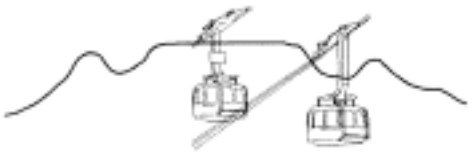
WCB ENGINEERING BULLETIN

The Institution of Certificated Mechanical and Electrical Engineers
Western Cape Branch (WCB)

P O Box 504, Rondebosch, 7700



DECEMBER 2005

MISSION STATEMENT:
1. To uphold the image and status of the Certificated Engineer.
2. To represent the Certificated Engineer at ECSA and other decision-making bodies concerning legislation, safety & health standards, the environment and the machinery regulations.
3. To promote continued education and training of its members and future engineers.
4. Promote fellowship in the engineering profession.

EDITORIAL

An incident that has received a lot of coverage in the press in the Western Cape has been the incident of where the 10 year old girl lost her scalp when her hair got caught in the revolving shaft of a go-cart she was driving. It is interesting to note some points about this case, where civil action was instituted by the parents after the incident. The Cape High Court ruled that the go-cart company is liable for the incident and would most probably have to pay compensation to the injured person.

Bad publicity and legal fees: Very few companies can afford or effectively deal with bad publicity. The go-cart company in question closed its doors a while ago, the reason for which is not clearly known. However, one can surmise that the bad publicity together with the legal fees greatly contributed.

The court ruled that the company was liable for the legal costs of the civil case.

Indemnities: An indemnity was signed but the judge's ruling makes it clear that these indemnity documents are not worth much. This is in line with Section 41 of the Occupational Health and Safety Act, 1993 (OHASA), which states that employers cannot indemnify themselves. The message is clear, first safeguard the persons and workplace and spend less time on trying to avoid legal liabilities by wording the indemnity document correctly.

Safeguarding of the process: The court heard claims by some persons that the injured child should have worn a hair net or proper helmet, which would have prevented the incident. Section 8 of the OHASA, clearly states that personal protective equipment (PPE) should be regarded as a last resort. The go-cart company should therefore first have safeguarded the revolving shaft before resorting to PPE.

Comply with the basic legal requirement: The OHASA prescribes specific or general legal requirements for most moving machine parts. The Driven Machinery Regulation 2 for instance requires of employers to guard "every **shaft**, pulley, wheel, gear, sprocket, coupling, collar, clutch, friction drum or similar object". The fact that the girl's hair got caught in the revolving shaft can only mean that the shaft or sprocket was not properly guarded and it would therefore be responsible to point the finger at the owner of the go-cart.

Be careful who you do business with. The parents of the injured girl also instituted civil action against the then owner of the Canal Walk shopping centre. This was mainly due to the fact that the go-cart company rented space from the shopping centre. Although the court ruled that the then owners of the Canal Walk shopping centre should not be held liable, this court case probably resulted in:

- Possible financial loss as the owner of the shopping centre had to employ a legal team to defend the case on their behalf; and
- Loss of time as senior personnel had to consult with their legal team and they probably also attended the court proceedings.

The King II report on Good Corporate Governance also places emphasis on the fact that companies must act responsibly when establishing relationships with other companies. It is still our duty to ensure that the Contractor must comply with all relevant legislation.

See to it that your contractors can comply with all relevant legislation before giving them the mandate to do any work on your behalf.

The above article is courtesy of SafeNet Africa – Tel (021) 946 1261

Chris Schnehage
Editor: Henriette Venter email: vencon@netactive.co.za

LOCAL BRANCH NEWS

Hello once again everybody.

It is hard to believe that the end of the year is upon us once again. The Western Cape committee would like to wish all members and friends who read this news bulletin a restful festive season and a prosperous 2006. May all your dreams and wishes come true.

In October we arranged a visit to the Behr factory in Parow East. It was interesting to see how they carry out their repairs, re-coring and manufacture of radiators and inter coolers. One thing that we noticed though was the distinct lack of application of safety principals.

