Engineering Council of South Africa

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Dear Colleagues,

In our last communication, we spoke about the skewed representation of gender and race in our profession, and we are pleased to announce that the Engineering Council of South Africa (ECSA) and the South African Women in Engineering (SAWomEng) are in the process of signing a memorandum of understanding, which will see SAWomEng, partner with ECSA to ensure that all efforts aimed at increasing the number of women engineers are increased. (See article by Shamiso Kumbirai from SAWomEng).

We are further encouraged that the chronic shortage of engineering skills, also forms part of the National agenda, and following President Jacob Zuma and the Minister of Public Works Ms Gwen Mahlangu-Nkabinde's call for increased efforts in addressing the skills shortage, we are happy to announce the launch of Engenius, an initiative aimed at promoting national collaboration, coordination and support amongst organisations involved in advancing the engineering profession. (See article by Dr Nozizwe Chinkanda).

We remain committed to ensuring that ECSA delivers on its core mandate, consequently improving its service to the engineering profession and the public at large, therefore through our legal department, we will on a regular basis be publishing what we call Advisory Notes, with the aim of advising interested parties on specific profession related topics. (See an update from Advocate Pieter Fourie on available advisory notes).

ECSA's processes for receiving and assessing applications for registration and educational evaluation are rigorous, require significant information and are inherently protracted. ECSA's registration process is subject to periodic review by the Engineers Mobility Forum. The last review was completed in 2010, indicating that ECSA's standards and processes match accepted practice. ECSA has reviewed its registration policies and processes and has completed the specification for a new IT system that is intended to smoothen the submission of essential information and the assessment process. ECSA will shortly publish a tender for the first phase, namely a system for registration applications for Candidate Engineer and Professional Engineer.

ECSA's accreditation system for BEng-type programmes was reviewed by a Washington Accord review team in September 2010. As a result of this report, ECSA's status as a Washington Accord signatory has been extended for a further six years.

Furthermore, following much deliberation on the need for a platform to discuss issues relating to our profession, ECSA is pleased to announce that it will be hosting its inaugural Engineering Summit in the last quarter of 2011. The aim of the Summit is to position the engineering profession as a force and catalyst for economic growth, socio-economic development and transformation. Therefore, this Summit will be used as a platform to profile activities geared towards a globally competitive and viable engineering sector, whilst providing all stakeholders with the opportunity to shape the future of engineering in South Africa. The intention is to institutionalise this endeavour and make the Summit an annual event that brings together all key stakeholders. We will be sending out more details closer to the time.

We appreciate the support you have shown to date and look forward to welcoming more ideas on how we can make ECSA an organisation that effectively represents the profession.

Regards,
Dr Oswald Franks, Pr Eng
CEO Engineering Council of South Africa

ECSA launches Engenius campaign to grow and transform the engineering profession

A CAMPAIGN TO GROW AND TRANSFORM THE ENGINEERING PROFESSION
UPDATE - June 2011

During the first six months of reviving the Engenius campaign, the main focus was on engaging stakeholders to collaborate and join forces in order to make a national impact. Engineering voluntary associations, deans of engineering faculties, SETAs, Department of Higher Education and Training, Department of Basic Education, Department of Public Works, Department of Science and Technology as well as another 38 organisations involved in advancing the profession through their activities and programmes were engaged.

These engagements lead to draft MOUs (around specific areas of collaboration) with: SAICE, SAIMechE, IEEE, ESKOM EXPO, NSTF, SAASTA, DPW, CBE, SAQA, DST, SAASTEC, Sci-bono, SAMF, UP, SAICE, TRAC, TELKOM, PROTEC, MQA, CETA, MERSETA.

A needs analysis was also done to identify areas of support required by these stakeholders. This lead to the development of the following products available to all stakeholders:

- www.engenius.org.za which brings information of all stakeholders together (Live from mid July)
- 3 min animated DVD for learners demonstrating engineering in everyday life with the message "Engineering makes it happen!" (To be completed end July).
- Promotional gifts: mosquito wristbands with the Engenius message: make it happen.
- Engenius brochure
- Engenius Advertisements
- Engenius Posters
- Standardised Engenius Presentation
- Facilitator/teacher/learner workshops based on existing programmes/competitions of stakeholders

Engenius supported the Sci-bono Engineering Careers Week through 12 of its stakeholder organisations doing workshops, presentations (146 forty five minute presentations) and exhibitions. A total of 3264 learners (from grade 10-12 studying mathematics and physics) and their 71 educators participated.

Engenius was launched in the media during March and there has since been much exposure of the program in print and electronic media.

The aim in the next six months is to train facilitators and reach primary and high school learners through the campaign's products, facilitators and member organizations' activities.

Specific joint projects will be kick started with stakeholders to fill identified gaps.

Engenius is calling on readers to add their support for the campaign by visiting www.engenius.org.za, contacting us for products or sharing your time, information and good ideas! Please contact liesel@ecsa.co.za.

Celebrating the next generation of Women in Engineering: 10 – 15 July 2011

By Shamiso Kumbirai – Designation, SAWomEng

The South African Women in Engineering (SAWomEng) was founded in 2005 by Mabohlale Mampuru and Naadiya Mosajee following the realisation that despite female engineers contribution to the science and technology fields, female engineers are still under represented in the profession.

Women still account for less than 20% of engineering graduates in many countries. To increase the progression of women in engineering it is imperative that women are educated about the field and to redefine the perception of an engineer. SAWomEng therefore serves as a platform for the advocacy, advancement and education of females entering the engineering industry in South Africa.

