

ENGINEERING. Review

No. 6

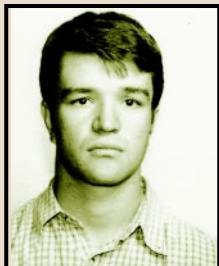
Communique of the Engineering Council of Namibia

CONGRATULATIONS TO OUR 2002 MERIT AWARD WINNERS

The ECN merit awards are presented annually to the most deserving B Tech and Diploma students at the Polytechnic of Namibia in 4 disciplines (Civil, Mechanical, Electrical and Electronic Engineering). In 2002 only two students from the Electronics and Civil Departments qualified for the merit awards.



Mr. Kritzman Phillip Jooste was the Best Overall Engineering Diploma student.



Mr. Theunis Jacobus Engelbrecht , the Best Civil B Tech student.

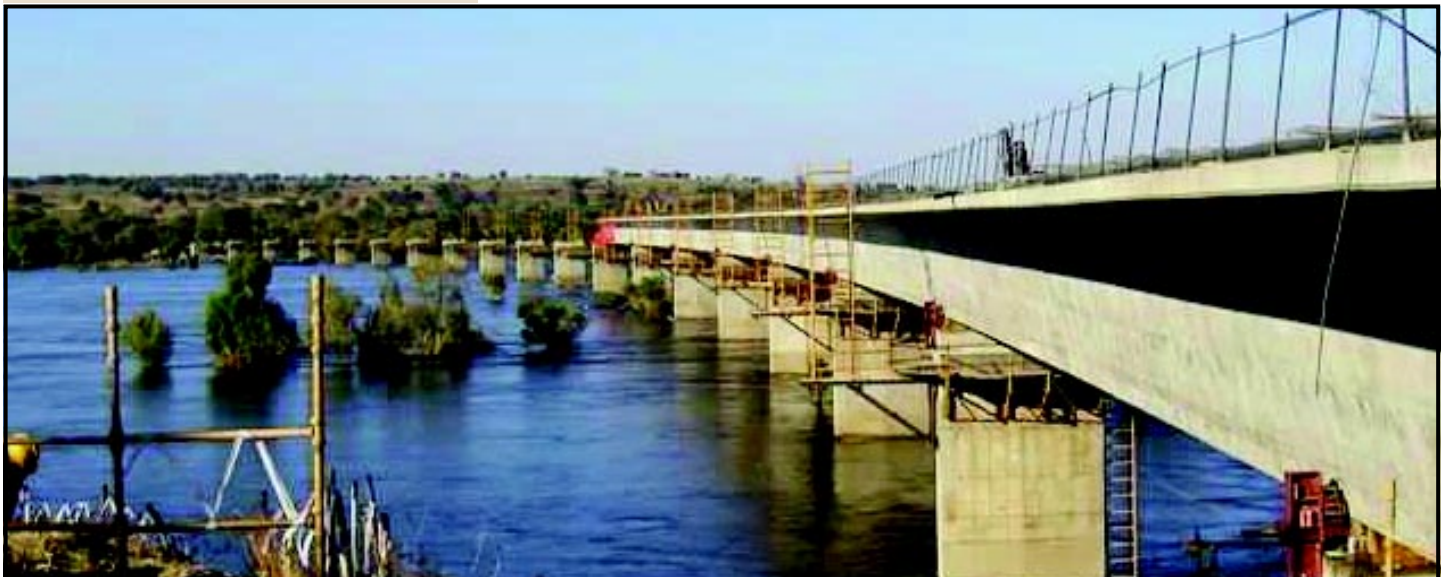
ZAMBEZI RIVER BRIDGE NEAR KATIMA MULILO

As early as 1966, the Government of Zambia commissioned a study on the possible construction of a bridge across the Zambezi River. The study evaluated a number of sites, and the final recommendation was for a bridge at the Mpwanda Rapids approximately two kilometres upstream of the Zambia-Namibia border and entirely on the Zambian side of the border. The recommendation was not implemented due to funding constraints, but ferry operations across the river were improved.

