



SOUTH AFRICAN ACADEMY OF ENGINEERING

22nd ANNUAL REPORT

1 April 2019 - 31 March 2020

T T Goba

South African Academy of Engineering

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TT Goba

President

Introduction

Another year of activities of the SAAE sees it reporting on further advances in its preparedness to be a source of knowledge and experience of its members, to formulate independent evidence-based advice on policy matters.

With continued support from the Department of Science and Innovation (DSI) grant, as well as commitment from its members and ASSAf, the SAAE continued its activities within South Africa as well as its participation in the international network of Academies. The DSI support for maintaining international links with other academies is highly appreciated.

The SAAE's membership continued to increase as did opportunities for members to participate in projects of topical societal interest. In order to respond to these and be able to be better coordinated in response to government and industry, and following a survey of its members' opinions in this regard, the SAAE embarked on establishment of sector based discussion groups nationally, including on Transportation, Water, Energy, Engineering Education and matters relating to Engineering Practice problems .

The theme for the Convocation of CAETS which was held in September 2019 in Stockholm, Sweden, viz Engineering a Better World – the Next 100 Years, provided an impetus for continued mindfulness of what Engineering has contributed to development in societies historically, as well as possibilities of its capabilities for the next 100 years.

Executive Committee

The Executive Committee (Exco) of the SAAE for the period 2018 – 2020 comprised the following members:

Dr Trueman Goba
Prof Elsabe Kearsley
Dr Hylton Macdonald
Mr Neil Macleod
Mr Seetella Makhetha*
Mr Hangwani Makwarela*
Mr Stanford Mkhacane
Prof Cyril O'Connor
Mr Bob Pullen
Dr Mike Shand
Prof Wikus Van Niekerk

*Messrs Makhetha and Makwarela were co-opted in November 2019 following the resignation of Dr Musa Furumele

Fellow TT Goba served as President of the SAAE and Prof Elsabe Kearsley was Deputy President. Fellow Bob Pullen was responsible for the Treasurer portfolio.

All members of the EXCO serve on a voluntary basis and their contribution of valuable time during the year is highly appreciated.

Four Exco meetings took place during the Financial Year 2019/2020, on the following dates:

- 14 May 2019
- 6 August 2019
- 19 November 2019
- 25 February 2020

The meetings took place in video conference format, with members attending in Pretoria and Cape Town. The continuing generous support of Aurecon who provided the meeting facilities is acknowledged.

The office accommodation and other support provided by ASSAf in their offices at The Woods, Persequor Park, Pretoria, has continued to be of great benefit to the SAAE. This support, provided at no direct cost to the SAAE, and the generosity of the ASSAf Council are greatly appreciated.

22nd Annual General Meeting, 27th June 2019

The 22nd Annual General Meeting (AGM) was held virtually through electronic communication. Fifty-seven members took part and this was slightly better than the previous AGM.

Membership

The Fellows who were elected at the AGM which was held on 27 June 2019, were as follows:

S C Bridgens
V J Crone
J D S Cullis
P R A Flower
D J Janse van Rensburg
K J Jenkins
W Jerling
D J N Limebeer
H E Makwarela
H S Oberholzer
J H Potgieter
M A Thela

Fellows Peter Flower, Kobus Janse van Rensburg, Kim Jenkins, Werner Jerling and Hangwani Makwarela were inducted by the President at the Western Cape Induction Dinner which took

place on 16 July 2019 at Kelvin Grove in Cape Town. Fellow Peter Flower delivered an informative presentation on the recent water crisis in Western Cape.

Fellows Stanley Bridgens, Viv Crone, James Cullis, David Limebeer, Hermien Oberholzer and Abe Thela were inducted by the President at the Gauteng Induction Dinner which took place at the Pretoria Country Club on 6 August 2019. Brian Currin, a renowned international human rights lawyer and facilitator of dispute resolution processes, delivered a presentation on *Government Alone Cannot Save South Africa from Self Destruction*.

INTERNATIONAL ACTIVITIES

COUNCIL OF ACADEMIES OF ENGINEERING AND TECHNOLOGICAL SCIENCES (CAETS)

CAETS invited Fellow Trueman Goba as former Board member to join in a three-member evaluation team visit to the Nigerian Academy of Engineering (NAE) on 3 and 4 June 2019 at their offices at the University of Lagos in Nigeria. The team's report on the evaluation was tabled at the CAETS Council meeting in Stockholm, Sweden on 27 June 2019. The Nigerian Academy of Engineering was accepted as a member of CAETS, becoming the second academy from Africa - SAAE having been the first to join in 2009 - to become a member.

