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# SAICE Journal

Prof. Gerhard Heymann



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# What is SAICE

South African Institution of Civil Engineering

SAICE is the Learned Society and professional home for almost 10 000 civil engineers, technologists, technicians.

Established in 1903.



# What services does SAICE provide:

Gives input to central government regarding legislation concerning civil engineering.

Infrastructure report card.

Continued Professional Development for its members (CPD).

The development of technical guidelines and documentation.

Community outreach programmes.

Publishes an informal magazine and a formal journal.



# Journal history

1903 to 1950s - Proceedings / Transactions of the Institution

1950s to 1993 - Regular magazine containing news and technical publications

1993 - Magazine and Journal published separately

## Accreditation:

1993 - DOE accredited

2007 - ISI accredited

## Open access:

2000 to current - Available on SAICE website (open access).

2009 to current - Available on SciELO platform (open access).

1903 to 2008 - Available soon on Sabinet African Journal Archive (open access).



# Sponsorship

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# TECHNICAL PAPER

**JOURNAL OF THE SOUTH AFRICAN INSTITUTE OF CIVIL ENGINEERING**  
 Vol 53 No 1, April 2011, Pages 46–54, Paper 754



CHARLES MacROBERT received his BSc (Eng) in Civil Engineering from the University of Cape Town. He works for Anglo Technical Services in the Civil and Structural Consulting Division. His interests are the interactions between the various soil states and how these relate to strength and stability. Currently he is involved in a number of large-scale field tests to analyse the process of sedimentation, consolidation and desiccation of slimes that leads to strength gain in deposited tailings. This research is also aimed at unlocking any potential water savings. His research interests furthermore include experimentation with new and novel methods to ascertain the in situ strength of soils, such as resistivity. He is an Associate Member of the South African Institution of Civil Engineering, and is registered with the Engineering Council of South Africa as a Candidate Engineer.

*Contact details:*  
 Anglo American Technical Services  
 45 Main Street, Johannesburg, 2001, South Africa  
 T: +27 (0)11 638 2032  
 E: cmacrobot@angloamerican.co.za



DENIS KALUMBA is a Senior Lecturer in the Department of Civil Engineering at the University of Cape Town (UCT). He holds an MSc degree in Geotechnical Engineering from UCT and a PhD in Civil Engineering and Geosciences from the University of Newcastle-upon-Tyne in England. He is the convener of all geotechnical engineering courses at both undergraduate and postgraduate level at UCT. A member of the British Geotechnical Association and the International Society for Soil Mechanics and Geotechnical Engineering, Dr

## Correlating Standard Penetration Test and Dynamic Probe Super Heavy penetration resistance values in sandy soils

C MacRobert, D Kalumba, P Beales

This paper presents a statistical method used to develop an empirical equivalence between the Standard Penetration Test (SPT) and the Dynamic Probe Super Heavy (DPSH) in sandy material. Penetration resistance values from the two tests are often taken as equivalent for design purposes, as the same drive energy is used in both. SPT and DPSH resistance values from different geological depositional and weathering environments were examined. The data came from the following areas across southern Africa: Matola in Mozambique, Gope in Botswana, Umdloti and Cape Town in South Africa, and Illha de Luanda in Angola. It was apparent that energy losses were greater in the DPSH test than in the SPT, leading to higher resistance values in the former. The SPT is carried out within a borehole, whereas the DPSH is continuously driven into the soil. The dynamic force applied to the DPSH rods causes soil to fill the small air annulus around the rods, exerting a frictional resistance. The different geological settings of the test sites revealed that, although different factors cause the friction, the equivalence varied in a similar manner. Hence a single correlation formula is suggested to determine equivalent SPT values from raw DPSH resistance values.

### INTRODUCTION

A major requirement of geotechnical engineering is an understanding of the soil and rock profile below a proposed development. In southern Africa a major method

survey of South African practice in conducting the two tests has shown that the tests are carried out to a large extent consistently with the IRTP (MacRobert *et al* 2010).

Both tests are dynamic in that a 63,5 kg

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# Advantages of SciELO

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Included in international indexes and search engines.

