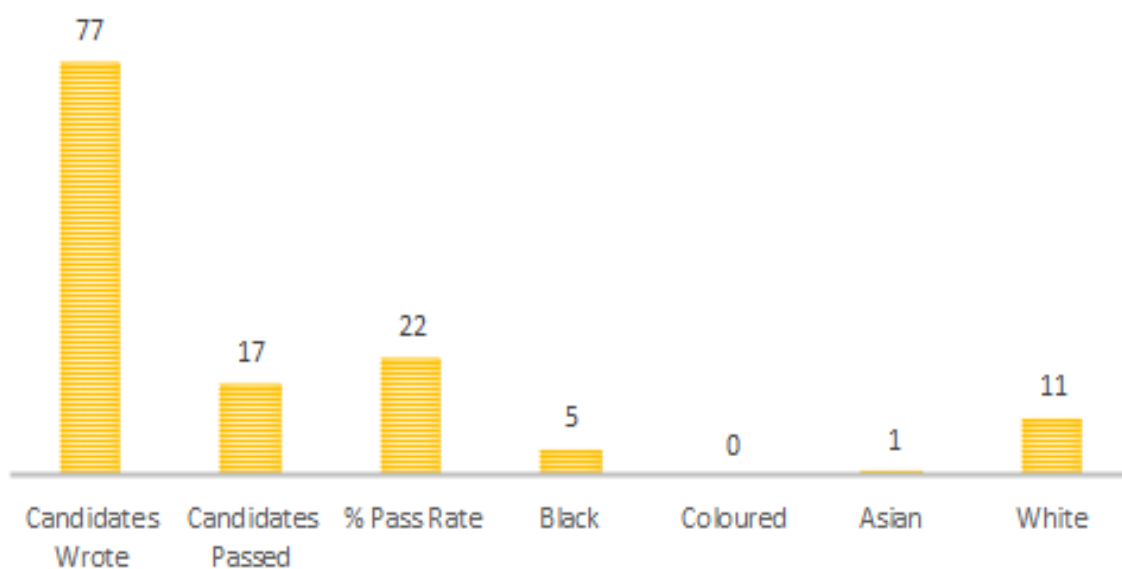
COM SCM



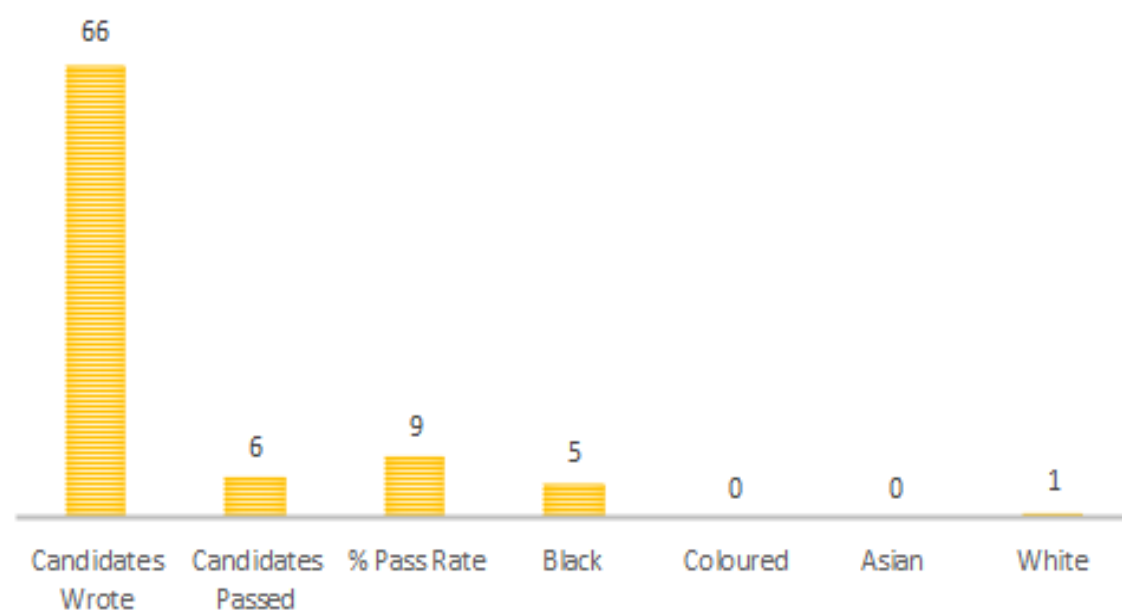
COM SCC



COM PAPER 1

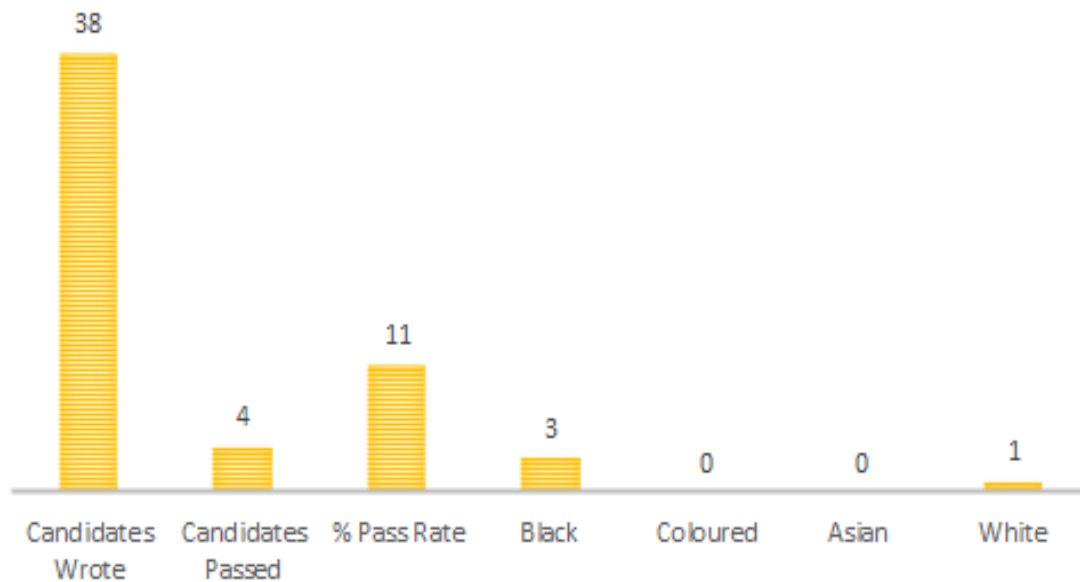


COM PAPER 2

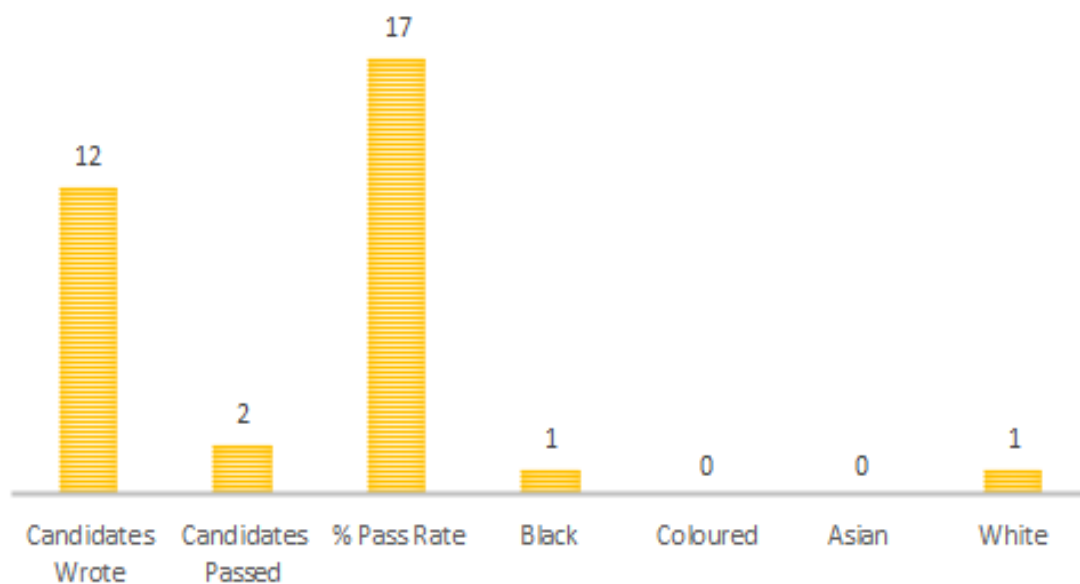


COM Exam Statistics October 2016

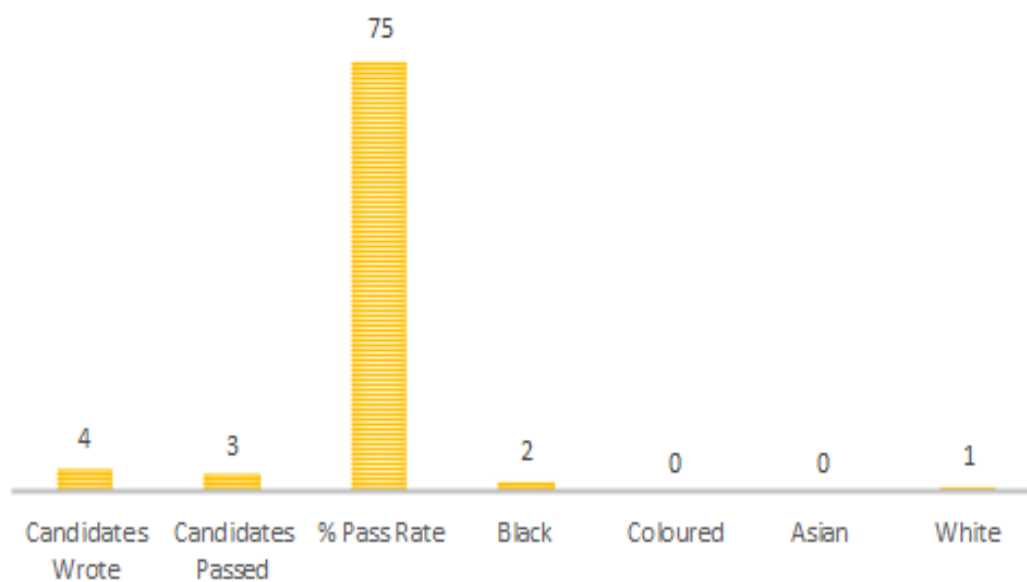
COM PAPER 3.1



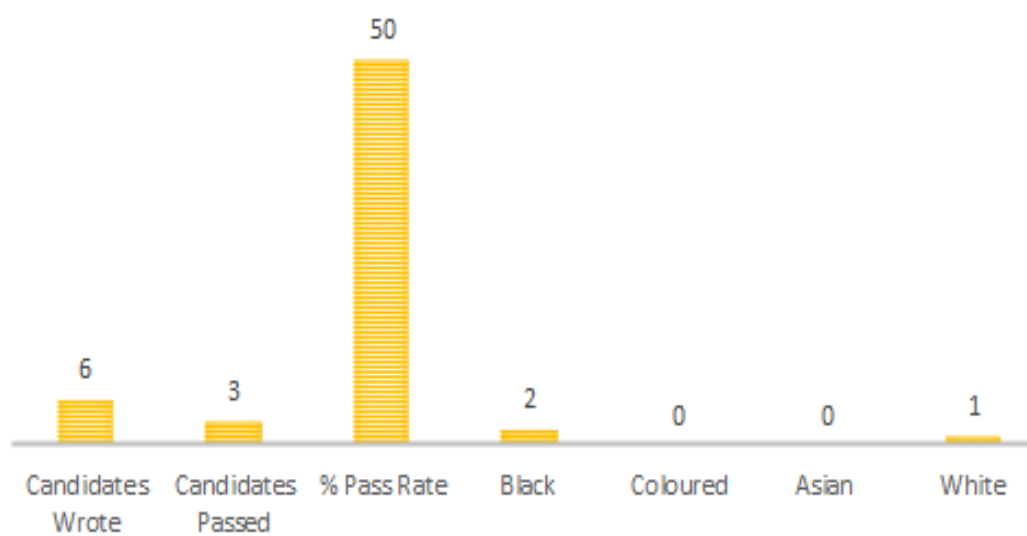
COM PAPER 3.2



COM PAPER 3.3



COM PAPER 3.4





Full Name: Cassius Selai

Position: Rock Engineering Superintendent

Company/ Organisations: Glencore Coal South Africa

Date and Place of Birth: 14 October 1985, Muila Village in Limpopo

Education: BESMEG (UNIVEN); CoM Certificate in Strata Control (Coal); CoM Certificate in Rock Mechanics (Coal)

First Job: Bolt Tester at Kenny's Strata Bolt Testing

Personal Best Achievement/s:

1. Obtaining my University qualification, because I was the first to achieve this in my family
2. Successfully designing a coal pillar extraction and further receiving the CEO award for this work
3. Presenting and publishing my very first Technical paper at the SHIRMS conference in 2012

Philosophy of Life: Whatever you do, do it with all your might.

