

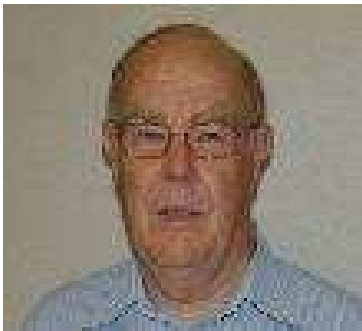
"Tackle a Block at a Time".

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No 1.

NEW CEO for ECSA



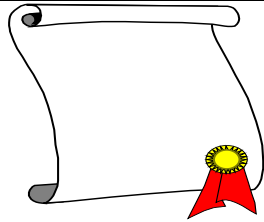
Prof Hu Hanrahan

As of 12 January, ECSA welcomed Prof Hu Hanrahan (Pr Eng) as its new CEO.

In a short speech to ECSA staff on his first day at the helm the professor said: "We know that ECSA is one of the better Councils within the Built Environment, it is up to us to make it the best" Hu Hanrahan has a degree and a PhD in Electrical Engineering, and spent most of his working life at Wits University, where he was the head of the Electrical Engineering Dept and more recently the Dean of the Faculty of Engineering.

He has been associated with ECSA for "more years than I care to remember" in both a voluntary role and as a consultant to the various committees. The fact that he can quote at will from policy documents and bills from as far back as the late 20th Century is an indication of his depth of understanding of the roles and functions of ECSA. When ECSA President Trueman Goba approached him to fill the gap left by the late and deeply mourned Professor Nayagar, he was in two minds as to whether he should "run like mad or try to make a difference". Fortunately for ECSA, Prof Hu was able to reschedule his other commitments and decided on the latter.

Welcome Professor, everyone at ECSA looks forward to working with you to indeed make ECSA the best Council, not only in the Built Environment, but in South Africa as a whole.



No. 2 Continuing Professional Development (CPD). General Details of the Scheme.

After many years the process of consultation and debate with stakeholders in the profession, including voluntary associations such as ours, the Engineering Council of South Africa (ECSA) approved a formal system affecting all registered engineering practitioners. This came into effect from **1st January 2006**.

CPD may be defined as "the systematic maintenance, improvement and broadening of knowledge and skills, and the development of personal qualities necessary for the execution of professional and technical duties throughout an engineering practitioners career".

The Engineering Profession Act 46 of 2000 requires;

that registered practitioners have to renew their registration at regular intervals. ECSA decided that the most appropriate way to implement the Act would be to link renewal of registration with CPD.

ECSA has attempted to design a system that is not a millstone around the necks of registered practitioners. A reasonable system of earning points or credits has been devised. This system includes attendance at educational / academic courses as well as work-based activities. The 5 credits per year or 25 credits to be acquired over a 5-year period should be easily achieved with the three categories of CPD. While a minimum of 3 credits must be earned per year, excess credits can be carried over.

A very brief summary of CPD requirements follows;

Category 1 which requires 2 credits per year has proved to be the most difficult and controversial. It is however not difficult to attend 2 accredited Courses / Seminars a year.

Category 2 awards workers 2 credits for just working more than 800 hours a year!

Category 3 awards members of an ECSA recognised Voluntary Association 1 credit for membership.

A misconception that only Civil practitioners may attend Civil courses is incorrect. Any discipline can attend other discipline courses if they are of interest and relevant to that particular practitioners profile. (For example Financial courses affect all and not only accountants)!

The above is not the full or detailed requirements or methods of obtaining credits. See previous and future newsletters about CPD courses and news.

REFERENCE SOURCES;
ECSA Web Site www.ecsa.co.za

No 3.**IPET CPD Course List**

(Kindly note that the list is not complete and only lists the current and/ or recent courses).

ECSA Validation Number	Description	Provider	Hours	Credits	Validity Dates
IPET-LLLS1-12/2010	Finance for Engineers (Middle & Top Managemnet)	Life Long Learning Solutions, P O Box 37545, Faerie Glen,0043.Tel 083 788 2666, 012 345 6738 / 345 4307, Fax 012 345 6793, E mail johanv@llls.co.za	20	2	01/01/2008 to 31/12/2010
IPET-LLLS2-12/2010	ISO 9001:2000 Guide to Practice	Life Long Learning Solutions, P O Box 37545, Faerie Glen,0043.Tel 083 788 2666, 012 345 6738 / 345 4307, Fax 012 345 6793, E mail johanv@llls.co.za	10	1	01/01/2008 to 31/12/2010
IPET-LLLS3-12/2010	Diversity in Practice	Life Long Learning Solutions, P O Box 37545, Faerie Glen,0043.Tel 083 788 2666, 012 345 6738 / 345 4307, Fax 012 345 6793, E mail johanv@llls.co.za	10	1	01/01/2008 to 31/12/2010
IPET -LLLS4-12/2010	Sales Negotiation Techniques	Life Long Learning Solutions, P O Box 37545, Faerie Glen, 0043.Tel 083 788 2666, 012 345 6738 / 345 4307, Fax 012 345 6793, E mail johanv@llls.co.za	10	1	01/01/2008 to 31/12/2010
IPET-LLLS5-01/2011	Environmental Risk	Life Long Learning Solutions, P O Box 37545, Faerie Glen,0043.Tel 083 788 2666, 012 345 6738 / 345 4307, Fax 012 345 6793, E mail johanv@llls.co.za	10	1	01/06/2008 to 30/05/2011
IPET/ 06/00001/07	The ECSA CPD Policy aqnd How to Log Your CPD	IPET P O Box 1824, Randburg, 2125, Tel / Fax / 011 787 9706, E mail engineer@netactive.co.za	1	0.1	01/07/2006 to 01/07/2009
IPET /2008/04/01	Workshop on HEGF & New Engineering Technology Education Qualifications	IPET P O Box 1824, Randburg, 2125, Tel / Fax / 011 787 9706, E mail engineer@netactive.co.za	10	1	01/04/2008
IPET 07/00001/10	Power System Protection Course	Ron Wedderburn, P O Box 78, Dargler, 3265. Tel / Fax 033 330 8412, Cell 083 735 8080	30	3	01/05/2007 to 30/05/2010
IPET 08/AST01	Fire Detection Engineering Course	Alien Systems & Technologies, PO Box 396, Walkerville, 1876, Tel 011 949 1157, Fax 011 949 1110, E Mail mike@astafrika.com	10	1	01/10/2008 to 01/10/2011
IPET 07 / IIR 101	Assessment for Pumps, Pipes & Valves Conference	Institute for International Research, PO Box 2353, Parklands,2121.	30	3	26/06/2007 to 28/06/2007
IPET / 07 / Eskom 100	Underground Cable Systems Workshop	ESKOM Distribution, Network Services,Cental Region, P O Box 11723, Randhart,1467, Tel 011 871 2993, Fax, 011 871 2653, Cell 083 464 1614, E mail Ramashmt@eskom.co.za	20	2	Jul-07
IPET 07 / IIR100	The Engineering Manager	Institute for International Research, PO Box 2353, Parklands,2121.	20	2	15 to 17 August 2007