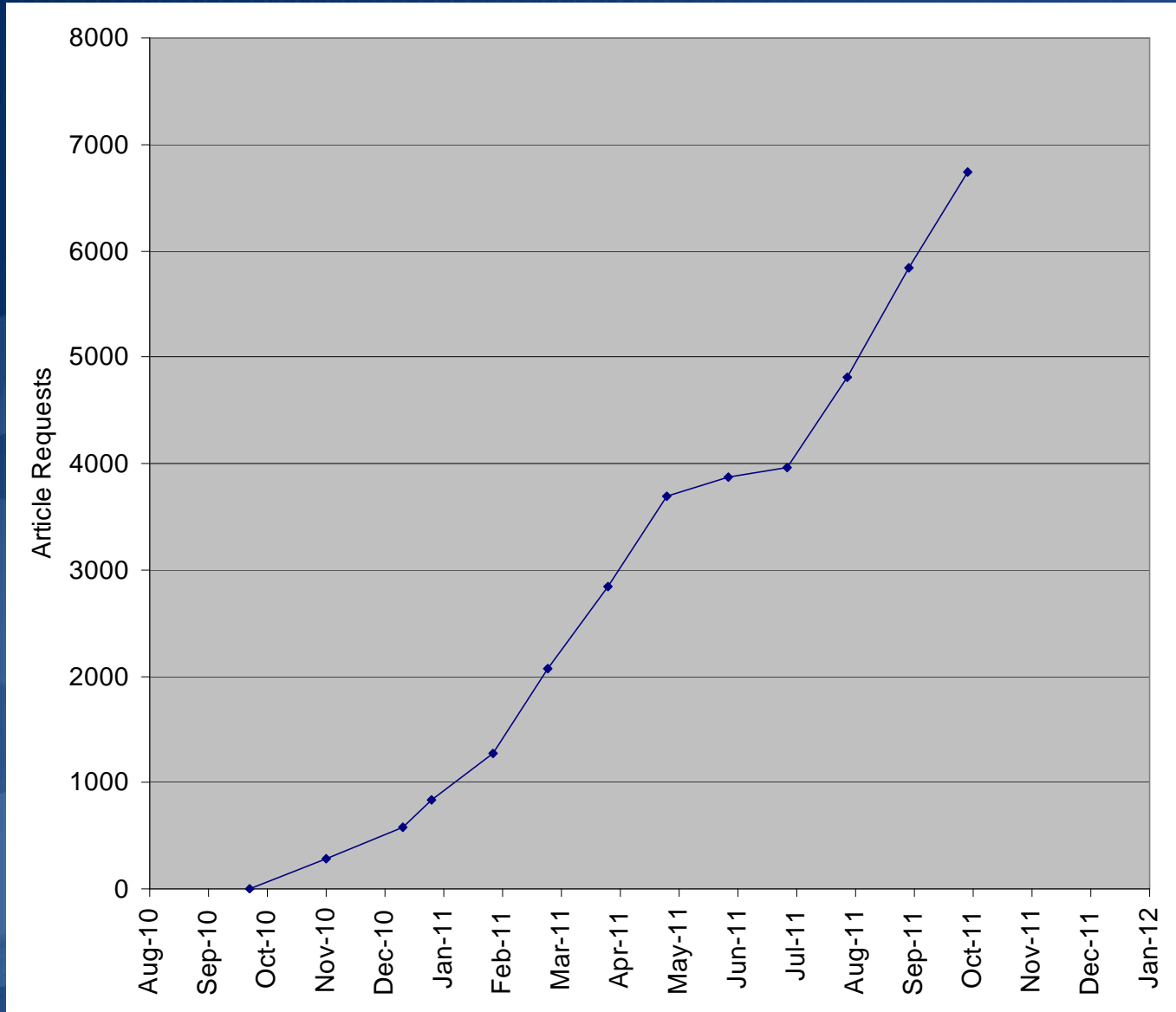
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- Science Citation Index Expanded
- Web of Science

Platform has search capability (author, subject, keywords).

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# Sabinet - African Journal Archive

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**Welcome to Civil Engineering**  
167 issues (in process)

The Journal of the South African Institution of Civil Engineering publishes refereed papers on all aspects of Civil Engineering relevant to Africa. It provides authoritative information not only on current developments and gives access to data on established practices and the construction of existing infrastructure.

