



# ICMEESA news

March 2006

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**ICMEESA President: Mr Vaughan Townsend**

Congratulation to Vaughan for being elected as President of ICMEESA for another term. We wish Vaughan all of the best for 2006.

## **President address: Skills shortage – Is History repeating itself?**

The Certificated engineer, by virtue of his training and the responsibilities bestowed upon him/her by a legal appointment, is going to be faced with the challenge of the skills shortage being advocated in all sectors of the economy.

The Human Sciences Research Council (HSCR) revealed in a recent study that of 135 organizations employing artisans, 34% reported shortages. These shortages are split between metal and mechanical at 20% and electrical end electronics at 10%. The same study also revealed that of the 113 organisations employing engineers, 54% reported shortages or difficulties in recruiting and employing engineers. More than one influential leader has recently commented on the impact that the pending shortage of skills is going to have on the governmental target of 6% annual growth in GDP.

Dr Con Fauconnier recently quoted a number of very enlightening statistics which I feel are worth repeating in order for us to get a feeling for the size of the challenge ahead of us. Due to huge shortages of artisan in the 1960's through to 1975 measures were put in place by major players in industry to address the local skills shortage. These were typically Iscor, SATS, SEIFSA, the motor industry as well as the mining industry. This intervention resulted in 33 000

registered apprentices. In 2000 only 3000 registered learner ships (apprentices) were recorded and in 2005 the MQA reported a mere 1440 learner ships. With some elementary mathematics it is not difficult to calculate that the average age of qualified artisans is between 50 and 60 years of age. This implies that in less than 10 years a substantial number of the qualified artisans in the skills pool will be retiring. In fact, many of us are experiencing the beginning of this exodus already. Excluding the 50 to 60 age group the average artisan is less than 30 years of age because between 1985 and 1995 there was a major slump in the number of apprentices.

The HSRC study also revealed employers concerns relating to the quality of artisans available in the market. Reasons for this are not clearly understood at this point in time. Sasol has also undertaken a study recently and found numerous capital projects are threatened by the skills shortage. They forecast that between 15000 and 25000 skilled pairs of hands would be required. Although also concerned about the shortage of engineers, the Sasol study highlighted that the demand for skilled artisans outstripped supply by more than 3500 annually.

The skills shortage is not unique to South Africa. Many other countries also have expanding economies creating a demand for skilled persons. It is no secret that Australia is one of the major recruiters of SA artisans and engineers. A recent article in the Engineering News indicated that there are about 45000 South Africans working in the United Arabic Emirates (UAE). How many of these are artisans and engineers? Based on reports from colleges, I would venture to say that the majority of them are skilled engineering people. This exodus of skills has a huge impact on the available skills pool in SA.

Let us reflect on the professional engineers for a moment. An asset management analyst revealed in a recent report that between 1965 and 1982 the SA government employed 4500 engineers. In 2005 the number had decreased to 1500. This has resulted in the reported negative impact on the delivery of basic services i.e. sanitation, electricity, water and housing, to name but a few. The intended action by government to address the challenge is to recruit engineers from other countries. The Director General for science and technology was recently reported to

have confirmed that discussions are taking place regarding the relaxation of immigration laws as a short term solution to increase the skills pool. We do not only have to contend with the backlog of services mentioned above, we also need to take cognisance of the 6% annual growth expectations as well as the R180bn the government plans to spend on major parastatal projects.

The R12bn Gautrain will no doubt attract a number of local skilled artisans and engineers to compliment the 50% which is going to be outsourced to French and Canadian companies. The huge skills requirements for the structural developments required to facilitate the 2010 soccer world cup will place even further strain on the skills pool in SA.

Then we need to also mention the proposed Eskom capacity expansion program. Although only 30% of the spend will be allocated to SA companies it is going to put additional strain on the SA skills pool requiring extensive skills recruitment from abroad. Alec Irwin alluded to the fact that Eskom alone is looking for 400 qualified engineers. Need I mention the above stated 30% is due to the fact that SA is not geared to supply anything more due to a lack of technical skills and expertise. There will no doubt be a major drain on the available skills in SA with the proposed growth and expansion projects which have been identified.

There is also a growing pattern of employment of graduate engineers within other sectors such as the finance and insurance sectors. The theory is that the strong analytical and project management skills demonstrated by engineers are found to be extremely useful and subsequently in demand by these sectors. A second theory is the employment equity requirements of various Acts and Charters which are currently driving the skilled, experienced white engineers to seek alternative occupations. Another area of concern is the number of engineering students graduating annually has decreased by 50% since 1982 and continues to decrease. A leading recruitment agency for engineers has stated that in excess of 8000 additional engineers will be needed during the next 5 years. At current trends, SA tertiary institutions will not be in a position to provide 50% of this requirement.

