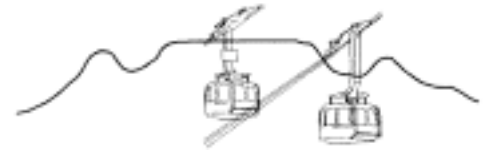




WCB ENGINEERING BULLETIN

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

P O Box 504, Rondebosch, 7700



DECEMBER 2008

- 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

Welcome to another edition of the Western Cape News Bulletin.

We have our normal articles in this news bulletin. GCC exam questions and answers and Part 2 of the article on the Electrification of Cape Town, titled "Lighting up the Fairest Cape 1895 to 1995".

The latest in terms of the Built Environment Bill. This Bill has been withdrawn for a short period while some matters are revisited. We have a copy of an article published on Engineering News for your information.

We also have a short piece on the SAQA recognition of the Certificated Engineer as a Qualification. This is the culmination of a lot of hard work by ECSA's Standard Generating Body tasked with this function. However, this is just the beginning of a long road for total recognition of the Certificated Engineer.

I trust that you will find the content of this news bulletin interesting enough to pass on to your colleagues and friends.

Chris Schnehage

Tel: 083 326 8023 email: chris@boron.co.za
Editor: Henriette Venter email: vencon@netactive.co.za

LOCAL BRANCH NEWS

Activities of the branch since last news bulletin were as follows:

On 21 October 2008 we presented a talk on "Developments in Electrical Power System Protection" by one of our members – Leon Ginsberg. A very interesting talk indeed.

Some members gathered at the Constantia Nek Restaurant on Saturday 22 November for an informal dinner dance. It was a most pleasant evening enjoyed by all.

We have not been successful in finding a suitable date to visit the SAPPI Kraft factory. As soon as we are able to, we will set up the details for the visit.

The line up for the next few months is as follows:
17 February 2009 – AGM and talk on Pumping Solutions
March 09 – Electrical energy savings and systems for saving
April 09 – visit to installation where savings is undertaken in air conditioning systems or similar installation.

We have just launched a blog for Certificated Engineers. Please take some time to visit the blog as it will explain the reason for putting it together and hopefully it will set a platform for communication between Certificated Engineers and other engineers or interested parties. Make use of this platform should you encounter any problems and someone will provide some way to overcome the problem with a solution. The address for the log is www.icmeewc.blogspot.com

We would like to take this opportunity to wish all our members and friends a happy festive season and a prosperous 2009. May all your problems be insignificant and manageable!

We look forward to seeing you at one of our functions.

Ciao for now!

Chris Schnehage

Tel: 083 326 8023
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OHSA June 2003 Question (2)

- 2.2 Before any employee is exposed or may be exposed to asbestos dust, an employer shall ensure that the employee is adequately and comprehensively informed and trained on both practical aspects and theoretical knowledge of asbestos. State SIX aspects that must be included in this information and training. (6)

Answer: AR (5) (1) (a) to (g)

- 2.3 When shall an employer who uses asbestos, ensure that an employee is under the medical surveillance of an occupational medical practitioner? (4)

Answer: AR (9) (1) (a) (b)

- 2.4 An employer or self-employed person using material containing asbestos fibres, shall ensure that examinations and tests of engineering control measures for the control of exposure to asbestos are carried out.

- 2.4.1 At what intervals must such examinations and tests be carried out?
2.4.2 Who shall carry out these examinations and tests? (3)

Answer: AR (18) (b)

- 2.5 For a lifting machine, what safety factor shall be used for:
2.5.1 Chains
2.5.2 Steel wire ropes
2.5.3 Fibre ropes (5)

Answer: DMR (18) (10) (c) (i) to (v)

Jorge Pereira Cert. Eng.

PLANT ENG. June 02 (1) (b)

A fire-tube boiler with a steaming capacity of 5 000 kg/h and a water capacity of 20 000 kg is fed with softened water containing 125 mg/l dissolved solids. Determine the blow down rate in kg/h to maintain a dissolved solids concentration of 2500 mg/l in the boiler. [6]

Answer:

To calculate the blow down rate, the following information is required:

- The required boiler water total dissolved solids (TDS) in g/l.
- The feed water TDS in g/l. An average value may be obtained by looking at water treatment records or a sample of feed water may be obtained and its conductivity measured.

Note: the sample of feed water that is required is from the boiler feed line or from the feed tank and not a sample of the make-up feed water.

- The quantity of steam which the boiler generates, usually measured in kg/h. For selecting a blow down system, the most important figure is usually the maximum quantity of steam that the boiler can generate at full-load.

When the above information is available the required blow down rate can be calculated as follows:

$$\text{Blowdown rate} = \frac{F \times S}{(B - F)}$$

Where:

- F = Feed water TDS in g/l
- B = Required boiler water TDS in g/l
- S = Steam generation rate in kg/h

The blow down rate is given in kg/h.

Now to answer the question given:

$$\text{Blowdown rate} = \frac{125 \times 5000}{(2500 - 125)} = 263,16 \text{ kg / h}$$

PLANT ENG. June 02 (1) (c)

Determine which of the boilers below is the most efficient when run on the same quality of coal. The specific heat capacity of superheated steam is 2,1 kJ/kg.K.