The forerunner of the South African Institution of Civil Engineering was established in 1903 as a learned society aiming to develop technology and to share knowledge for the development of the day. The minutes of the proceedings of the then Cape Society of Civil Engineers mainly contained technical papers presented at the Society's meetings. Since then, and throughout its long history (during which time it has undergone several name changes), the organisation has continued to publish technical papers in its monthly publication, until in 1993 it created a separate Journal for the publication of technical papers.

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SAICE journal: <http://www.saice.org.za/Publications/Journal/tabid/87/Default.aspx>

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THE TRANSACTIONS  
OF  
THE SOUTH AFRICAN INSTITUTION OF CIVIL ENGINEERS  
DIE SUID-AFRIKAANSE INSTITUUT VAN SIVIELE INGENIEURS

(ESTABLISHED 1902)

Volume I

OCTOBER 1951

Number 8

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The Institution, as a body, is not responsible for the statements made and opinions expressed in this publication

Vol. I

OCTOBER 1951

No. 8

PROCEEDINGS AT THE MONTHLY GENERAL MEETING  
FORTY-NINTH SESSION

Held in the Assembly Hall, Kelvin House, Johannesburg

Tuesday, September 25th, 1951, at 8 p.m.

PRESENT

MR J. P. LESLIE (President) was in the Chair and there were present nineteen members and visitors and the Assistant Secretary.

MINUTES

The Minutes of the Monthly General Meeting held on August 28th, 1951, which were published in the September 1951, issue of the *Transactions*, were taken as read and were confirmed.

MEMBERSHIP

(a) *Applicants elected to Corporate Membership by the Council.*—The Assistant Secretary announced that the names of the following candidates, having been published on the agenda of the August, 1951, monthly general meeting in accordance with Clause 2.4 of the By-Laws, the Council had elected them to membership as follows:—

*As and Associate Member*

D. R. Cliff, B.Sc.(Eng.) (S.A.), Durban.  
*As Associate Members—Transfer from Student*

E. K. Gooch, B.Sc.(Eng.) (Rand), Welkoin.

A. H. Hare, B.Sc.(Eng.) (Cape Town), Boksburg.

(b) *Applicants admitted to Student Membership by the Council.*—It was reported by the Assistant Secretary that the Council had admitted the following applicants to Student Membership of the Institution:—

C. J. Barker, Johannesburg.  
G. V. C. Elliott, Cape Town.  
C. Grobbelaar, B.Sc.(Eng.) (Stellen.), Durban.

B. J. C. Lawlor, Johannesburg.  
W. I. Low, Cape Town.  
A. P. M. Lyell, Johannesburg.  
K. B. Madsen, Cape Town.  
D. S. S. McIntyre, Cape Town.  
W. M. B. Taaker, Cape Town.  
D. F. Toerien, B.Sc.(Eng.) (Rand), Johannesburg.  
A. J. Tolbutt, Cape Town.  
P. W. Spencer, Johannesburg.  
J. F. Vinsen, B.Sc.(Eng.) (Natal), Wilbank.

(c) *Applicants for election to Corporate Membership.*—The Assistant Secretary reported that applications for election to

Questions?



**Overall Grade**

**D+**

Although South Africa's rail infrastructure is very poor, the world class air and sea infrastructure overall grade reflects extensive maintenance and refurbishment backlogs. These backlogs are caused primarily by funding and skills shortages.