There are around 950 activities listed on the ECSA Website
www.ecsa.co.za.

So for further information please look up the ECSA Website!

Note.

The following mini articles follow the trend of interesting scientific and engineering developments we set in our previous newsletters. We hope you find them of general interest!

Ed.

No 4. Solar Energy News

The two important types of solar energy are of course Solar heating (panels) and Photovoltaics.



Sun powered hot water systems are a familiar sight on the roofs of homes in sunny Spain, France, Australia and now in South Africa. Solar heating provides about 33% of the average hot water needs and is estimated to reduce CO2 emissions by approximately 350 Kgs annually.



Photovoltaics.

These are mostly manufactured from Silicon materials. Better materials are being investigated and these include dyes, nanotubes and synthetic porphyrins.



Roofs and walls could generate power by being covered with dye-sensitised solar cells in the form of a paint, according to research being conducted by the Swansea University in the UK.

Visit the [University Of Swansea School Of Engineering](http://www.swansea.ac.uk/schools/engineering/) for more information.

Nanotechnology in which solar cells are made by using dye-sensitised material and nanotubes is being investigated at the Penn State University in the USA.

Photovoltaics efficiencies appear to range from about 3% with the best claims being around 20%.



Leaves.

Photosynthesis in the leaves of plants achieve between 30 to 40% efficiencies in converting light

Researchers in Japan and Australia are trying to mimic this by creating wheel-shape molecule arrays called porphyrins.

Insulate, Insulate.

South African houses are generally not very well insulated, so suffer from heat loss in winter. Some ceiling insulation is a useful addition to saving electricity. Geysers blankets are also recommended.

Sourced from: [scenta](http://www.scenta.com)

Date Published: May 02, 2008

No 5.

Wind, Water and Sun Beat Biofuels, Nuclear and Coal for Clean Energy!

Civil and environmental engineering Professor Mark Z Jacobsen of Stanford University says the best ways to improve energy security and mitigate global warming and reduce the number of deaths caused by air pollution are using wind and water, not growing fields of crops nor nuclear plants.

He claims "clean coal" which involves capturing carbon emissions and securing them in the earth is not clean at all.

He has conducted the first quantitative scientific evaluation of proposed major energy related solutions by assessing their potential for delivering energy for electricity and vehicles as well as their impacts on global warming, health, energy security, water supply, space requirements, water pollution, reliability and sustainability. His findings show that the options that are getting the most attention are between 25 to 1000 times more polluting than the best available options!

Ethanol based biofuels will cause more harm to human health, wildlife, water supply and land use than current fossil fuels he claims. He added that Ethanol may also produce more global warming pollutants than fossil fuels according to the latest scientific studies.

Sources that Jacobsen found the most promising are, in order, wind, concentrated solar heating, geothermal, tidal, solar photovoltaics, wave and hydroelectric.

He recommended against nuclear, coal with carbon capture, corn and cellulosic ethanol due to pollution, land use and damage to wild life.

To place various alternatives on an equal footing he first made his comparisons by calculating the impacts as if each alternative alone was used to power all the vehicles in the USA including battery electric, hydrogen fuel cell and flex vehicles than can run on high blends of Ethanol.

Wind was the most promising showing better than 99% reduction in carbon and air pollution and consuming less than 3 square Kilometres of land for turbine footprints taking up about 0.5% of all USA land, more than 30 times less than that required for growing corn for Ethanol.

He advocates a package approach to use the best alternatives as using just one would be impractical.

Energy and vehicle options from the best to the worst according to the Profs calculations were;

1. Wind Power.
2. Concentrated Solar Power (CSP).
3. Geothermal Power.
4. Tidal Power.
5. Solar Photovoltaics (PV).
6. Wave Power.
7. Tie between Nuclear and Coal with carbon capture(CCS).

Best to worst Vehicle options;

1. Wind - Battery electric (BEV).
2. Wind - hydrogen Fuell cell (HFCV).
3. CSP - BEV

4. Geothermal - BEV.
5. Tidal BEV.
6. Solar PV - BEV.
7. Wave - BEV.
8. Hydroelectric BEV.
9. A tie between nuclear and Coal CCS - BEVs.
10. Corn - Ethanol.
11. Celluloisic - Ethanol.