Favourite Food/Drink: Simple Pap and Chicken

Favourite Sport: Soccer and Karate

1. How did your career in the mining industry begin and where are you now?

It began in earnest in 2008 when I joined the newly established Kenny's Strata Bolt Testing Consulting Company as a Bolt Tester, following the completion of my degree. My job was mainly to conduct the Short Encapsulation Pull Tests (SEPT), and in odd instances to assist with geotechnical logging of the rock cores. It was during this time that I gained more insight into the practical challenges pertaining to support installation that may often be overlooked simply because they are not reported. I am currently practising as a Rock Engineer after obtaining both CoM Certificates in Strata Control and in Rock Mechanics.

2. Why did you choose Rock Engineering?

In fact, Rock Engineering chose me and all that I had to do was to reciprocate. I have an analytical and inquiring mind, and often felt that I was capable of so much more during my time at the University and at times would get frustrated. After being introduced into this challenging yet interesting field and having progressed through the ranks, I now feel that I am beginning to realise my full potential.

3. Please tell us a bit more about your career journey?

It all started back in the days when I was doing my third year at the University of Venda. Although we had the Rock Mechanics related modules as part of the curriculum, I never thought that there was a qualification in Rock Mechanics. It was not until Anglo Coal (now Anglo American Thermal Coal) came through to give a presentation on the Rock Engineering issues at their operation, that I realized that there is a qualification in Rock Mechanics. As part of their visit, they would select 2 students to join their operation for some exposure in the field of Rock Engineering. I was fortunately one of the two chosen students to be part of their Rock Engineering team for a period of three months.

During my time at Anglo Coal, I was under the mentorship of the ever hard-working Mr Kenneth Mosetlha, who was then on his way out to establish his own practice. At the end of my mentorship, he then recruited me to be part of this newly established company as a Bolter Tester, an opportunity I could not refuse. It is from this point that I was really introduced to the mining industry and its dynamics.

In late 2008, I sadly had to leave the man who resuscitated my career, to join the then Xstrata Coal SA (now Glencore Coal SA) as a Learner Official Strata Control, under the leadership of Mr Brian Vorster (Group Rock Engineer), who has since relocated to Australia. Whilst working here, I have developed a suite of skills, such as Numerical Modelling, Mapping for pillar extraction, working with Senior Management, Training and coaching, etc. It was also during my time at Glencore Coal SA that I successfully compiled one technical paper as the main author and two as the supporting author under the mentorship of Sandor Pethö.

It was through the exposure and experience that I acquired at Glencore Coal SA that I was eligible to register for the CoM certificate in Strata Control Certificate in 2009, which I obtained during the year 2010. In 2015, I successfully completed the CoM Rock Mechanics Certificate in Coal and I am currently practising as the Rock Engineering Superintendent, overseeing 5 opencast operations and 1 underground operation. I am currently busy with my MSc (Eng.) in Mining (Rock Engineering) at WITS University and the Advanced Rock Mechanics Certificate.

4. What are some areas that you believe will become of increasing importance in the near future of the rock engineering discipline?

Mining in general has evolved significantly overtime and as a result, some of the previous research findings need to be reviewed for their relevance in the current mining environment. In the coal mining environment in particular, a lot of work was previously done by the pioneers in the area of pillar and support designs, which is being revisited. We are faced with a challenge of the coal resources nearing their depletion in the Witbank and Highveld coalfields and it is the duty of the practising Rock Engineers to work with research institutions in seeking viable solutions for future mining. Without delving much into the challenges of mining in the Waterberg area, it is evident that there is a need to devise means of safely expanding the life of existing mining resources.

A number of mining houses are currently mining the old coal pillars using an opencast method of mining, whilst some have resorted to staying away from the Pillar Extraction method of mining because of the inherent risk in the pillar extraction mining method. There is still a lot that we need to understand from the Rock Engineering perspective, with regard to pillar mining using an opencast method of mining, and I believe that we need the same intensity of research that was undertaken after the Coalbrook disaster. Furthermore, we need to fully understand and quantify the risks involved in coal pillar extraction. In this way, we will be able to positively contribute towards prolonging the life of coal mining, and which will in turn allow more time to further explore the Waterberg area for future mining.

5. What advice would you offer people aspiring to be in your position?

"Work hard and be patient enough to wait for your rewards".

6. Who is your role model/mentor?

There are few individuals really who I call a role model in various aspects of my being, i.e. spiritual, emotional and career wise. In my career, Sandor Pethö – my current Manager – is my role model and mentor on so many levels.

7. What is the best advice you have ever been given?

My mentor and role model once told me in the earliest stage of my career that "We need to learn to dance on a moving rug, as change is the only certain thing in our professions" and thus far, that is what keeps me going in this ever-changing working environment/profession.

A Probabilistic Structural Design Process for Bord and Pillar Workings in Chrome and Platinum Mines in South Africa

Rudiger Welf Olgert KERSTEN

The design of stable pillars in mining is of fundamental importance not only in the Bushveld mines but in the entire mining industry. Wherever mining occurs, pillars will be formed at some stage, and it is essential to predict their behaviour. It is imperative to know whether they would burst, yield or remain stable. Although of major importance, the design of pillars still suffer from major drawbacks and weaknesses that affect the results in a fundamental manner.

Faced with uncertainty, the designs have, for the most part, been conservative, resulting in the loss of millions of tons of ore by being sterilized and unavailable in the future. The reduction of the life of mines with dire consequences for the long-term life of the mining industry.

With the above in mind the thesis investigated the following:

- The pillar design method currently in use for its strengths and weaknesses
- Alternative methods in use, actual and suggested.
- Proposed an improved method for calculating the pillar strength and the loading system.
- Compared the improved method with underground observations.
- Proposed a simplified pillar strength equation based on the improved method.
- Presented main conclusions and recommendations.

Examination of the pillar design method currently in use for its strengths and weaknesses:

Pillar design has been based on the empirical equation on the work done by Salamon and Munro (1967) for coal mines and subsequently modified by Hedley and Grant (1972) at the Elliot Lake uranium mine. By changing the exponents relevant to the hard rock mine, the Hedley-Grant equation was created. It has since become known as the Hedley-Grant strength equation for hard rock pillars.

The weaknesses associated with the empirical method are as follows:

- The method is easy to use but could not be extrapolated beyond the range used for calibration.
- Very few pillar collapses have occurred in Bushveld mines which could possibly be ascribed to over-conservative design or correct design.
- Empirical methods are, by nature, observational and no deep fundamental understanding of the variables is required to derive an answer acceptable in general to the problem of stability.