In August 1990, after the independence of Namibia, the Livingstone-Grootfontein route including the Zambezi River Bridge at Katima Mulilo, was adopted as a SADC regional route and placed high on the regional priority projects. The Italian Government commissioned an update of the earlier study and recommended a bridge at the Katima Mulilo Rapids at the vicinity of the Zambia-Namibia border with a bridge running from the Zambian side of the border to the Namibian side.

By the end of 1990, most of the studies had concentrated on the crossing at Katima Mulilo. It was therefore considered important that the crossing of the Zambezi River be looked at. A study funded by the Canadian International Development Agency (CIDA) was commissioned to look at all the existing and possible crossings between Katima Mulilo and Victoria Falls. The Terms of Reference for the study did not cover the details of all the aspects regarding the crossings and therefore only recommended strengthening of the Victoria Falls bridge and improving the ferry operations at Katima Mulilo and Kazungula.

Continued page 2



ZAMBIA-NAMIBIA JOINT PERMANENT COMMISSION

Because of the importance Zambia and Namibia attached to the Katima Mulilo bridge, the Zambia-Namibia Joint Permanent Commission established a Joint Technical Steering Committee comprising of officials from line ministries in each country to oversee the successful completion of the bridge.

The Government of Namibia with support from the Southern African Transport and Communication Commission (SATCC) sourced grant funding from the African Development Bank (ADB) for the preliminary design of the bridge as part of a larger project. Five deck construction types were considered, i.e.: incremental launching, pre-cast beam and slab, balanced cantilever, advanced shoring and cable staying.

An investigation in terms of suitability, advantages and disadvantages favoured the incremental launching and pre-cast beam and slab construction methods for further evaluation. The investigation, which included an economic evaluation, gave more favourable indicators for the site at the Zambia-Namibia border, with the Zambia-Zambia option offering the best solution due to shallow foundations for the abutments and the pier foundations on rock outcrops in the river. This option was adopted at a Ministerial Conference in September 1997, and the Ministers requested the relevant officials to source funding from development partners for the construction of the bridge.

PROGRESS TO DATE

KfW of Germany, was approached for financing the bridge project, and provided a grant to the Zambian government amounting to DM20 million (N\$82 million). In addition, KfW also provided the finance to rehabilitate the Livingstone-Sesheke road (212 km) to facilitate a serviceable road link to the bridge from Livingstone through the Trans-Caprivi Highway to Walvis Bay.

The contract for construction of the bridge was awarded in April 2002 to a Joint Venture of Concor/Hochtief for a contract amount of N\$66 million and it is expected that the bridge will be open to traffic in April 2004.

The completed structure with a total length of 900 metre comprises 19 spans each 47 metre long. Incremental launching was utilised as the method of construction with the launching jack sited on the western side of the river bank. The superstructure segments were cast in an area behind the western abutment each in contact with the previous one and assembled by stressing it to the already built one. Once completed, the deck was moved forward a distance equal to the length of this segment, releasing the formwork for the next segment. Movement of the decks continued as the segments were cast, with finally the segment cast first reaching the abutment on the eastern side of the riverbank.

FUTURE PERSPECTIVE

The completion of the Zambezi River Bridge together with the rehabilitation of the Livingstone-Sesheke road will provide the Trans-Caprivi Highway in Namibia with a link to the road network in Zambia, and therefore promote the Walvis Bay-Ndola-Lubumbashi Development Corridor. The Government of the Republic of Namibia together with its development partners have invested close to N\$1.0 billion in the Trans-Caprivi Highway, and the bridge will contribute to an increased utilisation of that Corridor.

REGISTERED MEMBERS AS AT 31 OCTOBER 2003

Registered	Total No.
Professional Engineer	303
PE in Training	108
Incorporated Engineer	50
IE in Training	23
Engineering Technician	112
ET in Training	65
TOTAL	661

PROGRESS ON PROPOSED REVISED ENGINEERING PROFESSION ACT

At the Open Forum/Workshop (see article) interested parties were invited to publicly propose changes to the Engineering Profession Act, and were also requested to put these proposals in writing and send them to the Registrar. Once these proposals/comments are received the Legal Affairs Committee will meet to incorporate them into the new Act.