Water	<b>D+</b> for DWAF infrastructure	Well maintained but ageing bulk infrastructure reaching end of useful life, and requires refurbishment or replacement. 43% of dams have safety problems and require urgent refurbishing. Serious concerns about funding.
	<b>C+</b> for major urban areas	South Africa is one of few nations where in most urban areas water can be drunk directly from the tap. Major, and ongoing, strides in provision of water and sanitation since 1994. However, erratic compliance with water quality requirements in most municipalities. Water wastage (leakage) is much too high. Shortage of skilled personnel.
	<b>D-</b> for all other areas	
Sanitation (including wastewater)	<b>C-</b> for major urban areas	Serious problems with management of many wastewater (sewage) treatment works. Wastewater leakage and spillage much too high, and frequent problems with on-site sanitation. Inadequate operation and maintenance capacity, and shortage of skilled personnel. Major urban areas grade is pulled down by Cape Town and Sebokeng.
	<b>E</b> for all other areas	
Solid waste management	<b>C-</b> for major urban areas	Landfill sites in major urban centres well managed, but many municipalities, especially rural municipalities, have uncontrolled dumpsites with attendant health risks. More widespread waste avoidance and recycling initiatives required.
	<b>D</b> for all other areas	
Roads	<b>C</b> for major urban areas	Most in fair to very good condition, with recent strategic acquisitions in poorer shape. Increasing use of user-pays (tolling), but funding remains a challenge, especially given that key roads will soon require extensive refurbishing.
	<b>D-</b> for all other areas	Generally inadequate funding and management systems leading to neglect of maintenance, combined with overloading, means that maintenance backlogs are growing. Less condition monitoring than in the past. Shortages of skilled personnel. Decisions have been taken to stop maintaining some roads.
Airports	<b>B</b> ACSA owned facilities only	World-class aviation infrastructure provider, strongly driven by the need to meet legislated requirements. Delays and inconvenience due to continuous expansion to meet growth exceeding 10% p.a. A profitable company, and no shortage of funding.
Ports	<b>C+</b> Transnet owned facilities only	Proper management practices on ageing infrastructure have extended its useful life. Increased investment and support underway to address increased demand. Further improvement expected as Transnet profitability improves.
Rail	<b>B</b> for heavy haul freight lines	The iron ore and coal lines are world class and well maintained. Profitable. Where demand is approaching capacity, upgrading is programmed.
	<b>C</b> for general freight lines being retained	Condition declined in recent years due to maintenance backlogs and skills reduction. Traffic volumes are increasing, and upgrading urgently required. Improvement expected as Transnet profitability improves.
	<b>E</b> for uneconomical general freight lines	Low volume low priority lines in the process of being disposed of.
	<b>D+</b> for passenger lines	Gradual deterioration due to inadequate maintenance funding, reducing skills base, and vandalism, with resulting increased safety risks. Refurbishment underway. Improvement expected with the transfer to Department of Transport.
Electricity distribution	<b>C+</b> for Eskom's generating & bulk transmission capacity	Demand is nearly reaching the limit of generating capacity. Shortfall will get worse, before improving around 2011 when new base-load stations commissioned. Eskom profitable, and no shortage of funding, but capital programme was delayed too long. Long and vulnerable transmission lines from Mpumalanga coalfields to urban centres. Risk of power cuts until the reserve increases.
	<b>C+</b> for Eskom's local distribution networks	Major, and ongoing, strides in provision of electricity since 1994 (this applies also to municipal distribution networks). State of (Eskom local distribution) infrastructure generally acceptable, but skills shortages.
	<b>C-</b> for municipal distribution networks in major urban areas	Inadequate operation and maintenance capacity, and shortage of skilled personnel. In many areas, ageing and/or overloaded infrastructure. Improvements discernible. Grade pulled down by Johannesburg, although improvements also discernible there.
	<b>D-</b> for municipal distribution networks in all other areas	Same types of problems as in major urban areas, but significantly worse.
Hospitals and clinics	<b>C</b> for hospitals	Improvement in some provinces, eg KZN and Limpopo, but deterioration in others, mainly due to inadequate maintenance funding, and inadequate skills and management systems. Revitalisation programme addresses some issues.
	<b>D+</b> for clinics	



# Civil Engineering

Sivili Enjenereng

November 2010 Vol 18 No 10

saice



## FOCUS ON SAICE NETWORKING

Statutory bodies and associated structures  
Discipline-specific bodies  
International bodies  
Tertiary institutions