CAETS Council Meeting and Convocation

The Royal Swedish Academy of Engineering (IVA), the oldest member of CAETS, was the host for the 27th CAETS Council Meeting and Convocation which were held in Stockholm, Sweden from 24 to 28 June 2019. Fellow Trueman Goba as President, Prof Kearsley, Deputy President, Dr Mike Shand and Prof Wikus van Niekerk represented SAAE. Prof van Niekerk is the current SAAE representative on the Energy Committee.

The hosting of the CAETS Meetings in Stockholm was unique in that this coincided with IVA's Centenary Celebrations which centered on a Conference on *Engineering a Better World – The Next 100 Years*. The IVA had invited international authorities to address the Conference.

Following is a programme of events during the week:

- Formal meetings of the CAETS Board of Directors and CAETS Council took place on the morning of 24 June 2019 and on the afternoon of 27 June 2019 respectively at the IVA Head Quarters.
- The IVA Centenary Conference took place from the morning of 25 June 2019 to mid-day on 27 June 2019 at the Stockholm City Centre at Drottninggatan 71B. The Conference Programme of invited presentations on *Engineering a Better World – the Next 100 Years* brought prominence to this special week of meetings.

Conference delegates had ample opportunity between meetings to mingle and to make new acquaintances. The SAAE delegates made a point of meeting with delegates from the Nigerian Academy of Engineers and the Royal Academy of Engineering (RAE UK) to explore ways of collaborating in the future.

Meeting of the CAETS Board of Directors

The CAETS Board of Directors comprises members nominated by member Academies on a rotation basis. Since the SAAE does not have a nominee on the Board at present its delegates were able to participate in meetings of the CAETS Council Committees and Groups while the Board Meeting was in progress.

Meetings of CAETS Energy Committee and Working Groups

CAETS Energy Committee

The CAETS Energy Committee met to take stock of progress with finalization of the 2018 Report. This project is not yet complete with editing of the Report still in progress. Progress with the current project entitled Clean Energy Technologies was discussed.

Working Group on Diversity and Inclusion:

This meeting was chaired by David Tomlinson of the RAE and was attended by delegates from the UK, USA, Argentina, South Korea, Japan and South Africa. There was consensus regarding the on-going need for member academies to encourage diversity when electing qualifying members of their Academies from minority groups or under-represented sections of their societies. Being inclusive in that sense serves to deepen talent and enrich perspectives. It was recommended that the view of CAETS on the need for a policy on this matter be canvassed during the Council meeting later in the week.

Working Group on Sustainable Development Goals:

The meeting was chaired jointly by David Tomlinson from RAE and Matt Wenham from Australia. The countries represented in the meeting were UK, USA, SA, and South Korea. Previous discussions in CAETS regarding the role of Academies of Engineering were revisited.

The RAE is in transition to a new President and it was expected that new priorities would emerge regarding priorities in this regard. It became clear that none of the Academies represented in the meeting had geared themselves to working towards the Sustainable Development Goals adopted by the UN General Assembly in 2015. It was agreed that discussions and sharing of priorities between member academies would continue.

Working Group on Communication with the Public:

The Group discussed key audiences and outputs, as well as communication processes in use by individual academies. It was proposed that the CAETS Board appoint a subcommittee to advise on opportunities to strengthen CAETS's communications, both internally and externally.

Working Group on Engineering Education:

It was noted that there were opportunities for CAETS to develop a draft Statement on Engineering Education for consideration in 2020.

Meeting of the CAETS Council

After closure of the IVA Centenary Conference events moved back to the IVA Headquarters for the 2019 meeting of CAETS Council. The Council Meeting was Chaired by CAETS President Tuula Teeri assisted by Secretary/Treasurer Dr Ruth David.

After recognising the delegation from the Pakistan Academy of Engineering, represented by Jameel Ahmad Khan, at their first CAETS Council Meeting, the Chair invited all delegates and guests to introduce themselves.

The Agenda had been circulated and was approved.

The Minutes of the Council Meeting held in Montevideo, Uruguay, on 13 September 2018 were approved as presented.

Inkyu Lee of NAEK, the Engineering Academy of South Korea, made a presentation on preparations for 2020 CAETS Meetings and Convocation to be held at the Four Seasons Hotel in Seoul, South Korea from 22 to 25 June. The Theme for the Convocation will be on *Smart Society*, and registration for attendance would commence around March 2020.

Manuel Solanet of the National Academy of Engineering of Argentina (ANI) provided an update on CAETS 2021 which would be held in Buenos Aires, Argentina, from 20 to 23 September 2021. The theme will be *The Future of Energy*.

It was reported that the CAETS Board had, at its meeting on Monday, 24 June 2020, approved the 2018 Audit Committee Report as well as the 2020 Operating Budget.

The Secretary summarised the following points of information emanating from the Board meeting:

- An invitation to member Academies would encourage them to provide content as means to promote subsequent collaboration among members.
- A procedure to initiate Discussion Groups would be developed.
- The Board had appointed a small group of Members to develop a 5-year CAETS Strategic Plan for Council consideration.