So far the Registrar has received no written proposals or comments from participants to the Open Forum. We urge you to please send us your proposals or comments before the end of February 2004, as this will be your last opportunity to participate in formulating the new Act.

ADDITION OF TWO NEW ENGINEERING DISCIPLINES TO ENGINEERING PROFESSION ACT

Council has requested Minister Amweelo to approve the addition of two engineering disciplines: **Marine** and **Aeronautical** Engineering to Schedule II (Part A and B) of the Engineering Profession Act. Once approved the following engineering disciplines will be listed in the Act:

- | | |
|---|---|
| <ul style="list-style-type: none"> Aeronautical Industrial Agricultural Marine Civil Mechanical | <ul style="list-style-type: none"> Chemical Mining Electrical Metallurgical Electronic |
|---|---|

OPEN FORUM

An Open Forum/Workshop was held on 10th of September 2003. A short summary of some of the issues which were discussed and some possible solutions which could be implemented are printed below:

1. Grievances on Qualifications and Experiential Training

Minister Amweelo singled out two items which he believed were the main problems in the registration process. The first problem was that he believed that ECN did not accept foreign qualifications except those from South Africa. This, of course is incorrect. All participants agreed that the standard of registration should not be lowered as it would lead to incompetent persons coming into the profession.

2. Path to Registration

The second item that the Minister highlighted was pertaining to the proper path to professional registration. He said that if an applicant's application for registration is rejected, Council should see that they receive the necessary information on what they should do to be able to re-apply.

3. Too few women on Council

It was proposed that more women should serve on Council. Council is proud to inform that one woman is currently serving on Council and a second one has been nominated to serve on the 5th Council. This situation will definitely change once more women are working in the engineering profession, as only 4% of registered members are female.

4. Foreigners doing Engineering Work in Namibia

This issue was debated at length as it was felt that there are competent Namibians who, when registered with ECN, could be available for contracts. The main problem seems to be with State Ministries which allow contracts to be concluded without emphasising the requirement that foreign engineers should be registered at the ECN.

5. Information flow

It was said that there is a lack of knowledge on the requirements for registration and other engineering related issues. Council is aware of this problem and will ensure that the situation improves. This is also one of the main reasons why Council issues a newsletter.

6. Why are there so many Councils?

The question was asked why the engineers, architects and quantity surveyors could not have one council. ECN is not in favour of having one council for these three different professions, as each Council caters for its specific needs and engineering vary vastly from architecture or quantity surveying.