Source Adapted from Science Daily 2008/12/11 and adapted from material from [Stanford University](http://www.stanford.edu).

No 6.

U.S. Greenhouse Gas Emissions Still Increasing.

Total U.S. greenhouse gas (GHG) emissions were 7,282 million metric tons carbon dioxide equivalent (MMTCO_{2e}) in 2007, an increase of 1.4 percent from the 2006 level according to Emissions of Greenhouse Gases in the United States 2007, according to a report released December 4 by the Energy Information Administration (EIA). Since 1990, U.S. GHG emissions have grown at an average annual rate of 0.9 percent.

U.S. GHG emissions per unit of gross domestic product (GDP), or U.S. GHG intensity, fell from 636 metric tons per million 2000 constant dollars of GDP (MMTCO_{2e}/million dollars GDP) in 2006 to 632 MMTCO_{2e}/million dollars GDP in 2007, a decline of 0.6 percent. Since 1990, the annual average decline in GHG intensity has been 1.9 percent.

Total estimated U.S. GHG emissions in 2007 consisted of 6,022 million metric tons of carbon dioxide (82.6 percent of total emissions); 700 MMTCO_{2e} of methane (9.6 percent of total emissions); 384 MMTCO_{2e} of nitrous oxide (5.3 percent of total emissions); and 177 MMTCO_{2e} of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆) (2.4 percent of total emissions).

Emissions of carbon dioxide from energy consumption and industrial processes, which had risen at an average annual rate of 1.1 percent per year from 1990 to 2006, increased by 1.3 percent in 2007. Unfavorable weather patterns, where both heating and cooling degree-days were higher in 2007 than 2006, and an increase in the carbon intensity of electricity generation, driven by decreased availability of hydropower, both contributed to higher energy-related carbon dioxide emissions in 2007. Methane emissions increased by 1.9 percent, while nitrous oxide emissions rose by 2.2 percent. Emissions of HFCs, PFCs, and SF₆, a group labeled collectively as " high-GWP gases" because of their high heat-trapping capabilities, increased by 3.3 percent.

The full report can be found on EIA's web site at: <http://www.eia.doe.gov/oiaf/1605/ggrpt/index.html>

Sourced from ScienceDaily (Dec. 5, 2008) Adapted from materials provided by [U.S. Department of Energy](http://www.energy.gov).

No 7. LEDs And Smart Lighting Could Save Trillions Of Dollars, Spark Global Innovation.

ScienceDaily

A "revolution" in the way we illuminate our world is imminent, according to a paper published this week by two professors at Rensselaer Polytechnic Institute. Innovations in photonics and solid state lighting will lead to trillions of dollars in cost savings, along with a massive reduction in the amount of energy required to light homes and businesses around the globe, the researchers forecast. A new generation of lighting devices based on light-emitting diodes (LEDs) will supplant the common light bulb in coming years, the paper suggests. In addition to the environmental and cost benefits of LEDs, the technology is expected to enable a wide range of advances in areas as diverse as healthcare, transportation systems, digital displays, and computer networking.

"What the transistor meant to the development of electronics, the LED means to the field of photonics. This core device has the potential to revolutionize how we use light," wrote co-authors E. Fred Schubert and Jong Kyu Kim.

Schubert is the Wellfleet Senior Constellation Professor of Future Chips at Rensselaer, and heads the university's National Science Foundation-funded Smart Lighting Center. Kim is a research assistant professor of electrical, computer, and systems engineering. The paper, titled "Transcending the replacement paradigm of solid-state lighting," will be published in the Dec. 22, 2008 issue of Optics Express.

Researchers are able to control every aspect of light generated by LEDs, allowing the light sources to be tweaked and optimized for nearly any situation, Schubert and Kim said. In general LEDs will require 20 times less power than today's conventional light bulbs, and five times less power than "green" compact fluorescent bulbs.

If all of the world's light bulbs were replaced with LEDs for a period of 10 years, Schubert and Kim estimate the following benefits would be realized:

- Energy savings of 1.9×10^{20} joules
- Electrical energy consumption would be reduced by terawatt hours
- Financial savings of \$1.83 trillion
- Carbon dioxide emissions would be reduced by 10.68 gigatons
- Crude oil consumption would be reduced by 962 million barrels
- The number of required global power plants would be reduced by 280

With all of the promise and potential of LEDs, Schubert and Kim said it is important not to pigeonhole or dismiss smart lighting technology as a mere replacement for

conventional light bulbs. The paper is a call to arms for scientists and engineers, and stresses that advances in photonics will position solid state lighting as a catalyst for unexpected, currently unimaginable technological advances.

"Deployed on a large scale, LEDs have the potential to tremendously reduce pollution, save energy, save financial resources, and add new and unprecedented functionalities to photonic devices. These factors make photonics what could be termed a benevolent tsunami, an irresistible wave, a solution to many global challenges currently faced by humanity and will be facing even more in the years to come," the researchers wrote. "Transcending the replacement paradigm will open up a new chapter in photonics: Smart lighting sources that are controllable, tunable, intelligent, and communicative."

Possible smart lighting applications include rapid biological cell identification, interactive roadways, boosting plant growth, and better supporting human circadian rhythms to reduce an individual's dependency on sleep-inducing drugs or reduce the risk of certain types of cancer.