The challenge is not insurmountable, but needs to be addressed as a matter of urgency. Industry needs to expedite various interventions to counter the skills shortage some of which could be:

- Increase the number of learner ships / apprentices before we need to import these skills.
- Boost the intake of engineering students in tertiary institutions, both technicians and graduates
- Implement retention mechanisms to retain the available skills pool in SA
- Devise plans to persuade the skilled experienced artisans and engineers who left SA to return.

- Persuade government to relax the EE requirements as this is now proving to be counter productive. Importing white skilled persons as opposed to using SA white skills where available is questionable.

Those who cannot learn from history are doomed to repeat it.

Vaughan Townsend  
President: ICMEESA

#### Member Feedback

Thank you for sending the newsletter, I only received it last week but it is always welcome to hear what is happening.

It was with interest that I read the article on Lockout/Tagout/Blackout and whole heartedly agree with the engineer's perspective. I would like however to refer him to the NFPA 70E (National Fire Protection Association) section 120.2 and NEC (National Electric Code) section 230 for reference to LOTO and disconnects (Isolators in SA English). These codes are the guidelines for all operations and installations in the USA respectively. The NFPA 70E specifies that an isolation device be visible from the place of work and shall visibly isolate the power conductors.

The ability to visibly see the break is fairly new and many plants are now specifying this feature on LV switchgear. This so that the operator can confirm that the isolation device is off, and tagged out, while working on it. While there are exceptions, this is the accepted rule. High Voltage Regulation has long required a visible open point before grounding a system. I found these codes very confusing when I first came to the US but have come to see them as an essential resource and regularly refer to them. Installation codes differ greatly in the US compared to SA but I believe these codes would be a good resource for SA engineers as they cover virtually every situation (as a result of the litigious nature of American Society).

The article on Safety Harness's was very good and I will refer this to our safety officer for consideration in future training.

Many thanks.

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## Living in the crystal ball? – a look into the future

The subject matter covered in Vaughan Townsend's presidential address is a matter of great concern. It has been the subject of various articles, the subject matter of which I have gathered and hesitated to publish as it has inherent negativity and could be construed to have both political and racial slants. However the facts remain alarming and need to be objectively examined so I have decided to follow the theme set in Vaughan's address.

I remain the eternal optimist, a born and bred South African, a few years from retirement, with no thought or desire to emigrate. Let me immediately contradict that by stating that I have been working in Africa, north of the Zambezi, for the past six months and have just signed a two year contract. Why, well with the industry in difficult times I was concerned about being able to retire when I decide, and not when other circumstances dictate. The apparent shortage of engineers in RSA is not the impression I had when looking at alternatives. The financial offer was also one that never required debate.

These last six months have made me seriously reflect on what retirement is going to be like in the RSA within the next ten to twenty years. I often wonder if I am not now living in the proverbial crystal ball with the future now being reality, with nothing virtual about it at all.

The motivation for saying that is that power outages, poor potable water quality, polluting of water sources, inoperative sewerage plants, fuel shortages and general deterioration of roads and municipal infrastructure and services are an accepted part of everyday life here. For example, power outages at specified times and days of the week, of up to two hours are an accepted form of municipal power control. Sounds both familiar and ominous, does it not. It would appear that all of southern Africa has a power generation crisis.

It is easy to throw the ball into someone else's court, but let's be honest, the same problem is also occurring in the industry. Standards are just not what they were when referring to "good engineering practice". As engineers we need to give serious thought as to why we are entering into this deterioration spiral, and more so, what can we do to alleviate the problem.

The problem stems from the severe shortage of engineering skills that are most prevalent at the artisan level. This shortage is likely to be a serious constraint to the country meeting its target of growing GDP by 6% per annum.

With high unemployment one would imagine the solution fairly easy, employ more apprentices. The problem is exacerbated by the tendency for school leavers to prefer white collar professions as opposed to a career in a trade.

Unfortunately training is expensive, even with the new subsidised learnership schemes. The trend is also to train the candidate as quickly as possible to

fulfil only the minimum requirement to operate effectively in that specific works. Where we in the past had this large pond full of fish we now have many small ponds with fish only able to survive in that specific environment. A qualification that restricts an artisan's option to transfer to an alternative industry will also discourage entry into a trade.

Of most concern to me is the tendency to create "quick fix" qualifications with the impression that persons with pieces of paper will resolve the problem. There is no substitute for experience and quality training. This problem is strongly evident, specifically in the boilermaker and welder trades. The importance of both trades being strongly underestimated, with both key trades to industrial growth. It is no coincidence that in a major capital development here, there has been a need to imported both welders and boilermakers, as the local talent does not possess sufficient expertise to perform the tasks effectively. Examination of the training syllabi for obtaining the appropriate "craft certificate" will explain the reason why.

Let us be honest, this is a pure training problem and has nothing to do with employment equity. It just happens to be that most employment seekers today are from previously disadvantaged backgrounds. Further, is that we started a career in the trade of our choice, and underwent psychometric testing to ensure that our career choice was correct. Today there is desperation to find employment, any employment. The consequential result is many artisans who inherently desire to be in another profession.