The pillar strength equation is based on the following:

$$\sigma_{str} = k w^{\gamma} h^{\alpha}$$

Where k strength factor

w and h width and height of the pillar

γ and α variable exponential “constants”

σ_{str} pillar strength

Except for the width and the height of the pillar, the strength factor and the exponents are based on back-analysis of failed pillar areas. In the absence of failed pillar areas, the strength factor is assumed to be a fraction of the uniaxial compressive strength of the rock mass in the pillar; the value varied from 0.3 to 0.8, which is sometimes increased without sound scientific basis when no pillar failure occurred. This type of approach is not only wasteful but could prove to be dangerous.

The stress imposed on the pillar is determined by using the Tributary Area Theory (TAT) including the percentage extraction, depth below surface and the rock mass density.

One major advantage of the method, Hedley-Grant strength equation and the Tributary Area Theory, is its ease of use; few parameters needed to be defined.

Rock masses are difficult to define as an engineering material. At the time of the research, the average uniaxial compressive strength of five samples for an ore body had been deemed sufficient to design a mine. Detailed analysis of strength values showed that the coefficient of variation (COV) for pyroxenite and chromitite was 0.33 nearly falling outside the region of even statistical predictability.

Variability in the actual pillar dimensions, in plan and section, which differ substantially from design dimensions, adds to the uncertainty of the design.

Using the Monte Carlo simulation method, the influence of the variability of the input parameters for a typical bord and pillar chrome mine, using the Hedley-Grant equation and the tributary area theory showed the following results:

Probability of Failure = 23% at a factor of safety of 1.57.

Accepting that the Hedley-Grant equation is correct and that the Tributary Area Theory is a true reflection of the pillar strength and stress, the design safety factor of 1.57 is acceptable but the probability of failure of 23% due to the variation in input parameters raises the question of whether a factor of safety of 1.57 is sufficient?

The above argument presupposed that the values using Tributary Area Theory and the Hedley-Grant equation provided the correct answer. The fact that the predicted failure did not materialise indicated that the input parameters were overly conservative and/or the pillar equation is suspect.

It should also be noted that the probability of failure related to the probability that any given pillar had a factor of safety < 1.0 . Failure of a panel of pillars would only occur if those pillars happened to be in groups.

Investigate alternative methods in use, actual and suggested:

The deficiencies have been identified by other researchers and alternative approaches have been developed addressing some of these deficiencies. The overall conclusions from a literature survey were as follows:

The influence of the stiffness of the loading system was neglected in the pre-failure region but three methods assessed incorporated the strata stiffness concept in the post-failure regime

None of the methods considered the interaction between hanging wall and/or footwall and its effect on the pillar strength.

Composite pillars were generally treated as a uniform entity.

The variability of the mining dimensions and the rock mass properties were dealt with quantitatively in four methods.

None proposed a methodology that incorporated a combination of a more realistic strength equation, the system stiffness and the probability approach in design.

Proposal of an improved method for calculating the pillar strength and the loading system.

The proposed alternative approach is based on a semi-analytical strength determination using a two-dimensional mathematical model in conjunction with a failure criterion to calculate the pillar strength.

The selected method is based on the following:-

- Determining the pillar stress using *FLAC2D*,
- Incorporating the modified Hoek-Brown failure criterion.

It is assumed that the pillar/rock mass remained elastic until pillar failure occurred. The interaction between the local mine/pillar stiffness, and an elastic response, determines the loading conditions. The combination of the two concepts, both elastic, was used to determine the factors of safety for the pillar/rock mass.

With further development, the variability of the rock mass properties and mining variations were also incorporated in the proposed methodology.

The *FLAC2D*/Hoek-Brown model could simulate/incorporate the following conditions:-

- The pillar strength for a homogeneous pillar.
- Strength of composite pillars such as found in the chrome mines.
- Incorporation of the effect of planes of weakness.
- Use of known geotechnical parameters.
- Development of a simple equation for a specific set of conditions.
- Although of great importance, the influence of the hanging and /or footwall properties on pillar strength was not considered in the thesis.
-

Using the *FLAC2D*/Hoek-Brown model the following was observed:-

- The vertical stress was the lowest at the pillar edge at commencement of pillar failure.
- At the average peak pillar stress, the vertical stress at the core of the pillar generally exceeded the uniaxial compressive strength of the rock.
- Pillar failure was seen as a progressive process.

- The volumetric strain increment could be a possible measure of the depth of fracturing in a pillar.

For back analysis, it was obvious that some definitive values had to be used. The required variables were identified as follows:

- The mean uniaxial compressive strength from available samples for the property was used.
- The Geological Strength Index was estimated.
- The m_i value, hence the m_r , was based on the widely used RocLab programme.

Pillar loading is a function of the strata stiffness and the areal extent of the mining geometry while the Tributary Area Theory assumes an infinitely mined area with zero stiffness of the overlying rock mass.

This oversimplification leads to overdesign in most practical mining geometries. It is known that the geological losses in the platinum mines varies between 20% and 30% of the mined area resulting in limited mining spans between the “regional pillars” created by the geological losses.

The influence of the geological losses can be simulated using the concept of the load line of the loading system. The amount of convergence in an elastic medium can be calculated for various spans, different Poisson’s ratios and Young’s Moduli.

The research dealt with the pre-failure portion of the pillar design, therefore, the theory of elasticity could be used to the point of pillar failure allowing accurate calculation of rock mass, pillar stresses and deformations.

Figure 1 is a plot of a pillar strength curve intersecting the system loadline. The system obtains equilibrium at the intersection of the two curves. In this example, the system curve is based on the fact that without any support full elastic convergence would occur. The presence of a support medium, that prevents any convergence, is the product of the area and the vertical primitive stress.