Journal reference:

1. E. Fred Schubert and Jong Kyu Kim. **Transcending the Replacement Paradigm of Solid-State Lighting.** *Optics Express*, Vol. 16, Issue 6, December 22, 2008 [[link](#)]

Adapted from materials provided by [Rensselaer Polytechnic Institute](#).

No 8. USA EESstor Patents a Super Capacitor.

The Company recently was granted a patent using a core ingredient of aluminium coated with barium titanate immersed in a polythene terphthalate plastic matrix. This theoretically will make up an Ultra light weight capacitor that can store a high amount of energy.

Some claims are that a total capacitance of some 30 F which can hold some 52 kWh of energy are made for a device only weighing some 281 pounds! Further claims are that unlike lithium-ion cells the technology is not degraded with cycling and has an unlimited lifetime. This represents an energy density of approx 4+ times lithium batteries.

These are all claims but as yet no actual devices have been demonstrated so some commentators think that this is vapourware to get people to invest in the company. Only time will tell!!

Sources; Various on Internet.

No 9. Robots Are Evolving, Population Is Booming Worldwide.

The most recent edition of the "Handbook of Industrial Robotics," shows that the population of robots nearly doubled over the last decade in North America. The

Handbook has a foreword by late science fiction writer Isaac Asimov and contributions from 120 experts, some of them giants in research and industry. The term "industrial robots" refers to all robots manufactured by industry, not simply robots used in industry.

The handbook's editor, Purdue University industrial engineering professor Shimon Nof, says robots have been steadily evolving since the book's first edition was published 15 years ago.

Back in 1985 it was just a vision to integrate humans and robots," says Nof, who specializes in "robot ergonomics," or improving the ease and efficiency with which people and robots work together. "Today, it is quite common to have teams that include both robots and people."

Examples of such integration include applications in manufacturing, agriculture and construction. Since the first edition of the handbook, robotics has benefited from innovations in technologies dealing with electronic controls and sensors, computer vision systems, virtual reality, artificial intelligence, nanotechnology and other areas.

"Popular attitudes about robots have changed over the past 15 years as well," Nof says.

"The fear that robots would replace workers has completely disappeared," he says. Instead of displacing large numbers of employees, robots have brought about a more highly trained work force better capable of running robots and computers.

"We have many more trained people in robotics now," Nof says. "Some new challenges for robotics researchers are better human-robot collaboration interfaces, robot mobility and navigation in unknown surroundings, and better robot intelligence for services and for public transportation."

The handbook, which sells for \$150, was published last summer (Northern Hemisphere) by John Wiley & Sons Inc. It is intended as an educational resource for students, engineers and managers and is accompanied by a multimedia CD-ROM that includes segments on the history of robotics and descriptions of various types of robots, along with pictures and videos.

Among some of the trends detailed in the handbook:

- The number of robots per 10,000 manufacturing employees skyrocketed from 1980 to 1996. For example, it went from 8.3 to 265 in Japan, 2 to 79 in Germany, 3 to 38 in the United States and zero to 98 in Singapore.
- In roughly the same time frame, the world robot population surged, going from about 35,000 in 1982 to 677,000 in 1996 and an estimated 950,000 in the year 2000.
- In the five years from 1992 to 1997, the robot population in North America shot up 78 percent, from 46,000 to 82,000.

Adapted from materials provided by [Purdue University](#).

No 10. Eskom delays R19bn pumped-storage scheme

Eskom has delayed the construction of its R19-billion 1 520-MW Tubatse pumped-storage scheme, near Roossenekal, in Limpopo province, owing to a slowdown in the growth of demand for electricity.

Eskom was working on estimations of a 6% growth in the country's gross domestic product (GDP), which would have led to a 4% growth in demand for electricity, however, the GDP growth was expected to be much lower in 2009. No estimate of how long the delay would be was given.

The first of four 375-MW units at the project, which was previously called Project Lima, were initially expected to come on stream by 2014, while all four units would have been operational by early 2015.

The utility noted that the average pumped-storage scheme had a life in excess of 70 years.

No 11. Denmark to Host Wind Energy Seminar.

In promoting wind energy, and its potential to become big business in South Africa, the Danish Foreign Affairs Minister, Per Stig Moller, was scheduled to open a wind energy seminar in Pretoria on January 23.

Danish companies Vestas Wind Systems, Dong Energy, and Suzlon Wind Energy would make presentations on the global green energy frontier.

Denmark developed its wind energy strategies in the 1970s and 1980s, and, at present, renewable energies, largely wind, make up 27% of the country's electricity supply. Wind power has become big business, and Danish companies were viewed as world leaders in wind power production.

The Department of Minerals and Energy has set a target of generating 10 000 GWh of electricity from renewable resources by 2013.

No 12. China's Manufacturing Capacity of Wind Components to Reach 12 GW by 2010

China's 40 wind component manufacturers accounted for 56% of global wind power equipment installed in 2007. The country has a domestic manufacturing capacity of nearly 8 GW, a figure which is expected to reach 12 GW by 2010.

No 13. Manufacturing Sector Slowdown.

The November manufacturing data released early January shows the reality of what could be a fairly fast slowdown in South Africa's economy in the early portion of 2009. The country's second biggest sector has now hit its worst levels in 10 years.

The physical volume of manufacturing in South Africa in November declined by -4,4% year-on-year (y/y) after a revised decrease of 1,8% (-1,6% y/y) in October. It is at a concerning -12% on a seasonally adjusted and annualised basis! The last time the annualised numbers were this bad

was in January 1998, when they struck -12,4% . However, unlike the 1998 period, the decline has been faster, coming off growth of 15% in the second quarter of this year. This is not good news for the economy and does raise the possibility of job losses because the global slowdown also feeds into it.