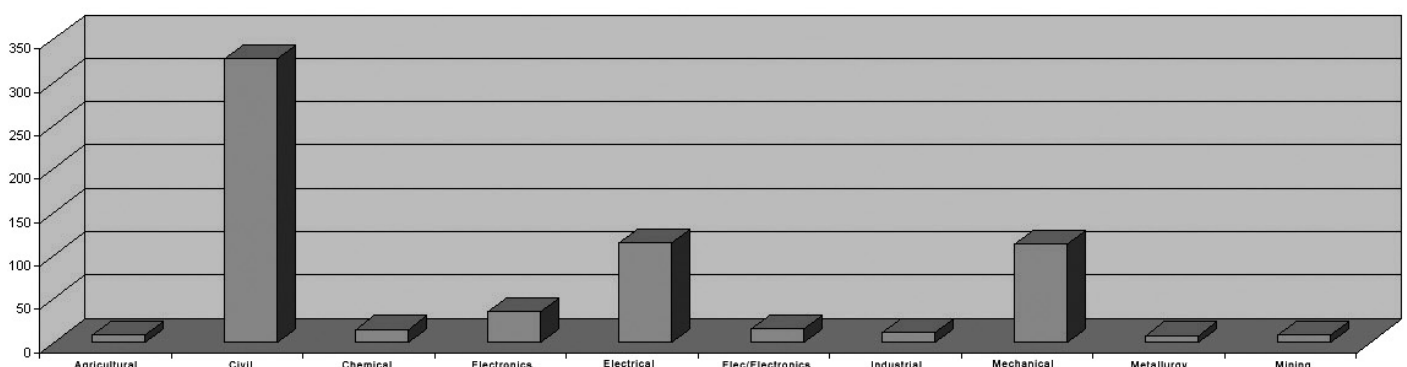
7. Engineering Technicians

It was said that when engineers, architects and quantity surveyors refer to an Engineering Technician everyone should understand the meaning of this category to be the same. In other words, Engineering Technicians must be holders of diplomas, perform work at the same level, have the same responsibilities, etc. which is not the case at present as the three professions give different functions to the same category of registration.

8. Council's Role in Training

It was said that Council should oversee the training of in-trainees by appointing mentors, make recommendations to the employer to facilitate training. Council is of the opinion that one body cannot wear two hats at the same time in monitoring experiential training and eventually also evaluate experiential training. Even if it was possible, no funds are available to do that. However, Council has the responsibility to encourage employers to have structured training programmes in place and will assess these training programmes to ensure it will lead to the full registration of an applicant.

BREAKDOWN OF ECN REGISTRATIONS IN THE VARIOUS DISCIPLINES



CALL ON TRAINEES TO REGISTER IN FULL

In the public interest, Government has assumed the responsibility to ensure that only persons fully competent to do so execute certain engineering work. The Engineering Profession Act 1986, (Act 18 of 1986), as amended in 1991 to be the Engineering Profession Act, 1991 (Act 25 of 1991), has been promulgated as the instrument to ensure that engineering work as specified in the Act is performed only by competent persons. The Engineering Council of Namibia (ECN) has been tasked with assessing the engineering proficiency of applicants who wish to register with the ECN. Registration is then proof of having attained the minimum competency and skills required by law to be allowed to undertake the specified engineering work. The following categories of registration are provided.

Professional Engineer - Professional Engineer - in -Training
B Sc degree at honors level plus 3 years appropriate experience

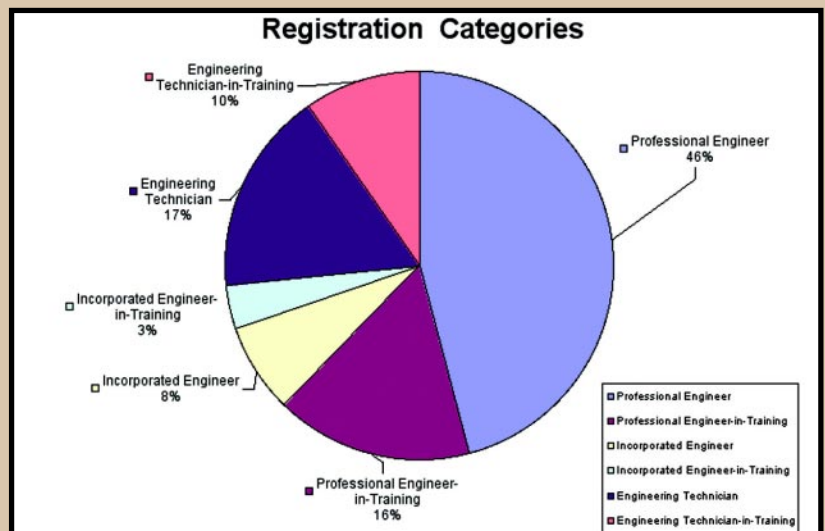
Incorporated Engineer - Incorporated Engineer- in - Training
B Tech degree plus 3 years appropriate experience, or
T5 (Master Diploma in Technology) plus 3 years appropriate experience

Engineering Technician - Engineering Technician - in -Training
T4 (National Higher Diploma) plus 2 years appropriate experience
S4 (National Diploma in Engineering) plus 3 years appropriate experience
T3 (National Diploma in Engineering) plus 3 years appropriate experience, or
N6 (National Technical Diploma) plus 5 years appropriate experience

The Engineering Profession Act is currently being revised and when promulgated will become compulsory for all persons actively engaged in the engineering profession to be registered in one of the above-mentioned categories. These categories should be regarded as guidelines, because there are certain further conditions and exceptions which are individually evaluated on merits to ensure that a fair range of qualifications and proven competency skills are accommodated.