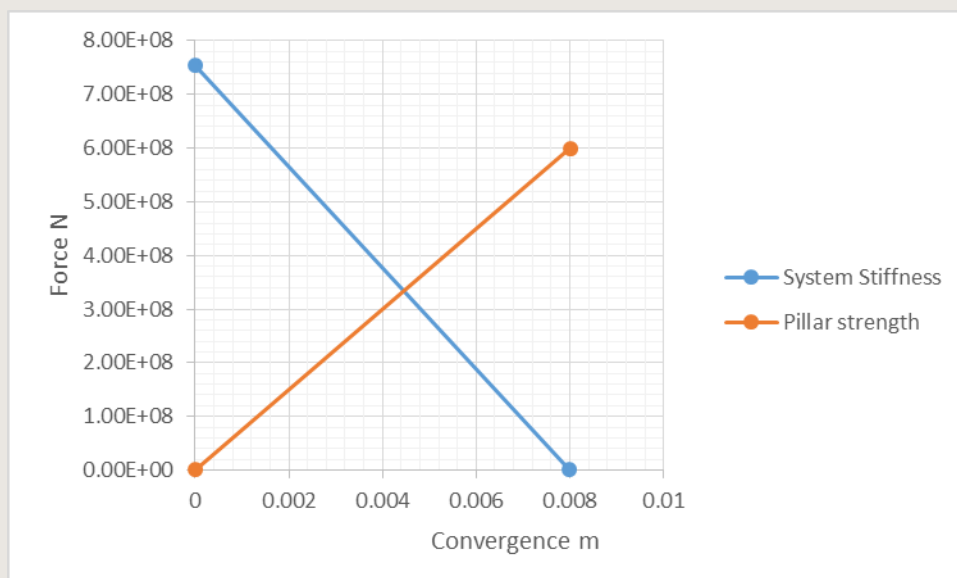


Figure 1. Plot showing pillar resistance and system curve

The pillar resistance curve is based on the stress and convergence obtained using *FLAC2D* and the Hoek-Brown failure criterion, while the system stiffness curve/load line is based on the elastic convergence of a slot in an elastic medium at finite depth. The intersection of the two curves gives the equilibrium condition of a specified geometry.

The combination of the two curves and the intersection point is referred to as the System Pillar Equilibrium Concept, SPEC for short.

The curves in the Figure 1 were obtained by following the process shown in the flow diagram, Figure 2.

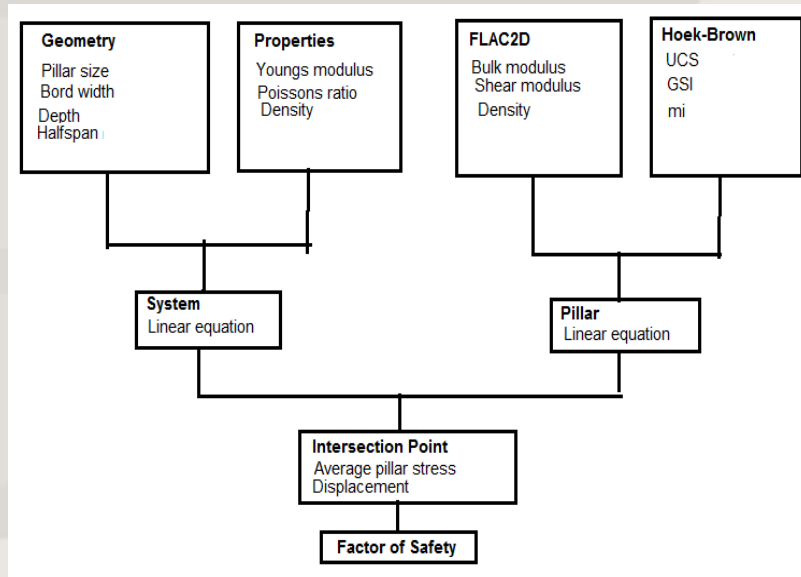


Figure 2. Schematic presentation of the steps involved in the *FLAC2D/Hoek-Brown* and *System Pillar Equilibrium/SPEC* methodology.

The comparison of the improved method with underground observations:

Two bord and pillar mines in the Bushveld complex were selected for calibration, Two Rivers and Impala Platinum Mines, to test the proposed methodology.

In both cases the extent of pillar failure, as well as the convergence, could be simulated and it was concluded that the method did represent the actual underground conditions better than other current methods.

A propose a simplified pillar strength equation based on the improved method:

One of the main advantage of the Hedley-Grant/Tributary Area Theory is its simplicity in application. In order to achieve a similar ease of modelling, it was attempted to obtain a generic pillar equation that is easy to use.

A simple generic equation was derived, using the Geological Strength Index and the uniaxial compressive strength, based on the detailed back-analysis that could be used for all “normal” situations in the Bushveld mines. It was found that for a specific range of data the equation below can be used:

$$\sigma_{str} = \delta \left(\frac{w}{h} \right)^\beta$$

Where $\delta = d e^{f GSI}$

$$\delta = 0.0999 e^{0.0704 GSI} \quad 120 \text{ MPa}$$

$$\delta = .1089 e^{0.0674 GSI} \quad 100 \text{ MPa}$$

$$\delta = .1675e^{0.06GSI} \quad 80 \text{ MPa}$$

$$\delta = 0.1652e^{0.0574GSI} \quad 60 \text{ MPa}$$

$$\beta = \text{TANH} \left[\left(\frac{GSI - a}{b} \right) \right] c$$

Where $a = 46.866$

$b = 16.916$

$c = 1.2906$

Where δ and β are both related to the uniaxial compressive strength and the GSI value.

By employing this equation, it was possible to simplify the calculation procedure as well as for use of the Monte Carlo simulation for sensitivity studies.

Present main conclusions and recommendations:

The weaknesses of the current design procedure have all been addressed and it was concluded that the proposed methodology is an improvement on currently available alternative methods of bord and pillar design.

The volumetric strain increment value for failure initiation lay between $1e-2$ to $3e-2$ for the fracture zone extent for both pyroxenite and chromitite pillars.

From the volumetric strain increment values, it appeared as if the *FLAC2D*/Hoek-Brown model in conjunction with the SPEC method required to calculate the pillar stress and convergence, approximated the real underground situation.

The stage has been reached where the methodology can be used to predict most likely failure of pillars at greater depth and alternative pillar mining methods could be modelled. The concept can also be extended to incorporate the energy balance of the system.

A generic equation based on the *FLAC2D*/Hoek-Brown methodology has been developed for general use in mine design.

Additional research is essential on subsections of the input values to finally establish that the methodology is a representation of underground physical changes.

Presidential Tour 2017

Johannesburg to Cape Town
25th September – 30th September 2017



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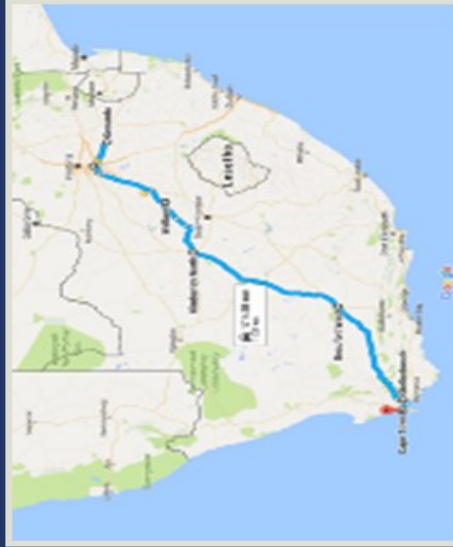
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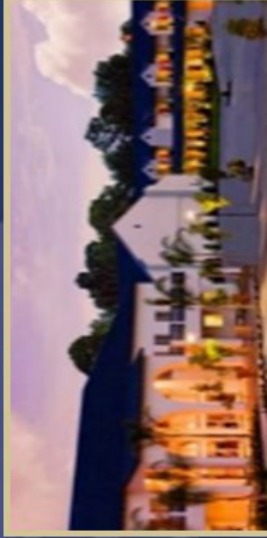
What is the Presidential tour?