The Secretary/Treasurer Reported on the following Board Approvals:

- Japan and Mexico had had to be invited to nominate candidates for election as Board Members for 2020 to 2021 as two Members had deferred their turn to make nominations.
- Germany, Belgium, Denmark and Pakistan would nominate candidates for election as members of the Board for 2021 to 2022,
- The Fees schedule would remain unchanged for 2021.
- The 2022 CAETS Meetings would be in Paris, France, on a date yet to be confirmed, likely to be in March 2022.
- Manuel Solanet of Argentina was appointed as President Elect and candidates from Japan, UK, Mexico and Canada were elected as Board Members for 2020 to 2021,

The Energy Committee reported that it had not yet finalised its 2018 Report. A new project on Clean Energy Technologies was underway and would include consideration of how best to integrate intermittent renewable sources into legacy power grids.

Closed Session of Council Meeting:

The Council meeting adjourned for a break and refreshments.

The Council reconvened in a Closed Session where only delegated representatives of Members are admitted. The Council considered applications for Membership of CAETS from the following Academies:

- Royal Society Te Aparangi of New Zealand
- Nigerian Academy of Engineering
- Academy of Engineering Sciences of Serbia

Following discussion of the applications, and informed by recommendations submitted by Visiting Committees, the applications were put to the vote. Council Members each have a vote and Member Academies are entitled to the votes of two representatives in the meeting. The three Academies were elected as Members and welcomed into the Chamber. The Closed Session of the Council Meeting adjourned.

Open Session:

Council reconvened in an Open Session where Certificates of Appreciation in Recognition of Service to CAETS were presented to the Past President for 2018 and to four retiring Board members.

The Council meeting was adjourned and group photos were taken.

Final Session of the 2019 CAETS Meetings and Convocation in Stockholm

On Friday 28 June 2019 the Convocation concluded with a presentation on an impressive and on-going urban development infrastructure project to spruce up the historical and archeologically important Slussen Locks area in Stockholm as a transport hub and future tourist destination. The presentation was followed by lunch and a boat tour around the site and the Stockholm harbour area.

IVA Centenary Conference on *ENGINEERING A BETTER WORLD – THE NEXT 100 YEARS*

During the first day of the Centenary Conference invited keynote speakers made presentations on Progress and Challenges in the following areas:

- First and Next 100 years
- Engineering for Society
- LIGO, Engineering for Science
- Energy System of the Future – Evolution or Revolution
- Unequal Cities
- Antibiotic Resistance – a Multiple Systems Failure
- Threatening Global Sustainable Development
- Water as Leverage, from Risk to Reward

The second day of the Conference focused on MORPHING and comprised two parallel meetings, each with morning and afternoon sessions, where several presentations were made on topics related to:

- Creative Chaos and Digital Dawn, and
- Effective Education and Inclusive Infrastructure

On the morning of 27 June 2019, the third day, the IVA Centenary Conference drew to a conclusion with two parallel Panel Discussions on the following topics:

- Policy Advice for Engineering Futures, and
- Industry-Academy Interaction.

The Centenary Conference was closed by brief statements from the CAETS President and the President of IVA.

International Collaboration

Chinese Academy of Engineering and Other Organizations in China

On 25 April 2019 Dr Trueman Goba and Mr Bob Pullen attended the Thematic Forum on Innovation associated with the Second Belt and Road Forum for International Cooperation (BRF) in Beijing. The aim of the Forum was to build bridges for international cooperation in science, technology and innovation.

On 26 April 2019 Dr Goba and Prof LI Xiaohong, the President of the CAE, formally signed a Memorandum of Understanding between the CAE and the SAAE in Beijing. The MoU outlines the intended cooperation between the two Academies in joint activities over the next three years. This MoU is the third such undertaking between the two Academies in terms of a Cooperation Agreement which was concluded in 2002.

The first activity arranged in terms of the MoU took place from 19 to 23 May 2019 when a CAE Nuclear Expert Group visited South Africa as guests of the SAAE. SAAE facilitated visits by the Expert Group to the Nuclear Safety Institute at the University of Pretoria, to NECSA at Pelindaba, and to Eskom's Koeberg Nuclear Power Station in Cape Town. Fellows of SAAE accompanied the Expert Group on these visits.

Royal Academy of Engineering, UK

From 28 April 2019 to 1 May 2019 Mr Bob Pullen attended a meeting in Kigali, Rwanda as guest of the RAE. This meeting was convened by the RAE as Implementing Agent of the GCRF in the United Kingdom, for their Africa Catalyst Initiative (ACI). The ACI is focused on establishing and developing sustainable institutions in the engineering professions in sub-Saharan countries. Participants in the meeting were representatives of teams who were responsible for projects completed in Phase 1 of the ACI and teams who were busy with projects in Phase 2.