In today's competitive engineering environment only the best, most proficient or competent will survive. It is therefore in the interest of the Engineering Firm/ Company or Individual Consultant Engineer or Contractor that employers review their strategy of jobs that contain engineering work to ensure that trainee's meet registration requirements and then move from "In-Training " to full registration in terms of the Engineering Profession Act. This will require the full support of the employer in terms of arranging for the applicants' full spectrum of training needs.

Registration with ECN will enhance professionalism in the job market and will foster more status, pride and effective leadership in engineering projects.



REGISTRATION AND ANNUAL FEES 1 APRIL 2003

CATEGORY	REGISTRATION FEES	ANNUAL FEES
Professional Engineer	280-00	365-00
Professional Engineer (already in training)	225-00	
Professional Engineer-in-Training	90-00	165-00
Incorporated Engineer	210-00	280-00
Incorporated Engineer (already in training)	165-00	
Incorporated Engineer-in-Training	70-00	110-00
Engineering Technician	135-00	195-00
Engineering Technician (already in training)	100-00	
Engineering Technician-in-Training	60-00	85-00

WHO IS RESPONSIBLE FOR MY EXPERIENTIAL ENGINEERING TRAINING?

The onus is on you to ensure that the practical engineering training you receive will meet all the requirements as determined by the Engineering Council of Namibia (ECN). Once registered as an in-trainee start to prepare yourself for a professional career through sound career development methods, as though it was your most important (engineering) project.

It is of critical importance to select employers who have committed themselves to the training and professional development of their engineering staff in accordance with ECN's requirements. This means that your employer should have a well-structured training programme for you and must review it from time to time. Acquire the necessary professional skills in a structured way. Get guidelines in your branch of engineering to help you and your employer in achieving the competencies necessary for registration. Request the Registrar to furnish you with a document setting out the general requirements for registration.

Although your qualification determines the minimum period of time needed for your experiential training, applicants should realise that the **quality** of the experience acquired is the critical element and not the time spent in training.

Remember that the Registration Committee's evaluation can only be based on the information the applicant supplies in the application and that information, which the referees may add. It is, therefore, in the interest of each applicant to complete the application as fully as possible in order to supply all relevant information.

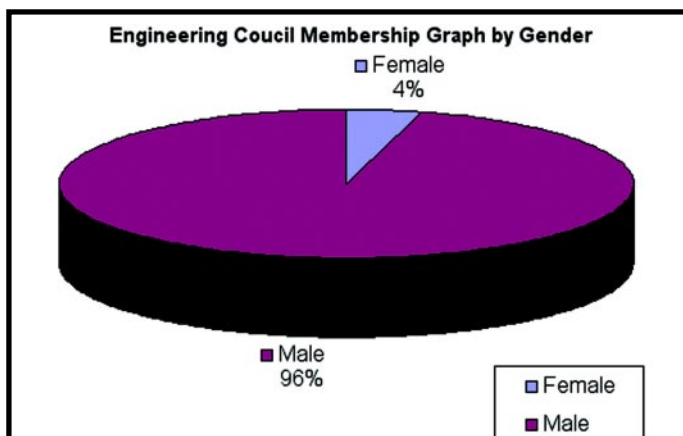
Care should be taken that you do not, for any extended period, undertake work that should be performed by those less qualified. Try to convince your employer that it is in the firm/company's interest to employ a reasonable mix of the correct people in each functional area. The work you do must be varied, and not be of a routine nature and should require the use of mental skills.

To ensure that you receive satisfactory training your mentor/supervisor should not be in a lower category than yourself, ensure that you gain market-directed experience and keep up to date with new technology in your field.

ECN strongly discourages applicants from applying for registration until they clearly meet all the requirements, regardless of the time taken to do so. If registration is refused the Registration Committee will inform the applicant in writing where the shortcomings are.