The purpose of the Presidential tour is to expose the members of SANIRE to new and different working environments within the Rock Engineering / Geological field.

Our Route



Paul.coutopm@gmail.com / 083 391 9243
Paul.couto@harmony.co.za



Monday – 25th September 2017

Birchwood – Arrival 17:00
– Tour briefing 18:00–18:30
– Dinner 19:00
Birchwood – Breakfast 06:00–07:00
– Depart to Sasol Coal 07:00

Tuesday – 26th September 2017

Sasol Coal – We will visit their mock up underground stope and training center which has just been completed.

Depart for Welkom: 13:00 – We will have a KeBenJa Brewery Tour before dinner starting at 16:30



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Presidential Tour 2017

Tuesday – 26th September 2017

Welkom Inn Hotel – Check in - 18:00
Dinner - Sietas Restaurant - 19:00



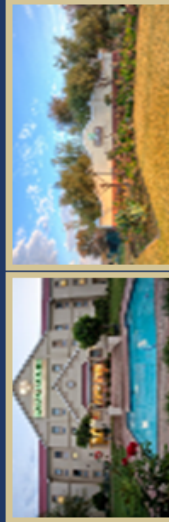
Wednesday – 27th September 2017

Welkom Inn Hotel – Breakfast - 06:00 - 07:00

Depart to Bambanani: 07:00 – 07:30
Shaft Pillar Extraction.
Underground visit.

Depart to Kimberley: 14:00 - Check in at the
Road Lodge Kimberley.

Dinner – 18:00 – Flamingo Casino



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Thursday – 28th September 2017

Road Lodge Kimberley – Breakfast: 07:00 –
08:30



Big Hole Museum Kimberley: Arrival at 09:00
Tour will start at 09:00-10:00 (±1 hour).
Lunch 11:00 – 12:00 Café at museum.

11:00 - Depart to Beaufort West – Check in at
the Wagon Wheel – 17:30

Dinner – 18:00
Breakfast – 06:00 – 07:00



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Friday – 29th September 2017

07:00 - Depart to Zevenwagt Wine Farm and
Tin Mine.

Arrival – 12:00

Wine Tasting/Snacks – 12:00 - 15:00

SANIRE Presidential Late Lunch / Early Dinner
– 15:00



18:00 - Depart for W & A Waterfront Cape
Town - for final night stay. City Lodge Hotel
W & A Waterfront



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Technical Corner

The Optical Televiewer

In recent years, the advent of borehole imagery and the ability of computers to manage and process the much larger data sets involved, have revolutionised the mineral wireline logging industry.

A continuous, orientated, high-resolution representation of a borehole wall offers many advantages to the rock mechanics engineer. The data provides knowledge about geology, structure, fractures and stress orientation. Most of this knowledge might be gained by analysis of orientated drill-core, but that option has proved to be time consuming, imprecise and costly.

In this age of information technology, objective and precise data, captured in situ, is transferred directly from borehole to computer where it can be stored, processed, analysed and disseminated, literally at the touch of a button. This is good for density, gamma ray and resistivity logs ... the wiggly lines. It is fantastic for borehole imagery, which uses all the functionality and capacity of a modern computer. It brings the formation to the engineer's desk.

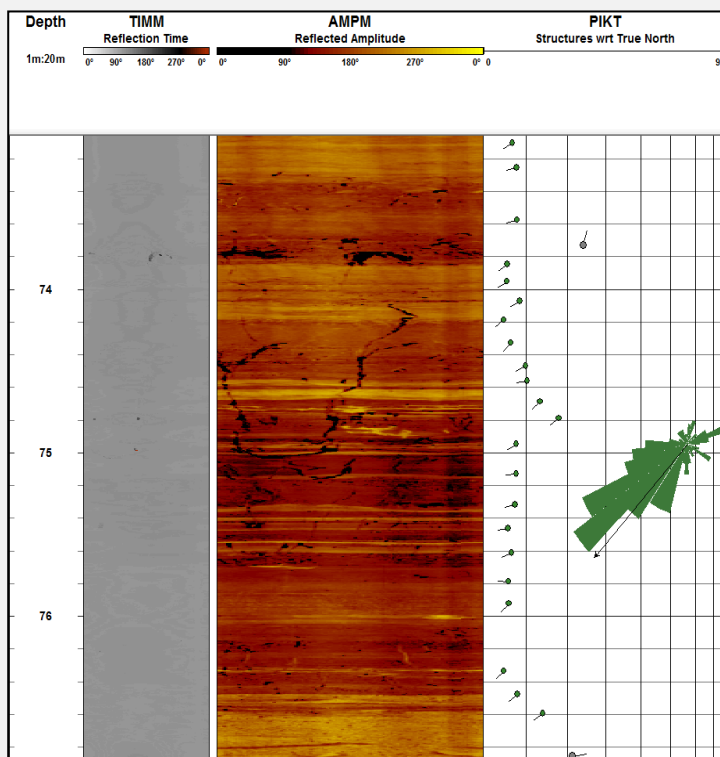
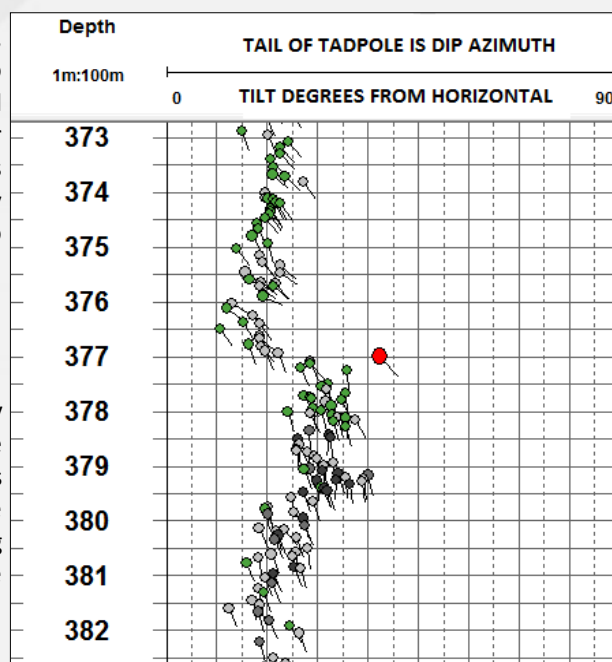
A Tadpole Plot

Twenty-five years ago, the resistivity **Dipmeter** was the only orientated measurement used in a borehole. It involved the correlation of three or four high-resolution resistance logs whose depth and position on the borehole wall were known. The result was a **tadpole plot**, a braille-like representation of bedding dip orientation. In mineral logging, the advent of borehole televiewers has made dipmeter logging a rare and specialised event; but the tadpole plot, as a means of displaying derived structures, has endured.