	Boiler 1	Boiler 2
Feed water temp (° C)	27	93,3
Temp. of saturated Steam at boiler pressure (° C):	188	198,3
Degrees of superheat (° C)	-	55,5
Dryness fraction of steam	0,96	1,0
Water evaporated per kg coal (kg)	7,7	8,3 [8]

We have to find the Equivalent Evaporative Capacity of both boilers. The expression EEC of a boiler, from and at 100° C, is given by:

$$EEC = \frac{ms}{mf} \times \frac{\Delta h}{2257}$$

where: $\frac{ms}{mf}$ = actual evaporative capacity (EC)

Δh = enthalpy change through boiler

If two boilers using the same fuel are compared in this way then the boiler with the higher EEC is the better boiler for steam generation.

Boiler 1:

From steam tables at 188° C we get hfg = 1984 kJ/kg.
 $\Delta h = 4,187 \times (188 - 27) + (0,96 \times 1984) = 2579 \text{ kJ/kg}$

$$EEC = 7,7 \times \frac{2579}{2257} = 8,8 \text{ kg steam / kg coal}$$

Boiler 2:

From steam tables at 198,3° C we get hfg = 1945 kJ/kg
 $\Delta h = 4,187 \times (198,3 - 93,3) + 1945 + (2,1 \times 55,5) = 2501 \text{ kJ/kg}$

$$EEC = 8,3 \times \frac{2501}{2257} = 9,2 \text{ kg steam / kg coal}$$

Boiler 2 is the most efficient.

J Pereira Cert Eng

ELECTRICITY IN CAPE TOWN

Part 2 of "Lighting up the Fairest Cape 1895 to 1995"

by Dennis Palsler, Past City Electrical Engineer of Cape Town

Early Governmental Installations

In Cape Town there were those who were quick to appreciate and exploit the advantages of electric lighting, while others were decidedly more cautious and initially very much opposed to this new form of lighting.

One of the first to recognise the advantages of electric lighting was the government of the old Cape Colony, the Cape Times of 15 April 1882 reporting as follows on electric lights for the House of Assembly.

The engine and necessary apparatus has arrived for lighting the House of Assembly with the electric light, and it is probable that the Legislative Hall will be so lighted within the next fortnight.

Within a month the installation of the new electric light installation had been completed, the Cape Times reporting further, as follows.

The House of Assembly continues to be lighted by the electric light and the result has so far been highly satisfactory. The light is full, clear, pervasive and steady, and greatly improves the appearance of the chamber.

Power for this installation was provided by a direct current steam-driven generator installed in an "iron building" in the grounds adjoining the public library, adjacent to the present museum building.

Another governmental body that was quick to take advantage of this new form of lighting was the Cape Town Harbour Board. About this same time the Board was expressing concern at "the frequent occurrence of accidents to both life and limb" in the harbour area and the need to "greatly improve the lighting". The Harbour Board no doubt saw this new form of electric lighting as the answer to its problems for in 1882 it entered into a twelve-month contract with the South African Brush Electric Light and Power Company to install 22 electric arc lamps, each of 2 000 candle-power, in the harbour area. This installation was commissioned on 3 October 1882, the lamps being supplied by generating plant installed in a building in St Andrew's Square. It is recorded that these lights "proved of great service, not only in minimising accidents, but also in facilitating the working of vessels at night".

Incidentally, St Andrew's Square no longer exists having long since been absorbed by road development work. It used to be a fairly expansive open area at the intersection of Somerset Road, Buitengracht Street and Waterkant Street directly in front of the Presbyterian Church, which building still stands to this day.

In 1884 the Harbour Board purchased the plant and machinery of the South African Brush Electric Light and Power Company, together "with all the licences and powers, so far as the same was practised or vended within the municipalities of Cape Town

and Green Point", and moved this equipment from its original site in St Andrew's Square to a more central location within the confines of the harbour area.

At this time the "railway terminus passenger station" was also being lit from this plant and the latest "incandescent" lamps were progressively being substituted for gas throughout the harbour area. In addition, several other premises in the vicinity were also supplied from this same source, including the nearby Gaiety Bar, the Standard Bar, the Central Hotel, the Fountain Hotel, and one or two shops. Permission had also just been granted by the government of the Cape Colony to light the "New" Somerset Hospital in a similar manner.

Shortly afterwards the Harbour Board added a 25 kW alternator to this installation to meet anticipated future load-growth. About this same time it also took over and assumed responsibility for the lighting of the House of Assembly.

In these early days generators were usually direct current machines of the type invented by Michael Faraday, known as "dynamos", in which the intrinsically generated alternating current was converted to the then more familiar form of direct current, or "continuous current" as it was frequently referred to in those early days. It was soon appreciated, though, that the complicating intermediate step of conversion to direct current could be avoided and alternating current machines, known appropriately as "alternators", soon became popular.