MALE VERSUS FEMALE

According to ECN records there are only 28 ladies amongst the 661 registered engineering members. From the figures it is obvious that the engineering profession is presently male dominated. Therefore, to achieve a better gender balance, women should be encouraged to study and be actively involved in technical fields.



WANT TO LEAVE A TELEPHONIC MESSAGE FOR THE REGISTRAR ?

The Registrar uses Telecom Namibia's Telemail system as an answering service, which will automatically take messages when she is unavailable or busy with another call.

WHAT IS THE INTERNATIONAL REGISTER?

Professional Engineers who are registered with the **ENGINEERING COUNCIL OF SOUTH AFRICA (ECSA)** can now apply to be registered in the **Engineers Mobility Forum (EMF) International Register of Professional Engineers**. The establishment of the International Register means that Professional Engineers would be granted "the right to practise" in any country signatory to the EMF Agreement. The signatories are Canada, South Africa, UK, Hong Kong, Ireland, New Zealand, USA, Japan, Malaysia and Korea.

What do you require to be on the Register?

- A degree accredited or recognised by ECSA.
- Registration with ECSA as a Professional Engineer.
- A minimum of seven (7) years practical experience since graduation.
- At least two (2) years spent in a responsible position, or in charge of significant engineering work.
- A satisfactory level of continued professional development maintained over a period of time.

For more information visit ECSA's website : www.ecsa.co.za

HOURLY TARIFF

Since costs increase annually due to inflation the present rate of N\$ 350 per hour is too low to compensate Professional Engineers and Incorporated Engineers for their work. The Association of Consulting Engineers has prepared an analysis and motivation for an increase in the hourly rate from N\$ 350 to N\$ 740 per hour. This rate must be calculated to be a reasonable hourly rate and needs to be done by a simple method of relating remuneration required to attract qualified, capable and experienced engineers. The following cost items were identified as factors that influence the hourly rate:

<u>Factors used</u>	<u>2003 Figures used in calculation</u>
1. Total Annual Cost of Employment (TACE)	- N\$ 300 920-00
2. Number of available hours (Hours)	- 1760
3. Utilisation factor (UF)	- 0,63
4. Overhead factor (OF)	- 2,10
5. Profit and Taxes (T)	- 1,30

The calculation is done as follows:

$$\text{Hourly Rate} = \left[\frac{\text{TACE} \times \text{OF}}{\text{UF} \times \text{Hours}} \right] \times T$$

$$\text{Hourly Rate} = \frac{300920 \times 2,1}{0,63 \times 1760} \times 1,30 = \text{N\$ 740-00 per hour}$$

TACE - Total Annual Cost of Employment

A figure of N\$ 300 920-00 was used as the TACE. This figure represents the average salary of a chief engineer (i.e. BSc or equivalent plus registration as Pr. Eng plus 12 years professional experience).

Hours - Number of Available Hours

The total number of effective hours per annum is 1760 hours calculated on an 8-hour working day (minus 11 public holidays, 20 days annual leave and 10 days sick leave per year. No overtime was considered).

UF - Utilisation Factor

The utilization factor of 0,63 was used and this conservative figure was based on the actual factors for a number of Namibian firms.

OF - Overhead Factor

An overhead factor is commonly used to link total annual operating cost in a professional practice to the remuneration package of the practice.

The definition for the overhead factor is:

$$\text{Overhead Factor} = \frac{\text{Total Annual Operating Costs}}{\text{Total Annual Employment Costs of Technical Staff}}$$

T - Profit and Taxes

A profit making consulting engineering practice pays taxes to the Namibian Government. The current tax rate for individuals is 35%. Should a 30% mark-up be used it effectively translates into an after tax profitability of $30 \div (100+30) \times 1 - 0,35) + 15\%$, which is not unreasonable given the risks and uncertainties of the consulting engineering industry.

The above-mentioned document was submitted to the Association of Construction Professions (ACP) on 29 September 2003 who are responsible to submit the frequent (including architects and quantity surveyors tariff) to the Ministry of Works, Transport and Communication.