The **Acoustic Televiewer** logs the borehole wall in terms of hardness, measuring the amplitude of a high frequency, reflected sonic pulse at very high resolution. It describes the borehole skin rather than the formation beyond.

An acoustic televiewer log

Hard rocks reflect high amplitude signals, and soft rocks and fractures reflect low ones. Measurements of reflected amplitude are made continuously (send-receive cycles last a few hundred microseconds) by a rotating transducer or, more often in slim tools, a rotating sonic mirror aligned with a stationary transducer. The result is a map of the borehole wall with an individual resolution of about 2 millimetres in ideal conditions. The images above show what the log looks like. The borehole wall is unwrapped with the left edge (and right edge) of the resulting image aligned with magnetic north. Fractures and bedding planes appear as sinusoidal lines where the deepest point on the line is the direction of dip.



Reflection travel times (left image) for each cycle are measured and mapped in the same way as the reflected amplitudes (right image), resulting in a complete description of the borehole cross-section. Tool centralisation is important to ensure similar travel time and signal strength in all directions. Resolution is reduced in large boreholes and/or drilling mud where signal dispersal is a problem.

Because the acoustic televiewer is sensitive to rock hardness and can measure fracture orientations and apertures (lost in drill-core), it has become an important geotechnical tool in both sedimentary and hard-rock environments.

A limitation of acoustic tools is that they only function in fluid-filled holes. If the rock engineer requires data from dry boreholes, the **Optical Televiewer** should be employed. It measures the colour and shade of reflected light. The borehole wall is lit by a ring of light-emitting diodes (LEDs) on the tool, and reflections are directed to a light-sensitive sensor via a conical mirror. Resolution is very high, with pixel sizes down to well below 1 millimetre at HQ borehole diameter.

The optical device provides an orientated photograph of the borehole wall at high resolution and without perspective ... like virtual drill-core, but describing a larger sample diameter.

An optical televiewer image

The system does not offer a travel time image, and log quality is dependent on clean borehole fluid if it is run below the water table. In slim holes, optical televiewer images can be of such high quality and value that it is usually well worth cleaning the borehole wall and replacing dirty fluid before logging.



Data processing of all three image types, acoustic, optical and electrical, is normally performed in the same way. An empty structure log is placed over the image and populated by manually picked orientations ... sinusoids are fitted over selected events using a mouse. After picking and classifying (fracture, fault sedimentary bed, vein etc.) is completed, the structure log is orientated with respect to horizontal and true north, and displayed as a tadpole plot, rose diagram, polar plot, etc.

During data processing, the log analyst can derive the dip and direction of bedding, layering, joints and faults, as well as fracture condition and aperture. This is a major advantage if you are designing the foundations for a multi-billion dollar power station or dam wall. In fact, it is surely difficult to argue a case for not running the sonde if site investigation boreholes are to be drilled on that type of project. The system offers an in situ, objective, orientated description of the ground that may be analysed, stored, transmitted and shared easily. The user of televiewer data captures:

- The complete picture (no gaps)
- Orientation
- Aperture
- Fluid ingress points (in dry hole)
- Gas ingress points (in wet hole)

None of these benefits is guaranteed or consistently reliable from drill core.

There are limitations to the OTV system which can affect log quality.

Dirty water obscures the target.

In the big diameter hole scenario, it would be necessary to clean out the opaque borehole fluid, otherwise the advantage of the lighting power is lost completely. It is remarkably difficult, even with very bright lights in small diameter holes, to describe the borehole wall through dirty water.

Oily residue or water droplets often become attached to the lense cover.

If the OTV is required to log the dry section of a borehole, the logger should avoid dipping the sonde into the water before logging upwards. Any oily liquid will float to the top of the water and beads of oily water might damage the optical image.

The optical televiewer lighting plant

This usually has only an aesthetic effect on the data ... to be avoided, but not critical to the purpose of running the system.

Magnetic formations seriously affect image orientation.

If a borehole is drilled to intersect very magnetic formations and the borehole is close to vertical, then neither acoustic nor optical images may be orientated. You get a good image and events on it may be identified, classified and counted, but they cannot be orientated.

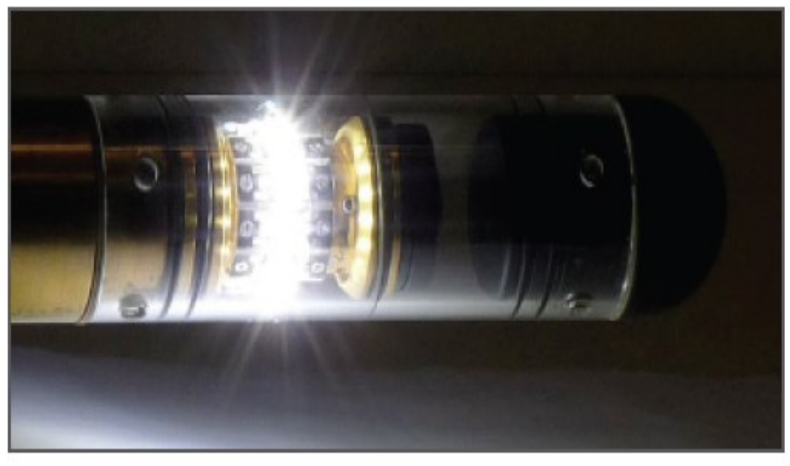
Orientation of the borehole trajectory depends on the televiewer sonde's navigation sub. The logged trajectory, as well as having value as a navigation log, is used to rotate picked events on an orientated image so as to be aligned with respect to true dip and azimuth.

- The measurement of borehole **tilt** with respect to the vertical, usually based on accelerometers, is unaffected by magnetism.
- The measurement of borehole **azimuth**, with respect to magnetic north and later corrected to be with respect to true north, will be damaged by magnetic formations.
- Orientation of the optical or acoustic **images** to magnetic north (left edge) will be damaged by magnetism confusing the magnetometer set in the navigation sub.

The solution is to orientate the image with respect to the **high side** of the bore, as determined by the accelerometers. Events will be orientated and may be rotated by reference to a repaired magnetometer-based navigation log, to a gyro-based navigation log or, if necessary, to the estimated trajectory of the borehole.