PUBLIC LECTURES

Annual Academy Lectures

On 30 July 2019 Dr Gustav Rohde FSAAE presented a lecture *The Fourth Industrial Revolution: Digital Transformation – An Opportunity to Reposition*. The Lecture took place in the Bessie Head Room at the Doornfontein Campus of the University of Johannesburg and was attended by fifty seven guests.

On 28 November 2019 Peter Flower FSAAE presented the 2019 Annual Academy Lecture entitled *Cape Town's Water Supply – Experience and the Way Forward* in the New Lecture Theatre on the UCT campus. The lecture was attended by one hundred and twenty people.

Hendrik van der Bijl Memorial Lecture

On 9 October 2019 Andrew Kirby FSAAE, President and CEO of Toyota South Africa and President of NAAMSA, presented the Hendrik van der Bijl Memorial Lecture in the Senate Hall of the University of Pretoria. The Hendrik van der Bijl Memorial Lecture is presented annually by the SAAE in collaboration with the University of Pretoria. The topic of the lecture was *Can the South African Automotive Industry contribute to the reindustrialisation of our country?* The lecture was attended by one hundred and ten people and the lecture was live streamed via YouTube, a first for a SAAE lecture.

Presentation of information from CAETS Convocations

The SAAE disseminated information from the 2018 CAETS Convocation in Montevideo, Uruguay, by presenting a series of lectures on the subjects discussed so that the South African public may benefit from SAAE's membership of CAETS. The theme of the Convocation was *Engineering a Better World - Sustainable Development of Agricultural and Forestry Systems*. Mr Felix Reinders FSAAE, Manager of the Irrigation and Drainage Engineering Division at the ARC's Institute for Agricultural Engineering, made presentations on the proceedings of this Convocation at Stellenbosch University on 8 October 2019 and at the University of the Free State on 29 October 2019 with the kind cooperation of the Deans of Engineering of the respective Universities and with financial support from NSTF pro-Set. The lectures were very well attended.

FINANCIAL OVERVIEW

The Report of the Independent Auditor on the Financial Accounts of the SAAE for 2019/20 confirms that the financial position of the Academy as at 31 March 2020 is satisfactory with cash in hand of about R189 000. This is sufficient to cover the fixed costs of the association, primarily administration and membership expenses, for a full year even if no income was realized. The Auditor reports that the financial performance and cash flows during the year 2019/20 are fairly presented in all respects in the Annual Financial Statements. These Statements are based on Management Accounts which were prepared for consideration by the Management Committee during the year.

Attention is drawn to the following points of interest and, perhaps of concern:

- The three main sources of income for the Academy are member's subscriptions, a Grant-in-Aid from the Department of Science and Innovation (DSI), and a Grant from the NSTF. Income is also derived from *ad hoc* sponsorships and donations.
- No income was generated from project activities or investigations funded by other entities as was the case in the previous two years. This has had a negative impact on the cash reserves of the Academy.
- Sponsorships for events arranged for the benefit of Members was at the same level as in the previous year, but again well below that in previous years.
- While the funds made available to the SAAE by the DSI (formerly the DST) for memberships of CAETS and for other activities associated with international liaison in 2019/20 amounted to R285 000, only R139 553 was utilized. Not only were the costs of having a delegation of four members participate in the annual CAETS meetings (this year in Stockholm, Sweden) much lower than budget, but no costs were incurred in attending CAETS Board meetings. Of greater concern is the fact that a symposium on engineering aspects of Agricultural and Forestry Systems and on the Engineering Professions in SADC countries, which was planned for late in March 2020, could not take place due to constraints imposed by COVID-19 pandemic. This event was postponed until a date when such meetings can take place. The budget provision for this and related events could not be utilized, and it is hoped that these funds will be available in the next financial year.
- The assets of the Academy comprise primarily cash and cash equivalents, represented by cash in the bank accounts, which has been accumulated from retained earnings over many years. Total assets stand at R244 448, marginally up from the previous year.
- Membership subscription fees owing on 31 March 2020 amounts to R40 060, of which R15 860 is in arrears for more than 12 months. Some debts have been written off and a provision is made for the doubtful debts which may be recovered in the coming year.

OUTLOOK FOR THE FUTURE

The focus of the SAAE is on improving the mobilization of knowledge and experience of its members to formulate independent, evidence-informed advice, usually on policy matters, for transmission to Government and to Industry.

This implies that every effort has to be made towards identifying new platforms where such advice may be of value, and to take the initiative as early as possible so that members have an opportunity to contribute their expertise. In this regard some industrial companies may see the benefit of having such support available from the SAAE and be attracted to contributing financial support which could strengthen the SAAE.

Fellow TT Goba

President

South African Academy of Engineering, Johannesburg

11 June 2020