2011 marks the 6th annual SAWomEng Conference to be held from the 10th until the 15th of July. The theme for this year is 'Building Sustainable Buildings through Green Building' and promises to be both exciting and thought provoking. Alongside the technical project, the delegates are also afforded opportunities such as professional etiquette seminars, meeting leading women in industry, being assigned and engaging with mentors and the chance to establish contact with some of the country's prominent companies which all assist in allowing them to be better equipped for their entrance into the professional world and gain confidence in their abilities as women in engineering.

What once was an organisation run by two students has expanded nationally with committed female engineering students and graduates who volunteer their services to this organisation and strongly believe in the tremendous capabilities women possess and can offer this field. Passionate, intelligent female engineers need to be retained in the field of engineering in order to change the perception that engineering is an industry only for men. SAWomEng will continue tirelessly to motivate, empower and celebrate the next generation of women in engineering.

Looking back at the Japan Disaster

By Professor Philip Lloyd Pr Eng, Energy Institute, Cape Peninsula University of Technology

We engineers tame the forces of nature. We improve the human condition by our work. But we are human ourselves; and sometimes we fail.

All are chastened by the recent events in Japan. How was it possible for whole towns to be swept away before our very eyes? How could the model of a modern high-speed railway have disappeared with all its passengers? Or a cruise liner with its hundred tourists? What was a fishing boat doing, sailing across the fields and overtaking a doomed pantechnicon? How could a nuclear reactor have had its safety compromised, threatening to contaminate the region with radioactivity?

Japanese engineers have mastered earthquakes to a high degree. Tokyo emerged essentially unscathed from a tremor 8 000 times stronger than that which levelled Christchurch only a few weeks before. Yes, the high rise buildings rocked and rolled, but they did not collapse. The nuclear reactors went into a safe shutdown, just as they were supposed to. But power lines and many other services failed so there is more work for the engineers to do to make the infrastructure earthquake proof.

The real problem was the tsunami. We did not understand its possible magnitude. We had not realised that Aceh was merely a sneak preview. We had forgotten that, in 1883, Krakatoa caused waves 35m above normal sea level. In 1958, at Lituya Bay in Alaska, a wave reached 516m as a result of a landslide triggered by an earthquake of magnitude 8.3.

And you should not think that it is only around the Ring of Fire, the shores of the Pacific, that tsunamis strike. In 1751, an earthquake destroyed Lisbon, and the ruins caught alight. The citizens fled to the banks of the River Tagus to avoid the blaze. An estimated 20 000 died when the tsunami roared up the river. Japan has already spent billions of dollars on anti-tsunami seawalls, which line at least 40% of its coastline and are up to 12 meters high. However, the March 11 tsunami washed over the top of many walls, and even caused some to collapse.

Unfortunately, it washed over the seawall at Fukushima Daiichi, a nuclear power plant. When the earthquake struck, the reactors were immediately shut down. The earthquake broke the power lines, but the emergency generators kicked in to keep the essential cooling water flowing. But 55 minutes after the earthquake, the tsunami arrived, flooded the generators for four of the six reactors, and stopped the cooling of those reactor cores. Two of the staff, who were presumably outside the reactor buildings at the time, have disappeared.

The seawalls held the tsunami at bay at the remaining two of the Fukushima Daiichi reactors, at the four Fukushima Daini reactors next door, and at the three Onagawa reactors further up the coast, even closer to the centre of the earthquake. All these reactors shut down safely, the emergency generators kept functioning, and they will almost certainly be started up again.

All four of the reactors that lost emergency cooling have suffered catastrophic damage. There has been some release of radioactivity into the surrounding environment. The release has been far less than that at Chernobyl, which in turn was far less than the radioactivity spread around the globe by the atmospheric testing of nuclear weapons in the 1950's and 1960's.

The catastrophic damage was caused by explosions of gaseous hydrogen. Many metals react with water when they are very hot, and the reaction produces hydrogen. This caused a build-up of pressure in the reactors. The operators took the decision to reduce the pressure, by releasing the gas along with some radioactivity into the secondary containment building. The hydrogen-air mixture then exploded and destroyed the secondary containment.

It is a miracle that no-one was killed in these explosions. When the building round Reactor 1 exploded, four people were injured, none seriously. When the hydrogen from Reactor 3 blew up, eleven were injured, one of whom had to be hospitalized. None were injured in the explosions that destroyed the buildings around Reactors 2 and 4. To prevent build-up of hydrogen in the Reactors 5 and 6, the owners have improved the ventilation of the secondary containment.

The workers trying to bring the plants under control are being exposed to significant quantities of radiation. The Japanese Government has just raised the limit to 250 millisieverts per worker. To put this in context, most of us are exposed annually to about 5 millisieverts from natural sources. A single whole-body dose of 5 000 millisieverts will kill half the population, but the death rate falls off rapidly below that level. It is unlikely that any of the workers will suffer serious consequences from their exposure.

The radioactivity that has been released is detectable in food grown within 30km of the failed reactors. The activity is primarily that from the iodine isotope I131, half of which disappears every 8 days. The releases are dropping as cooling is restored, which means that the food grown in that region will be safe within about 2 ½ months, if no further significant releases occur.

We should be absolutely terrified of tsunamis, they are far worse than earthquakes and nuclear disaster, in the loss of life and destruction of property they cause. We engineers have to learn from our mistakes. We need to bolster our defences against tsunamis. We can now do a pretty good job of designing against earthquakes. And the recent events have shown that most nuclear reactors can survive that greatest of cataclysms called a tsunami.