In magnetic formations, the logger needs:

- A borehole tilt that exceeds 1.5 degrees from vertical (so that it has a high side).
- A reliable navigation log from a gyro sonde or estimation.

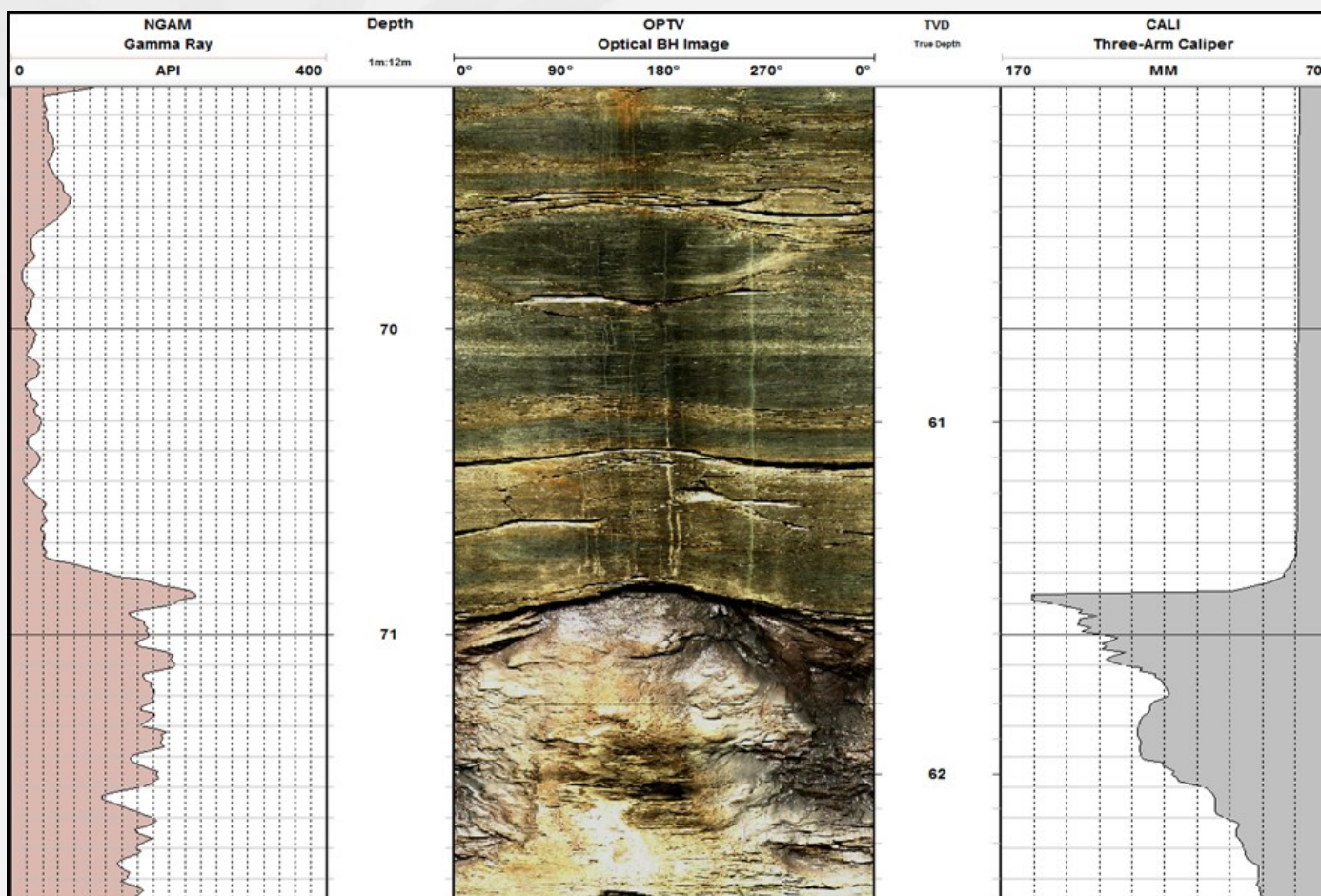


Very often in these circumstances, the driller is required, by his client, to drill at an angle rather than nominally vertical. In most cases, where a borehole exceeds 100 metres in depth, the trajectory deviates from vertical anyway.

Questions to be addressed early in the programme:

- Which log is required, OTV, ATV or both?
- If OTV, can any dirty borehole fluid be replaced?
- If ATV, how deep is the fluid level (the sonde needs a water-filled environment)?
- Is the formation expected to be magnetic?
- Should the driller purposely drill non-vertical boreholes?
- Is the logger required to mobilise a gyro verticality system?

Each imaging tool has its advantages and disadvantages. Borehole conditions play a big part in image quality and that is where the **driller** should be involved. It is important that the borehole be prepared to offer the best conditions for the selected methodology. That might mean, where possible, flushing and cleaning for the optical televiewer. In all cases, fresh water within smooth borehole walls works best.



OTV logging can be frustrating if the logger and his client fail to plan properly and make resources, such as water tankers, available on site.

New Members June 2016—January 2017

No.	TITLE	NAME	SURNAME	GRADED AS	ISSUED NO.
1	Mr	Ereck	Mponya	Associate Member	A601
2	Mr	Collen Charles Nkhetheni	Muthelo	Associate Member	A602
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SANIRE

SOUTH AFRICAN NATIONAL INSTITUTE OF ROCK ENGINEERING

**South African RockBowl 2017
hosted at the
KLOOF TRAINING ACADEMY
on
26 May 2017**

***A minimum of 20 questions, answers and
references per team needs to be submitted to Paul
Couto before the 13th April 2017.***

**Closing date for registrations and payments:
19th May 2017**

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SANIRE members - R200
Non-members - R300





SANIRE

SOUTH AFRICAN NATIONAL INSTITUTE OF ROCK ENGINEERING

Vision: To promote the interests of a vibrant South African Rock Engineering Fraternity

Mission: SANIRE promotes the advancement of the Rock Engineering discipline through the following objectives:

- ◆ Encouraging interest and the advancement of education in Rock Engineering
- ◆ Maintaining professional practice and high standards of ethics
- ◆ Encouraging networking; Collaboration and information exchange
- ◆ Identifying, promoting and facilitating rock engineering related research

Values:

- ◆ **Honesty**
- ◆ **Integrity**
- ◆ **Professionalism**
- ◆ **Accountability**
- ◆ **Transparency**

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EDITORS CORNER

This is your newsletter and I would like to hear from you.

*If you have any information or stories that we can use, please submit them via
email to*

paul.couto@harmony.co.za or alida.hartzenberg@lonmin.com

Your feedback will be highly appreciated.

Paul Couto and Alida Hartzenberg