Unfortunately our attempt to do an Onsite visit to talk on "On site Alignment on Ships" did not work out for November. Maybe it was too close to the end of the year, I don't know.

On the 25th November we held a year end bring & braai at the Pinelands club. Unfortunately there were only two members who are not on the committee who attended. A great evening was had by all in any case!

We look forward to seeing some of you in the new year.

Ciao for now!

Chris Schnehage
Tel: 083 326 8023
Email: icmeewc@netactive.co.za

"TO **BE** OR **NOT TO BE** ? THAT IS THE QUESTION."

Here are 5 words that I would like add to that quote.

"to **be** or **not to be** an active, passionate icmeesa member, that is the question"

I don't know whether our members have ever asked themselves this question but I certainly know that I have pondered this point on more than one occasion.

An environment of interest and enthusiasm needs to be the order of the day where members look forward to attending meetings and site visits to the many places of interest that are found in and around cape town. There is a wealth of experience and knowledge amongst our members and we must strive to learn and improve ourselves.

Are we making each new member and/or guest feel welcome?
Someone doing all the necessary introductions to all the other members present can easily achieve this if we are not doing this. Each member will be issued in future with a name tag identifying them by name and perhaps what company they work for and perhaps what sector of the industry they are in.

For example:

Enrico Anelli	**Jorge Pereira**
Sbh Cotton Mills	**ABB**
Textile	**Transformer**
Manufacturing	**Manufacturing**

We need to increase members' participation at the institution and I would like members to email me and make suggestions on how this can be achieved.
My email is engineer@sbhcotton.co.za.

Here are a few key words that come to my mind in helping you come up with suggestions:
Should meetings be more **fun** with **increased excitement** and **satisfaction**. Continual **expanding of** one's **knowledge base**, more sense of **responsibility** to our institute and fellow engineers, **learning from others**, **sharing** one's experiences, **resolving** of any burning issues if they exist.

It will be great to hear from all of you in this regard. I believe we can all give valuable input into this to offset any perceived waning enthusiasm if it exists.

I will draft an anonymous list of suggestions that I receive from you all and we will discuss it at the next few committee meetings.

Members please we really would like to hear from you and get you back to our meetings.

Enrico Anelli

UPDATE IDoEW

Section 20 of the Council for the Built Environment Act requires the CBE to identify the scope of work for every category of registered persons after receipt of the recommendations of the Councils for Professions prepared in terms of their respective Acts. Section 26(1) of the Engineering Profession Act (Act 46 of 2000) requires ECSA to consult with voluntary associations, registered persons, bodies and industries that may be affected by any laws regulating the built environment professions regarding the identification of the type of engineering work which may be performed by persons registered in any categories provided for in the Act; including work which may fall into the scope of any other profession regulated by the Professions'Act referred to in the Council for the Built Environment Act (Act 43 of 2000). Section 26(2) of the Act requires ECSA to submit recommendations to the Council for the Built Environment (CBE) following such consultation.

The Identification of Engineering Work Steering Committee (IDoEW-SC) convened its inaugural meeting on 11 November 2004, followed by subsequent meetings held on a monthly basis since February 2005.

The Committee consists of representatives from the different disciplines and registration categories as welt as individuals representing interest groups. The Steering Committee also makes use of a *"Reference Group"* consisting of persons who expressed their interest in the project and undertook to contribute to the process without having to attend the meetings.

The ECSA Council meeting held on 16 September 2005 approved the following documents developed by the Committee:

•the *"Baseline Report"*, dated 14 August 2005, and
•the draft *"Framework for the IDoEW"*, dated 14 September 2005.

*The **Baseline Report** developed by ECSA's Identification of Work Steering Committee:*

- *sets out the reasons for the identification of engineering work;*
- *proposes a procedure to specify engineering work that needs to be reserved for Registered Engineering Persons, making use of competency standards;*
- *provides a preliminary list of Identified Engineering Work functions to be reserved; and*
- *documents the process which has been followed by the Steering Committee.*

The Framework for the Identification of engineering work:

- *sets out the approach to the identification of work;*
- *establishes the manner in which work for categories of persons registered with the ECSA may be identified;*
- *provides the logical framework for the development of regulations.*

Both abovementioned documents, which are based on the premise that competence is the panacea for the IDoEW have been posted on the ECSA website for access by interested and effected parties.