Basic iron and steel, non-ferrous metal products, metal products and machinery make up 22,4% of the local index and that is also where the problems are coming in. The seasonally adjusted data for basic iron and steel shows that this sector dropped a marked 28,2% between September and November when compared with the preceding three months. It contributed a full -1,6 percentage points to the seasonally adjusted percentage change in total manufacturing production. The data shows that the seasonally adjusted manufacturing production for the three months ended November 2008 decreased by 3,1% compared with the previous three months.

The rot has also set in among other sectors, like motor vehicles parts and accessories, which dropped -7,7% quarter on quarter.

Petroleum, chemical, rubber and plastic products also fell on a seasonally adjusted basis by -4,4% from the quarter before. This sector makes up 22,5% of the total and contributed -1 percentage points to the decline. Added to the above can be the fact that cement sales in Southern Africa declined 20,2% y/y in November to 1,158 million tons, according to data from the Cement and Concrete Institute.

The problems are clearly widespread, also borne out by the fact that the estimated consumption of electricity in South Africa in November 2008 declined 5,7% y/y compared with -1,4% y/y in October 2008. Growth in manufacturing in December is not likely so it seems 2009 is going to be tough year.

No 14. Study Visit to Lund University, Sweden , 14 November 2008 to 14 December 2008.

By Willem Badenhorst Pr Tech Eng. (Senior Technologist Public Works and Infrastructure Development Department, Tshwane).

Background:

The Swedish Government channels a vast amount of money to Overseas Development Aid (ODA) through the Swedish International Development Agency (SIDA). In 2006 this amounted to approximately 53% of the total Swedish ODA (SEK 15,6 billion, about USD 2,0 billion). SIDA employs about 900 full time personnel of which about 150 are located outside of Sweden.

The overall goal of Swedish Development cooperation is to contribute to improving the living conditions of the poor in less developed countries. To this end SIDA runs, among other things, Advanced International Training Programmes in various fields. Other institutions are contracted for specialised tasks such as presenting courses on specific subjects to delegates from the developing world.

As part of this programme, Lund University, in the south of Sweden, has been contracted for the past few years to present a course named "Road Traffic Safety". Two four week training courses are presented every year. The first phase (four weeks) of the first course is presented at Lund University in March / April of each year with phase 2 (about one week) being presented in one of the participating countries in October / November of the same year. The first phase of the second course is presented at Lund University in November / December of each year with phase 2 being presented in one of the participating countries in May / June of the following year.

The target countries for the first course are Africa, Asia, Latin America and Central / Eastern Europe. The target group for the second course is Africa.

The Road Traffic Safety Course - November / December 2008.

I was fortunate enough to be selected to attend the above course at Lund University as part of a South African Delegation of four people.

Two technologists from the City of Tshwane attended the same course during November - December 2007. There was also a member of the Johannesburg Metropolitan Police Department, as well as a senior manager from the Road Traffic Management Corporation, as part of the South African Delegation.

The target group for this course is Medium Level Managers working with policy and development issues within road administration, police agencies, traffic safety authorities as well as non governmental organisations (NGO's) working in the field of road traffic studies.

The course was attended by four delegates from Ethiopia, three from Ghana, four from Malawi, three from Namibia, four from Nigeria, four from South Africa, four from Tanzania as well as two delegates from Zambia.

The delegates were more or less equally divided between engineers / technologists, police officials and officials from road safety organisations.

The course leader was Professor Andras Varhelyi, a traffic engineer, who has had 17 years teaching experience. His main fields of interest are Traffic Safety management, Speed Management, Traffic Surveys, Black-spot analysis, Behavioural Studies and Road Safety Measures.

Various other experts also presented lectures. These included lecturers from Lund University covering a wide variety of disciplines including engineering, psychology and teacher education. Various other lecturers from outside were also invited to present lectures. These included academics from other Swedish Universities, lecturers from a police academy, lecturers from a training institute for emergency services as well as many other experts from other organisations.

One of the first presentations was about Swedish society and Sweden as a whole. Experts included personnel from the Swedish National Society for Road Safety, Bilprovningen (a state run organisation doing regular roadworthiness and emission testing on all vehicles in Sweden), the Swedish Road Administration, the Danish Road Administration, the Danish Road Safety Council as well as consulting engineering practices. This proved extremely interesting.

Main Topics of the Course.

- Road Safety in a global, historic and international perspective
- Accident theories
- Behavioural models
- Risk theories
- Socio-psychological principles
- Road traffic system – Man, machine and environment
- Different user's special problems and needs (persons with disabilities, the elderly and children are some examples)
- Analytical tools for traffic safety evaluation
- The role of different stakeholders in traffic safety
- The role and effect of legislation, traffic safety schemes, law enforcement, road user training, engineering measures, emergency services and campaigns on traffic safety
- National databases on accidents, vehicles, driving licences and road parameters
- Co-ordination, administration and funding of traffic safety work
- Benefit-Cost calculations.

The main activity of the course was individual project work. This was done by means of case studies which are related to the above topics.

Case Studies:

The class was divided into nine groups who had to work together on seven case studies. Each group had to prepare and present presentations on the following subjects:

- How to measure road safety
- Traffic safety theory
- Organizational principles
- Vulnerable road users
- Road Safety Measures
- How to evaluate the effects of road safety measures
- Benefit / cost analysis

Academic evaluation:

This course was extremely well researched, presented and organised. The organisers of this course went to great lengths to get extremely knowledgeable lecturers to present the course.