SNAPE MEMORIAL LECTURE 2010

SAICE'S NEW CEO

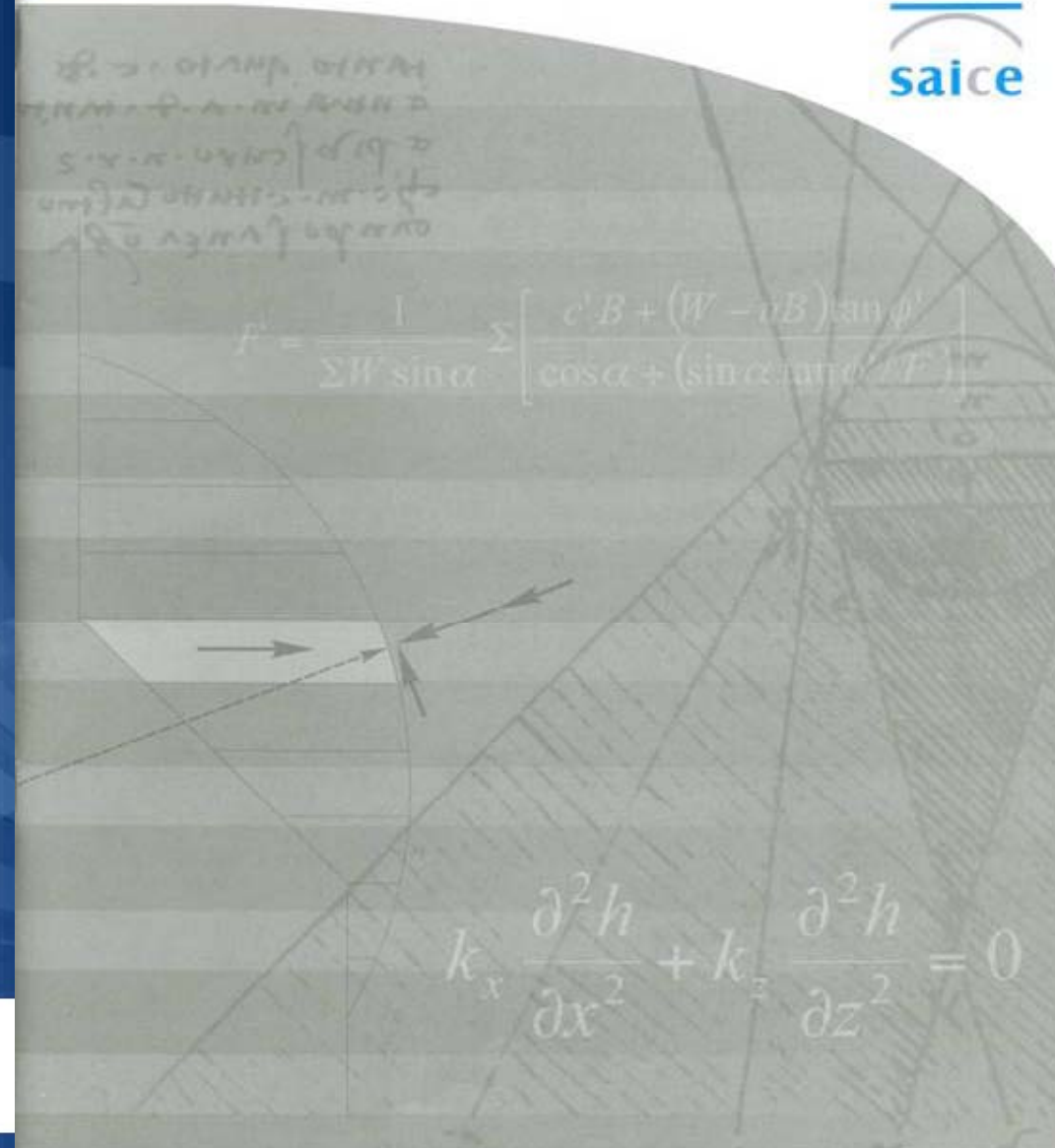


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# JOURNAL

of the South African Institution of Civil Engineering Volume 53 Number 1 April 2011





# Journal title over the years

**1903 tot 1909: Minutes of the Proceedings of the Cape Society of Civil Engineers.**

**1910 tot 1946: Minutes of the Proceedings of the South African Society of Civil Engineers.**

**1947 tot 1950: Proceedings of the South African Institution of Civil Engineers.**

**1951 tot 1958: Transactions of the South African Institution of Civil Engineers.**

**During 1959 the publication was called The Civil Engineer in Southern Africa.**

**1960 tot 1992: The Civil Engineer in South Africa.**

**1993: Magazine and Journal were separated.**

**1993 to present: Magazine: Civil Engineering.**

**1993 to present: Journal: Journal of the South African Institution of Civil Engineering.**