In an attempt to reduce overhead cost within the company structure, training has been outsourced. My conclusion here is that that the majority of these institutions train for profit, and not necessarily to fulfil the outcome required by the customer as to the proficiency of the learner.

There is much speculation on the reason for the skills shortage at engineer level. Even with a sharp decline in both mining activity and civil engineering projects, research shows that Government's overzealous transformation drive has been the chief cause behind the shortage of skilled staff in the public sector, particularly in local government. Many white engineers were offered lucrative retirement packages to make way for greater black representation. Unfortunately, there were not enough skilled black engineers with the necessary experience to fill the void. That created a skills gap, where younger graduates were effectively cast adrift in local government with little or no guidance from older hands. Others postulate that in many instances engineers were simply not prepared to work under black authority. They also fled local government in favour of higher salaries in the private sector. Research into municipalities showed that technical personnel had been replaced by non-technical personnel. Only 60 of the 231 municipalities have civil engineers employed, while 74 municipalities

employ no form of technical expertise. Before we bash the municipalities too much, remember the article in a previous newsletter about attempts to withdraw the legal requirement for engineers in the mines? And then the equity issue seems to come up again. I recently reacted critically to a negative statement about the performance of an equity candidate. The candidate finished school and was privately financed to study at a technikon. He then spent three years at the mine as a pupil engineer. After obtaining his Government Certificate of Competency he is expected to perform competently under a statutory appointment without appropriate mentorship. In comparison, I spent four years as an apprentice doing practical and academic training. After almost one year as an artisan I was accepted as a pupil engineer for two years. After obtaining the GCoC, I was exposed to a legal appointment with the protection of the system making sure I did what was necessary. But more importantly, as the legally responsible engineer, the competence of the foreman and artisans were an important part of that support system and a major part of my technical learning curve. That vital link is no longer there to support the young inexperienced engineer today. This necessitates that the training of the young engineer is required to be even more intensive and better than before.

To dispel any thoughts that I have a biased view on my present experience in Africa, let me quote from an article in a sister association magazine, (Craig Clarke; SA Mechanical Engineer, October 2005, Municipal Infrastructure threatened by lack of skills,) where the writer had visited one of the largest cities in Africa, and comments as follows. *"if this is where we will be in twenty years time it will be a total disaster. If we don't do something about it now to make it work, the country will just collapse. We, as engineers, should all show greater commitment, because the future of this country depends on engineers"*

So the question remains, as to what we can do to prevent our beloved country from becoming the same as we are witnessing elsewhere. Well, I am not sure who has the definitive answer. Our President's address concludes that the problem is not insurmountable, and lists five possible remedies. And I remain the eternal optimist.

**Letter to the state president –  
"Removal of Affirmative Action Bill as it Affects  
Technical Disciplines in South Africa."**

Dear Sir

We are writing to you on behalf of the Engineering Profession in general, and the International Society for Professional Engineers, Union International des Ingenieurs Professionnels, and the Society for Black Engineers in particular, representing the engineering profession in South Africa and around the World.

Whilst we agree that the discriminatory measures of the past by the Nationalist Government have to be corrected, the ANC Government must not practice a system of discriminating against one of the race groups, thereby repeating the past and following a policy which you fought to eliminate. We wish to advise the South African Government to urgently remove the Affirmative Action Bill and various empowerment equity bills from the Technical disciplines in SA, and curtail the conditions set out in the Professional Procurement Bill. The requirements of the Affirmative Action Bill and the various Empowerment Equity Bills, when applied to the Engineering Profession, are destroying the future growth of SA and are leading to the complete destruction of the infrastructure of this country.

Not only is it affecting the growth of manufacturing, but it is slowing down future investment in SA.

The Bills have already destroyed the structure of most of the local authorities in SA, in that 74 of the Local Councils do not employ any Qualified Technical Specialists. In your own recent Government survey, only 8% of people in key jobs at local authority level of Government had the required skills to perform their jobs. There are too many skilled professionals being denied job opportunities at various levels of government because they are outside of party political networks that have captured civil service jobs for patronage. Strict professional competence criteria need to be applied when appointing technical staff. The spread of diseases such as cholera and typhoid, due to inexperienced and incorrect handling of water drainage and sewerage will continue without expert help. The continued electricity outages in Johannesburg by City Power need to be addressed by a team of professional engineers very urgently before the hub of SA is destroyed. The requirements of the Affirmative Action Bill are also preventing and limiting the employment of professional black engineers from surrounding SADEC countries because the same rules written into your Bill apply to engineers from neighboring states. Very little skills transfer has taken place since 1994 and this has affected the development of Graduates from Universities and Technikons in SA. Thousands of previously disadvantaged learners from the Technikons are unable to get their practical experience in order to complete their qualifications.

All the facts and figures can be obtained from our website:

[www.professionalengineers.co.za](http://www.professionalengineers.co.za)

We look forward to your early response to our letter,

Yours Sincerely,

Michael D. Hosking B.Eng

Executive Director

International Society for Professional Engineers