Technical Site visits:

Many site visits were arranged. These included the following:

- Visit to Bilprovningen in Malmo to experience the roadworthiness testing of cars.
- Visit to the Malmo City Council where road safety projects were demonstrated to the group
- Visit to the accessibility track to learn about problems experienced by persons with disabilities
- An excursion around Scania, the southernmost province of Sweden. During this visit some innovative roundabout sites, a heavy vehicle weighing station, roads which are known as "two plus one" (two lanes in one direction and one lane in the other for two or three kilometres after which it is changed to two lanes in the other direction), and roads where the speed limit dynamically changes (e.g. depending on whether there is a bus at the bus stop) as well as several other interesting developments were visited.

General – Sweden:

Sweden is a country roughly half the size of South Africa. It is more than two thousand kilometres long reaching into the Arctic Circle in the north. The country has the second best traffic safety record on earth (after Great Britain) measured using the annual mortality rate as a criterion. Sweden has fewer than 500 fatalities on its roads annually whereas South Africa had the same number of fatalities during the first three weeks of December 2008.

Sweden enjoys a high standard of living and the residents enjoy outdoor recreation, especially aquatic sports in summer and mainly indoor sports like handball during the winter. It remained neutral in both the First and Second World War and this, no doubt, contributes to the high standard of living. Sweden is also very conscious of energy efficiency and there are a large number of windmills, which develop electricity. This electricity is fed into the national grid.

Sweden is the country in Europe with the third highest number of bicycles. Very good provision is made for both pedestrian and bicycle facilities. The public transport system is also very well developed and is used extensively by the people. The Swedes are a law-abiding nation and there is very little crime.

General - Lund:

Lund is a very old city with a population of about 100000 although it feels bigger. There is a school (Klosterskolan), which has been in existence since 1085 (923 years) and a pharmacy, which has been in the same position since 1651. There are only 5 policemen permanently stationed in Lund. Lund University was founded in about 1437 as an institute of higher learning, converting to a university in 1666. It is the largest university in Sweden with more than 38000 full time students. Lund University is the second oldest university in Sweden after the University of Uppsala. Tuition is free for Swedish citizens.

The university offers courses in many varied disciplines including Theology, Medicine, Law, Engineering, the Arts and Music. There are currently more than 500 Masters Degree programs which are taught entirely in English at Swedish universities. The Lund University has a division called Ideon which works as an “incubator” to develop good ideas into functional firms. The headquarters of Sony-Ericsson, Tetrapak, Alfa-Laval as well as Astra-Zeneca (to name a few) are all in Lund. These firms all originated from Ideon.

Word of thanks:

I would like to extend a hearty word of thanks to the City of Tshwane who made it possible for Nomsa Sibanyoni and I to attend this course. I would further like to extend an equally hearty word of thanks to the Swedish International Development Agency (SIDA) and Lund University for inviting us to attend this course.

No 15. Cracks in Lifting Machinery.

By RT Vogt - Pr.Techni.Eng.

Problem Identification

The ores of most useful metals are seldom found on the surface of the earth – they are mostly found in soil or buried beneath the earth, even at times at considerable depth. If indications of their presence do not exist on the surface and are not discovered by accident, they are sought for by intelligent inquiry. The methods of extracting and raising them to the surface must be likely to produce a profit for the owners of the land. When found and made use of is another matter.

Technology is defined in the Oxford dictionary as “Science of the Industrial Arts”. Modern mining technology is highly involved and advanced as it relies to a marked degree on complex and sophisticated machinery.

These machines require vast amounts of finance to purchase, operate and maintain. It therefore makes sense for the customer to expect a long and trouble free service life.

The real world we live in has, however, taught us differently. Even the most expensive and robust machine can break down, usually at a time in direct proportion to the inconvenience it can cause.

On such occasions that the familiar comments are made:-

- Why does it always break in the same spot?
- The steel is still too weak, last time we doubled the thickness. This time we will use stronger steel.
- I give up! Every time we weld it, it breaks again – next to the weld.
- They always last for a few month and then all crack in the same area at the same time.
- These cracks must have some intelligence, as soon as the warranty expires; they appear as surely as head office cuts the budget.

The fundamental dilemma that has arisen can probably be found in the following argument: -

Modern steel-making practices such as vacuum arc degassing, controlled rolling, quenching and tempering have resulted in a family of steels with excellent properties, which can be guaranteed by the steel makers. Modern design aids such as CAD, finite element analysis and dynamic simulation on computers permit designers to push the steel to its limit. In designs for cranes and lifting machines allowable stress and limit state methods are used. It would seem that modern fabrication technology has not kept pace with steel-making and design improvements in the relevant industries. In addition it would be fair to say that designers do not always pay enough attention to small details and, at times, design errors inadvertently creep into a machine.

A very effective way of overcoming such problems is to systematically eliminate them by "reverse engineering" i.e. "see where it went wrong, then fix it. This is of course not the ideal solution to problems. Such solutions should, however, be well engineered, fully documented and fed back to the original designer to be incorporated in present and future designs.

As far as cracks are concerned, the ideal situation would be to never have cracks in the first place. This is possible, but highly unlikely. If it is accepted that cracks do occur, it is necessary to understand why they occur so that effective corrective action can be implemented. Repairing cracks blindly or replacing cracked components with components of identical (non-original or pirate) design may simply postpone the problem and quite often will lead to an even worse situation than before.

Again many questions are asked:-

- How do cracks start and are all cracks bad?
- When does a discontinuity become a crack?
- Why are some cracks straight and some zigzag?
- Why do some cracks progress slowly and others propagate rapidly?
- Can cracks be welded up safely?
- Small cracks are harmless, big cracks are dangerous. Is this true?
- How good is a repaired crack?
- Can we use patch plates over cracks?