The *"Framework for the IDoEW"* which is calibrated with the *"Policy Document on the Statutory Regulation of the Built Environment Professions"* issued by the CBE proposes a multi-dimensional approach towards the IDoEW.

The Committee proposes that Engineering Work to be reserved for persons registered with the ECSA can be identified by answering the following three pertinent questions:

- does the work fall within the scope of any of the types of works (14):
- does the work require any of the engineering functions (10) to be performed, and
- does the work require any of the engineering Capabilities (competencies) (5) in its execution.

If the answer to all three questions is in the affirmative, the work is deemed identified for the purpose of the IDoEW.

The issues which ECSA may have to address before finalising the IDoEW include the following:

- (a) dealing with small contractors that perform civil. mechanical and electrical engineering work within the construction industry;
- (b) the use of discipline specific codes of practice as an appropriate means of regulating the behaviour of registered persons, and appropriate means of regulating the behaviour of registered persons, and
- (c) rationalisation between various pieces of legislation i.e. OH&SAct, MH&SAct and Merchant Shipping Acts.

The debate continues.

HEALTH AND SAFETY POLICY

Section 7 of the Occupational Health and Safety Act, 1993 (OHASA) states that the minister can direct any employer to draft and implement a Health and Safety Policy. Contrary to what some people believe, this section has never been known to be enacted resulting in it not being a legal requirement to draft and implement a Health and Safety Policy. Those companies that have drafted and implemented such a Policy mainly did this as they regard this as good management practice.

On 2 September, the Government published, via the Government Gazette – No. 27975 of 2 September, something that may have set the benchmark for Health and Safety Management Systems implementation in South Africa.

It has, under Section 7(1) of the OHASA instructed all employers in the Class XIII: Iron, steel, artificial limbs, galvanizing, garages, metal, etc. as per the classification of industries in terms of the Compensation for Occupational Injuries and Diseases Act, 1993, to prepare a written policy concerning the protection of the health and safety of employees at work.

In the instruction it also states that there should be a description of the organization and the arrangements for the carrying out and reviewing of that policy, within six months from the date of the notice.

The Government has recommended that the guiding principles of the OHSAS 18001: Occupational Health and Safety Management Systems – Specifications be used.

OHSAS 18001 is a relatively new concept in managing health and safety in the workplace in South Africa, but we firmly believe that companies should not waste valuable resources to implement systems that are not going to guarantee sustainability in their health and safety efforts.

We would recommend that one approaches an organization that can assist you with your efforts. Should there be any further interest you are welcome to contact the editor of this bulletin for more information.

Chris Schnehage

FROM: **Jorge Pereira Cert. Eng.**

OHSAct June 98(3) (a) & (b):
Question (3) (a):

State whether the following statements are TRUE or FALSE in respect of the environmental regulations for work places:

(i) "WBGT index" means a number that characterises ventilation conditions.
(ii) All work places must be provided with artificial lighting having a Lux value in accordance with the illuminance value specified in the tables.
(iii) The window area of all work places must be at least one tenth of the floor area.
(iv) All work places must be ventilated by natural as well as mechanical means
(v) The user of machinery must provide 2,25 m^2 per person of clear and unobstructed space around each machine
(vi) The employer of employees working indoors must make sufficient clear and effective open floor space available for every employee
(vii) Work places where equivalent noise levels exceeds 85 db (A) the employer need to do nothing more than to demarcate the area and provide hearing protectors
(viii) All employers must take measures to be informed of any imminent flooding
(ix) The employer must ensure that all work places are provided with at least two means of egress situated as far apart as is practicable for use in case of a fire.
(x) The employer, having regard to the size, construction and location of the work place, can decide on the adequacy and suitability of me fire fighting equipment

Question (3) (b)
An employer is required to construct a flammable liquid store. State five regulation requirements that must be complied with.