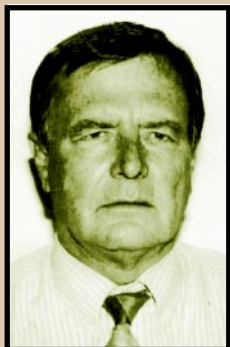
Profit and tax factors of 1.3 were used.

A MATRIX OF DEFINITE ATTRIBUTES OF PROFESSIONAL ENGINEERS, INCORPORATED ENGINEERS AND ENGINEERING TECHNICIANS

PROFESSIONAL ENGINEERS	INCORPORATED ENGINEERS	ENGINEERING TECHNICIANS
<p>Professional Engineers are concerned primarily with the progress of technology through research, innovation, creativity and change.</p>	<p>Incorporated Engineers form the mainstream of professional engineering practitioners and act as exponents of today's technology.</p>	<p>Engineering Technicians are competent by virtue of their education, professional development and practical experience to apply knowledge and proven techniques and procedures to the solution of problems in a wide variety of contexts.</p>
WHAT PROFESSIONAL ENGINEERS DO?	WHAT INCORPORATED ENGINEERS DO?	WHAT ENGINEERING TECHNICIANS DO?
<p>Their work involves the application of a significant range of fundamental principles, enabling them to develop and apply new technologies, promote advanced designs and design methods, introduce new and more efficient production techniques, marketing and construction concepts and pioneer new engineering services and management methods.</p> <p>They may be involved with the management of high risk and resource intensive projects.</p>	<p>They perform complex technical duties of an established or a novel character in a wide variety of industrial engineering contexts, often comprising of specialist tasks within the engineering profession.</p> <p>They are also often included in the management of high risk and resource intensive projects due to their highly specialised skills attained in their training package.</p>	<p>Engineering Technicians contribute to the design, development, manufacture, construction, commissioning, operation and maintenance of products, equipment, processes and services.</p> <p>They also apply safe systems of work.</p> <p>Engineering entails the correct practical application of engineering principles, which can only be fulfilled while having adequate engineering related skills to be able to master those tasks.</p>
HOW ARE PROFESSIONAL ENGINEERS EMPOWERED?	HOW ARE INCORPORATED ENGINEERS EMPOWERED?	HOW ARE ENGINEERING TECHNICIANS EMPOWERED?
<p>Professional judgement is a key feature of their role, allied to the assumption of responsibility for the direction of important tasks, including the profitable management of industrial and commercial enterprises.</p>	<p>They have a substantial degree of personal responsibility and authority, often providing leadership and control in a managerial role in industry.</p>	<p>There is always a strong element of personal responsibility, often applied in consultation with Professional Engineers and Incorporated Engineers.</p>
WHAT POSTS PROFESSIONAL ENGINEERS OCCUPY?	WHAT POSTS INCORPORATED ENGINEERS OCCUPY?	WHAT POSTS ENGINEERING TECHNICIANS OCCUPY?
<p>Professional Engineers undertake and lead varied work that is essentially intellectual in nature, requiring discretion and judgement. Such work has its base in proficiencies and competencies derived from and extended by experience and research.</p> <p>It is concerned with cost effective, timely, reliable, safe, aesthetically pleasing and environmentally sustainable outcomes.</p>	<p>The posts occupied by them demand the combination of a practical approach and a detailed understanding of the particular technology in manufacturing and services.</p> <p>Mainly engineering 'specialists' which are highly trained to perform tasks assigned to this group.</p>	<p>Similarly, they are frequently involved in the supervision of, and guidance of others, carrying a measure of supervisory and technical responsibility.</p> <p>Practical application of engineering principles cannot be left to unskilled persons due to the highly technical nature thereof.</p>
HOW MUST PROFESSIONAL ENGINEERS BE PREPARED?	HOW MUST INCORPORATED ENGINEERS BE PREPARED?	HOW MUST ENGINEERING TECHNICIANS BE PREPARED?
<p>The work of a Professional Engineer requires the exercise of original thought and judgement concerning the development of new systems, across a wide and often unpredictable variety of contexts.</p> <p>They will have the ability to supervise the work of others and the maturity to assume responsibility for the direction of important tasks, including the profitable management of industrial and commercial enterprises.</p>	<p>They must understand the fundamentals and practical application of current industrial engineering technology and be able to maintain and manage such existing technology efficiently.</p> <p>They need communication skills and awareness of the business and professional environment beyond their specific area of responsibility.</p>	<p>Engineering Technicians must be prepared by a diverse yet specific set of technical competencies related to their particular field of work, which are an outflow of educational development of modern technology and fulfil an important gap others are not competent to do.</p>