An attempt may be made to answer some of these, and many similar, questions in a further article on cracks and propagation thereof.

To summarize the identification of the problems:

Cracks in lifting machine structures, or in other lifting equipment components, can be precluded by extremely careful design and manufacture.

Cracks occur in service. The problem is what to do about them:

- Discard the item or lifting equipment/machine? Too expensive!!!
- Leave as is? May lead to unsafe operating conditions!!!
- Repair? Yes/may be, but will it last? Is it worthwhile?
- Tell the manufacturer/supplier about the problem and hope for the best? Not really acceptable since the supplier may have built the problem in – in the first place!

Methods and efficiency have improved extensively from the days of manual lifting machinery and equipment, with modern technology development. In recent years, requirements for greater structural efficiency and improved operational performance have inevitably led to situations where many components or structures are operating at virtually the mechanical limits of the material.

The demands imposed on such lifting equipment/machines by increased load capacity, speed of operations, as well as temperature extremes, corrosive environments and severely fluctuating operational loads have often increased

the probability of deterioration and/or failure. These failures can often be attributed to the insidious undetected development of cracks in key components. This also frequently occurs through metal fatigue, leading to sudden unexpected fractures. Indeed it has been reported, and is also the view, that over 80% of failures that occur in major lifting equipment and other plant can be attributed to fatigue cracking and also incompetent use / operation of the equipment.

Such large scale lifting machinery/equipment is, however, very cost effective and efficient as long as it is utilized safely and proficiently by registered operators. Catastrophic failures of key components due to cracking could be avoided, if said equipment is correctly handled by qualified and competent persons.

There are several common factors affecting lifting equipment/machines, front end loaders, knuckle boom cranes (lorry loaders), mobile cranes, fork lift trucks etc. The common factors are those that lead to the problems of cracking and include the following:-

- All (or most) made of steel.
- Frequently comprise cast and forged metal components (and may thus have inherent defects).
- Almost all fabricated by welding (the quality of which is sometimes variable).
- All or most have complicated shapes, and changes in sections.
- Frequently no gentle transition in section changes; rarely perfectly smooth surface finish of components.
- Often machined to final size and shape (holes or sharp corners are often machined into a component).
- In service, all operate by carrying live loads, or carrying a product – resulting in significant load fluctuation (and hence cyclic stress).
- Exposure to extreme temperatures.
- Plant operated by people who are not infallible or competent.
- Lack of maintenance and compulsory 12 monthly inspection/testing as prescribed by the OHS Act – DMR 18.
- All go wrong at some time or another and need repairs.

Plant operation and recapitulation of some basic concepts:
-

In view of the common features itemised above, it would perhaps be surprising if lifting machines/equipment did not exhibit defects or develop cracks during their service life. To extend this idea it is worthwhile to consider the operation of some large item of lifting machinery.

Such equipment would stand on foundations or feet or have some substantial ground connection. It would carry loads at various places, the most serious usually being the payload at some extremity and which is invariably a fluctuating load. Such a load causes both direct stress denoted by σ , and a cyclic stress, $\Delta\sigma$. We recall the

relationship between stress, σ , in Mpa as the force (in kN) per unit area (in mm sq.).

All formulation is covered in most engineering books or possibly in another technical article.

It is frequently from such stress concentration regions that the local stress exceeds the local strength on a very small localized area and fatigue cracks can initiate. With repetitive loading, such cracks can propagate by fatigue and may lead to catastrophic failures if not detected in time. Impact loading can lead to very large and very sudden stresses, which can further lead to unsuspected fast fractures.

Thus it becomes important to characterize the various parameters that will help us to understand how cracks develop in lifting machines/equipment and how we can safely "live with defects" (in certain cases only). In addition we need to recognise the importance of stress concentration factors; the effect of poor welding and weld defects; the true meaning of fatigue; what is the "toughness" of a steel (its resistance to crack propagation) and how do we measure it. More particularly, how big a crack can be tolerated and / or how long will it last before failure is catastrophic. Consequently how often should critical areas be thoroughly inspected to prevent such fatigue / stress failures?

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No 16. Small Adverts.

IPET is prepared to place very small text only adverts in the Newsletter if they are deemed to be of direct interest and value to members. The Editor and Executive's decision on any particular advert is final. The adverts may not exceed 100 words and are, for the time being, free. Adverts that just advertise companies and / or their products are excluded from this offer. Other adverts, for which payment will be required, may be entertained in the future.

As our country is experiencing a difficult economic and financial crisis your organisation is trying to assist members where practical. Those seeking permanent positions in industry or those younger persons who need experiential training in order to complete their degree or diplomas may advertise their requirements with their contact details in a mini advert which will be included in the regular E Newsletter. As we also have requests from ECSA "Candidates" for Mentors, this request will also be covered in a mini advert. This is a free service to members.

No 17. Adverts.

See www.inovationfund.ac.za if you have a bright technical idea and require funding!

No 18. Publication Policy.

Our policy is to be informative but not to compete with Newspapers or Engineering Journals. We try to give a selective rational overview of the engineering scene relative to our members. We endeavour to cover matters of importance that might not make it into the general press. While we publish regularly, we may not always have the latest scandal! We need good technology news in terms of people, products and processes. If you have recently been promoted, moved to a different job, started a business, completed an interesting project, received an award of which you are proud, or have a handy tip to share, your news, views and letters to the editor on relevant issues will be welcome. Don't leave it to others; we want to hear from you!

The editor reserves the right to shorten and edit letters or reject them for publication where necessary.

No 19. The Joke Column.