Answer to Question (3) (a):
(a) (i) ERW 1. False. Characterises thermal conditions.
(a) (ii) ERW3 (1) True.
(a) (iii) ERW4 (1) (a) False Glazing 3/5 x √ floor area, if room is less than 100 m^2.
(a) (iv) ERW5 (1). False. Adequate ventilation by any means.
(a) (v) ERW6 (1) (a) False. Adequate space around each machine.
(a) (vi) ERW6 (2) (a). False. 2,25 m^2 per worker.
(a) (vii) ERW (7)(3). False. Have to reduce db level first. Then provide protection if still in excess of 85 db (A)
(a) (viii) ERW8 (a). True.
(a) (ix) ERW9 (1)(g). True
(a) (x) ERW9 (2). True. But also has to be recommended by local authority.

Answer to Question (3) (b):
GSR4 (10) (a) to (e)

Plant Eng. Nov.2005 (9,1) (Mines) Tariffs
A plant requires a 10 MVA, 550 V supply. The electricity supply company can provide a 6,6 kV supply with a maximum demand charge of R16/kVA and an energy tariff of 6 c/kWh or a 550 V supply with a maximum demand charge of R18/kVA and an energy tariff of 7 c/kWh. The additional equipment required to utilise the 6,6 kV supply costs R25/kVA and has an efficiency of 98%. The total operating charges are 20% per annum of the capital cost of the 6,6 kV equipment.

If the plant works at a constant full load and 52 weeks per year, determine the number of working hours per week above which it will be more economical to use the 6,6 kV supply. **(12)**

Suggested Answer:
Consider 6,6 kV supply first:
Operating Charges:

$$:= \left(\frac{10000}{0,98} \times R25 x 0,2 \right) = \underline{R51020,41}$$

Maximum Demand Charges:
10 204 x R16 = R 163 265.31

Unity Charges:
(hours/week)=K
(10 204 x 1 x 52 x K x R 0,06) =
=R 31 836.48 x K

Total Charges of 6,6 kV supply:
= Operating + MD + Unity Charges =
= R214285,72 + R 31836,48 x K

Consider 550 V supply:
Total Charges = MD + Unity Charges
MD = 10 000 x R18 = R180 000,00
Unity = 10 000 x 52 x K x R 0,07 =
R 36 400,00 x K

6.6 kV supply = 550 V supply
R 34 285,72 = R 4 563,52 x K
Therefore K = 7,51 hours/week

From: John Davidson

HYDROELECTRIC AND PUMPED STORAGE GENERATION

In the first article we discussed a brief history of generation and electricity supply in Cape Town covering the period 1879 to 1974, with the City entering a long term agreement with ESKOM in the latter year.

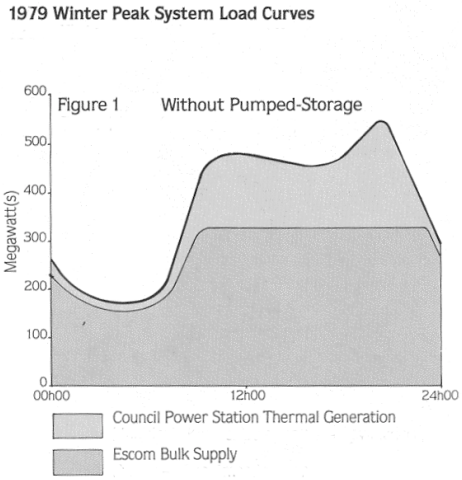
The first hydroelectric power station in South Africa, with a capacity of 300 kilowatts, was installed in 1895 by the Cape Town City Council at Molteno reservoir in Oranjezicht situated on the lower slopes of Table Mountain. Another first for the City was Steenbras, being the first hydroelectric pumped-storage scheme on the continent of Africa with an installed capacity of 180 MW.