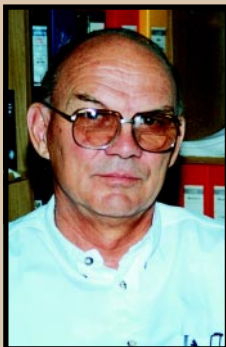
TRIBUTE TO FORMER COUNCIL MEMBERS

The term of office for the 5th ECN Council has expired and a new Council will be appointed. We have learnt that the following members will not be available for re-election and ECN wants to thank them for their long and outstanding service.



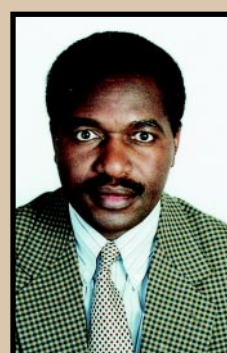
OUTGOING PRESIDENT OF THE FOURTH ENGINEERING COUNCIL

Fried Nitsche, the outgoing President of ECN is a well-known figure in engineering circles and has been a member of Council since 1986. He was the chairman of the Legal Affairs Committee, member of the Registration Committee for Professional Engineers and the Executive Committee. He was the managing director of Bicon Namibia and Bicon Zambia, but has now retired. His contribution to the profession through his membership on ECN as well as the Association for Consulting Engineers is valued highly.



MEMBER OF EXECUTIVE COMMITTEE

Kai Lund has been a member of Council since 1984 and was the President for 13 years. He served on various committees and was the representative of the Association of Consulting Engineers of Namibia.



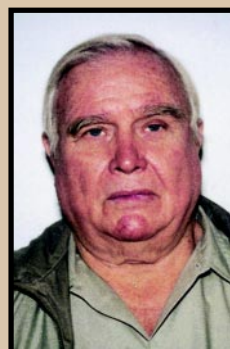
ALTERNATE MEMBER AND REPRESENTATIVE OF GOVERNMENT

Veston Malango was the representative of the Ministry of Works, Transport and Communication and has served on Council since 1999 and often assisted the Registration Committees with the assessment of applications in the mining discipline.



ALTERNATE MEMBER

Floris Marx has served on Council since 1996 as alternate member of the Association of Consulting Engineers.



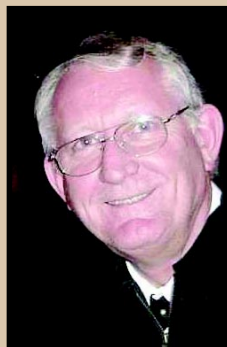
CHAIRMAN OF THE REGISTRATION COMMITTEE FOR INCORPORATED ENGINEERS AND ENGINEERING TECHNICIANS

Lutz Ebrecht was the representative of the Namibia Institute of Technology since 1992 and was elected chairman of the Registration Committee for Incorporated Engineers and Engineering Technicians in 1999.



ALTERNATE MEMBER

Fernando Vahekeni was a representative of the Ministry of Works, Transport and Communication and has served on Council since 1999.



EXECUTIVE MEMBER AND CHAIRMAN OF THE PRIVATE PRACTICE COMMITTEE

Juliohn Taylor, representative of the Association of Consulting Engineers has been a member of Council since 1996 and has been chairman of the Private Practice Committee. He also served on the sub-committee charged with the updating of the Regulation Regarding the Tariff of Fees for Professional Engineers and Incorporated Engineers.