Warning / Disclaimer.

Sensitive readers are warned that the following may erroneously be taken to contain sex, violence, strong language, gender, race, ethics etc. Readers are warned not to read or have any of the following read to them. Recommended readers age is limited to 120 and 121 years of age. A further requirement is you must have a sense of humour.

Before I married my wife I was her little dumpling, her pumpkin pie, her sweet peach. After 10 years of marriage, all I am is her bread and butter!

When I was young I thought money was the most important thing in life. Now that I am older I know it is!

The Financial crisis is so bad that women are reportedly now marrying for love!

Life is like a toilet seat.
It has its ups and downs!

It is also possible that blondes prefer gentlemen!

I still miss my ex-husband, but my aim is getting better!

No 20

Institute of Professional Engineering Technologists, PO Box 1824,
Randburg, 2125

Tel / Fax / Answering Machine (011) 787 9706

E Mail engineer@netactive.co.za

The Annual General Meeting of the Institute of Professional Engineering Technologists will be held on:

Monday 9th February 2009

**At the Engineering Council of South Africa
First Floor Board Room
Waterview Corner Building
2 Ernest Oppenheimer Avenue
Bruma Lake Office Park
Bruma
Johannesburg
2198
At 14H30.**

1. Opening of Meeting.
2. Attendance Register and Apologies.
3. Additions to the Agenda.
4. Approval of the Minutes of the Annual General Meeting of IPET held on 7th November 2007.
5. Matters Arising.
6. President's Annual Report.
7. Annual Financial Report.
8. Appointment of Auditors for 2009 and 2010 Financial Year.
9. The Council for 2009 / 2010.
10. Presidential Address.
11. Additional Items added to the Agenda.
12. Closing.
13. Refreshments.

Kindly RSVP before 4 February 2009 to the above Tel / Fax / Answering Service so that adequate catering can be provided!

Executive Officer: V Nel, Pr Tech Eng, Pr Techni Eng.

The Council For 2009/2010

Nominations are invited for up to seven (7) Council members. Nominations are also invited for representatives of non-corporate members.

The Council members are:

Current Council that remain in office; Messrs;	Council members who may be nominated	Corresponding volunteer members who serve in absentia in an advisory role.
D Lange (President)	Col D Jordaan	D Argyrakis (Corresponding member, PE)
Dr M W Lotter (Past President)	J Moloisane	K Ramjee (Corresponding member, PE).
K Chabikuli (Senior Vice President)	F Walker	
J Lessing (Junior Vice President)	P C van Dyk	
	W Badenhorst	
B L Pitman	Dr G Fanourakis	
J J de Koker (Treasurer)	B Pitman	
	C Mynhardt	
	Ian du Plessis	
	V Nel (Admin Officer)	

Messrs. Col. D Jordaan , J Moloisane, F Walker, B Pitman and P van Dyk have retired but are eligible for re-election.

Messrs. MW Lotter, , D Lange, K Chabikuli, J Lessing, and JJ de Koker remain in office and need not be nominated.

Kindly note that if the nominee is a Full member of the present Council, his signature as a nominee will not be required.

Persons who are not mentioned above may also be nominated.

Please note that only nominations of members in good standing will be accepted.

Nomination Form

Kindly complete and return on or before the 6th February 2009.

IPET

PO Box 1824

Randburg

2125

Fax 011 787 9706

Dear Sir,

I, the undersigned, wish to nominate the following Corporate Members to serve on the IPET Council for 2009 / 2010.

Nominee	Post Held	Signature
1		
2		
3		
4		
5		
6		
7		

Proposer

Name (Please Print) _____

IPET Membership Number _____ Date _____ Signature _____

Annual General Meeting of the Institute of Professional Engineering Technologists

Monday 9th February 2009

PROXY VOTING FORM

I

IPET membership Number:

will be unable to attend the Annual General Meeting of the Institute on Monday 9th February 2009, so hereby appoint

(please print)....., or failing him the Chairman to vote on

my behalf at the meeting or at any meeting following an adjournment thereof.

Signature.....

No 21. List of Members in Good Standing.
Please refer to our Website for the latest list. See www.ipet.co.za
It is not reproduced in this newsletter!
If your name does not yet appear there, then kindly check that you have paid your annual fee. If you have then submit documentary proof of payment with your name and IPET number to our office so we can trace records and update lists where required.

No 22.
Unsubscribe Option.
As a member of IPET you should want to receive the E News. If however u do not want to receive the E News as an E Mail then you have the option to unsubscribe.
To unsubscribe send an email with ""IPET unsubscribe"" in the text to engineer@netactive.co.za

Number 23. O. & O. E.
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QSL.

If you need to correct your contact information please use this form. Kindly complete this form in large black font especially for E-mail addresses.

Return the completed form by post or Fax. **E Mailed Update Forms are not accepted.**

Update Forms are also available on our website www.ipet.co.za

All information will be treated as confidential and will not be shared with any other party unless you have sent the signed Free Listing / Advert form which offers free listing on our Website.

Last Name	Initials	Title (Mr / Mrs / Ms /Etc)
Postal Address		
Work Telephone	Work Fax number	Cell Phone
Home Telephone	Home Fax	E Mail address (in large black font please)!
Your IPET Membership Number (Last 4 digits)	Your ECSA Registration Number (If applicable)	
Your signature that info is correct	Race for Statistical Purposes only (Government keeps asking)!	Date

When you have finished with this Newsletter, Please it on to your Chief Executive Officer, Technical Manager, Technical Supervisor, Human Resources Manager, Technical Buyer, and/ or your Engineering Colleagues.