Apart from its economic advantages, the Steenbras pumped-storage scheme also affords an increased measure of security of supply to the City since, unlike thermal power stations, hydroelectric pumped-storage installations, can be brought into operation and up to full load within a matter of minutes.

The underlying principle of pumped-storage is now well established, the economic advantages having been first realised and exploited in the late nineteenth century. In recent times there has been a considerable upsurge of interest in pumped-storage with the result that today there are hundreds of major installations around the world. ESKOM has built two of their own considerably larger pumped-storage stations in South Africa, subsequent to the inauguration of Steenbras and there are plans for a third ESKOM pumped storage station in the near future.

Because of the varying demand for electricity during any given day, there is a high demand during the mornings and late afternoons with a surplus of generating capacity available in the valley or low demand periods at night. In a pumped-storage scheme, surplus generating capacity is employed to utilise relatively low cost off-peak electricity to pump water from a lower to an upper storage reservoir. During periods of peak demand in the day, this same water is released back to the lower reservoir thereby generating relatively low cost electricity as in a conventional hydroelectric power station.

Figure1 Illustrates the typical daily load curve for Cape Town in 1979 without Steenbras. The daily peak demand requirements being met by the Council thermal stations and the bulk, base load from ESKOM. Figure 2 illustrates the effect of introducing pumped storage that would allow for optimisation of this bulk supply from ESKOM to a virtually constant daily supply. Figure 3 illustrates actual data of the system on 4 July 2001. The Steenbras pumping rate at almost 200 MW overnight until 06:30 and restarting at 22:00 is included in the shaded portions overlapping the bulk supply energy at the base of the graph.



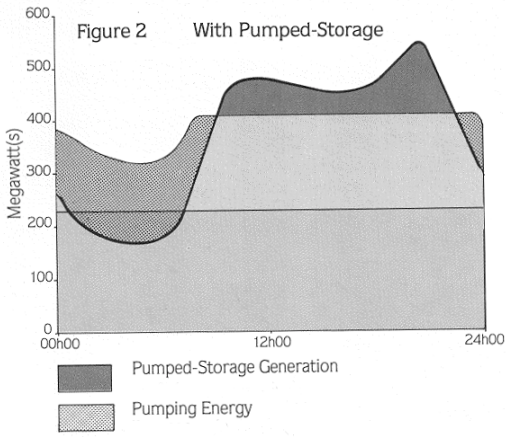
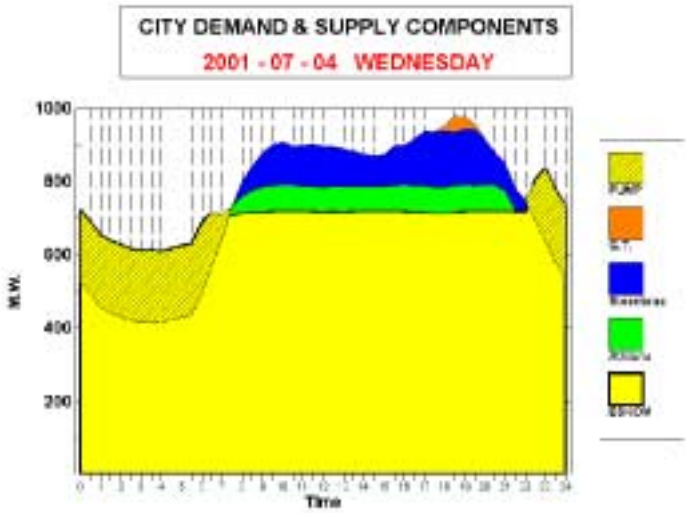


Figure 3



Thus principle of the advantages of pumped storage operation has been illustrated where the “flattening” of the ESKOM demand profile is clearly shown. Note in the Figures 1, 2 & 3, how the system load has grown from less than 600 MW 22 years previously, to almost 1000 MW in 2001.

In the next issue we will deal with the Steenbras project and some economic considerations.