It is interesting to note that after this move to the harbour area the House of Assembly was supplied by means of alternating current at a pressure of 2 000 V, presumably from the new alternator that had just been installed in the harbour. Supply to the House of Assembly was transmitted on bare wires installed overhead on poles up the length of St George's Street. This same system of transmission was also adopted for the lighting of the then "New" and the "Old" Somerset Hospitals, which were also supplied from the harbour, although the lighting of the latter was not undertaken

until as late as 1894. In 1897, however, the bare high-voltage wires running along St George's Street were rightly considered dangerous and replaced by means of an underground cable.

Incidentally, St George's Street used to be known as Burg Street and was only renamed following the laying of the foundation stone of St George's Cathedral by Sir Lowry Cole on 23 March 1830.

This varied collection of generating plant, now housed in the harbour area, effectively constituted the first power station within the municipal area of Cape Town. Records do not reveal in any detail the type of equipment installed here save to say that there were three "sixteen-light" dynamos and one "six-light" dynamo, as well as a "Victoria " dynamo for incandescent lighting supplies. The most popular unit was the so-called "sixteen-lighter" that was capable of lighting a maximum of sixteen 2 000 candle-power arc lamps. This station remained in operation until at least 1903, when the City's new Central Electric Light Station in Dock Road was completed.

The Cape Town railway station continued to be supplied from this harbour plant until 1889, when the railways formed their own electrical department. The first work undertaken by this new department took the form of train lighting. The suburban steam trains at this time were fitted with electric lights supplied by accumulators housed in short vans coupled to the end of each train. During the day these vans were taken off the trains and the batteries recharged at the railway's headquarters in Salt River.

In 1895 the headquarters of the railway electrical department were moved to Cape Town, where a small central generating station was established, initially to charge the accumulator-van batteries. Over the course of the next few years further plant was added, including "constant-current arc-lighting machines" and alternators to meet the increasing demand. By the turn of the century all railway stations as far afield as Rondebosch were lit by electricity.

Certificated Engineer registered with SAQA

We are proud to announce that the registration of the Certificated Engineer has been registered with SAQA. See detail following.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

REGISTERED QUALIFICATION:

National Certificate: Certificated Engineering

SAQA QUAL ID	QUALIFICATION TITLE		
63450	National Certificate: Certificated Engineering		
ORIGINATOR		REGISTERING PROVIDER	
SGB Engineering			
QUALITY ASSURING ETQA			
-			
QUALIFICATION TYPE	FIELD	SUBFIELD	
National Certificate	Field 06 - Manufacturing, Engineering and Technology	Engineering and Related Design	
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUAL CLASS
Undefined	120	Level 7	Regular-ELOAC
REGISTRATION STATUS	SAQA DECISION NUMBER	REGISTRATION START DATE	REGISTRATION END DATE
Registered	SAQA 0006/08	2008-10-22	2011-10-22
LAST DATE FOR ENROLMENT		LAST DATE FOR ACHIEVEMENT	
2012-10-22		2015-10-22	

This qualification does not replace any other qualification and is not replaced by any other qualification.

To view the full report and further details follow the procedure:
Go to www.saga.org.za;
Select – Qualifications and Standards
Select – Registered Qualifications and Standards
Select – Search for a Qualification
Type in – Certificated Engineer
Select GO.

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Built Environment Professions Bill withdrawn – Minister

By: Jade Davenport
Published: 18 Nov 08 - 13:06

The controversial Built Environment Professions Bill has been withdrawn, newly appointed Public Works Minister **Geoff Doidge** said on Tuesday, citing technical and legal issues.

The objective of the Built Environment Professions Bill was to foster the accelerated transformation of professions, such as engineering, architecture, and quantity surveying, and also proposes the establishment of a new South African Council for the Built Environment.

This supercouncil would incorporate all the existing professional councils, including the influential Engineering Council of South Africa, and transform them into subsidiary boards.

Addressing a media briefing in Cape Town, Doidge explained that a number of the technical and legal details contained within the Bill overlapped and needed to be reworked before it could be tabled again in Parliament.

In addition, the Built Environment Professions Bill had not been subjected to the Nedlac process whereby various public and private stakeholders had an opportunity to review the Bill.

As a result, Doidge explained that the Department of Public Works was embarking on a process whereby all stakeholders would be consulted on the Bill "properly" before its promulgation.

Various stakeholders have raised concerns about the new Bill in recent months.

In this regard, Doidge acknowledged that he had not had the opportunity to engage extensively on the issues and concerns that had been raised by various stakeholders.

He conceded that there were many "convincing concerns" and that the department would have to "listen to both sides of the story" before the Bill could be tabled again.

"However, we are sure that the various stakeholders will find each other on many of the contentious issues," enthused Doidge.

He stressed the importance of this Bill and elaborated that transformation was an essential priority for the built environment sector.

The built environment sector had been neglected, from a legislative perspective, since the 1960s and, thus, the promulgation of the Bill was essential to the regulation and transformation of the industry, said Doidge.

"The most significant challenge, at this stage, is to ensure that transformation can succeed without sending skills out of the country."

Doidge expressed uncertainty as to whether the Bill would be tabled before the elections, which were scheduled for April next year.

However, if the Bill was not promulgated during this session of Parliament, Doidge stated that the Bill would certainly be tabled during the next session.

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