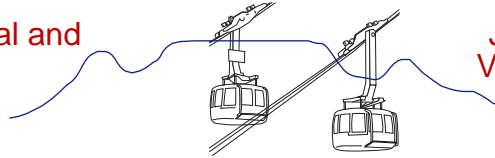


WCB ENGINEERING BULLETIN

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

P. O. Box 504, Rondebosch 7700



June 1999
Vol. 5 no. 3



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

Editorial

IMPORTANT DATES TO REMEMBER

Regulation Gazette No R 1611 of 11 December 1998 states:

All exemptions under S54 of the Factories, Machinery and Building Work Act 1941 and S32 of the Machinery and Occupational Safety Act 1983 will only be valid until 11 December 1999.

Section 40 of the OHSAct of 1993 carried over the exemptions granted under S32 of the MOSAct of 1983 and these will now have to be re-applied for.

It is therefore incumbent upon the employer and user who have been granted certain exemptions by the Chief Inspector or the Minister to examine these and consider whether they wish to re-apply. If this is not done timeously the defaulter could find himself in an embarrassing position. If, for example, a user has been exempted from employing a Certificated Engineer or equivalent when the power installed is 3000 kW or more he could be acting illegally by continuing to employ a less qualified person as his Competent Person to supervise machinery as required by General Machinery Regulation 2(4)(a)(ii). The equivalent qualification to Certificated Engineer in this regard is an electrical or mechanical engineering degree and a pass in the legal knowledge examination together with two years practical experience.

Exemption must be distinguished from approval or permission given by inspectors in terms of certain regulations such as ammonia pressure vessels not having to be inspected and tested in terms of the Vessels Under Pressure Regulations.

Another important date is 8 January 2000 after which a boiler or pressure vessel may only be inspected and tested for statutory purposes by a registered competent person for boilers or pressure vessels or approved inspection authorities.

There are many Certificated Engineers who would like to carry out the statutory inspections and tests but would have to be registered as Competent Persons according to the rules laid down by the SA Quality Control Committee. An employer would be disgusted to be told that his highly qualified engineer is not qualified to inspect his boilers or pressure vessels. When one considers that a C E is licensed to supervise machinery at a mine or factory which may or may not have boilers and pressure vessels, it is quite contradictory that he should be required to write another examination to prove his ability to make an acceptable inspection of the above type of machinery.

Let us consider the matter of supervision of machinery a little more deeply. A C E is appointed to an establishment which has machinery. At the commencement of his service

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Local Branch News

Since our last Bulletin we have arranged 2 very interesting events. On 20 April we held a most interesting talk on electrical equipment safety. The talk was given and hosted by Schneider Electrical. The membership turnout was 11 and 19 guests making up the numbers.

On 18 May we had a most enlightening visit to Ratanga Junction. A total of 38 members and guests attended. It certainly proved to be a very popular visit as we heard about the where, what and how of the operation and design of the machinery at the park. The highlight of the visit certainly was the ride on the COBRA!! Enjoyed by all who chanced the ride.

The planned programme for the next few months is as follows.

- 1 July - Talk on Turbo Chargers to be held in conjunction with SAIMENA.
- 20 July - Visit to the WP Technical College workshop in Thornton.
- 17 August - Risk Management & Self auditing system of Engineering Standards.
- 21 September - A visit to Koeberg power station to view one of the Turbines. (date may change as it depends on when the machine is opened).
- 19 October - New Certificate of Compliance and talk on Mega/Uni City.
- 16 November - Visit and talk on underwater construction.

As you can all see, we are doing our best in putting an interesting programme together and we would certainly value contributions for future consideration.

Your support at the functions which we arrange would really be appreciated!!

Cheers for now!

Christopher Schnehage

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Out of Context

This story was related by the international speaker Stuart Briscoe on his recent visit to South Africa to illustrate that the text of a matter should not be taken out of its context. A farmer in a country district was walking along the road with his mule and his dog. An open truck came round a curve rather too fast and knocked the trio into the ditch. In due course the farmer sued the truck driver for injury to himself and the loss of his mule and dog.

The defence council questioned the farmer: "You told my

Continued on Page 2 col 2

Legal Knowledge — November 1995

Occupational Health & Safety Act No 85 of 1993

Question No2

(a) At what intervals is a boiler required to be inspected and tested? (1)

Ans: *VUP Reg 13(1)(b) - Within 36 months of previous inspection and test.*

(b) Define a 'portable gas container'. (6)

Ans: *VUP Reg 1 - Water capacity 0,5 - 1200 litres, compressed, liquified or dissolved gases.*

(c) What particulars are required to be marked in the machine room or machine compartment of every lift, escalator and passenger conveyor? (6)

Ans: *Lift Reg 4: (a) Name of manufacturer
(b) Year of installation
(c) Official number
(d) Rated speed
(e) Rated load in kg*

(d) Minimum effective open-floor area per employee in indoor workplace? (1)

Ans: *ERW 6(2)(a) - 2,25 square metres.*

(e) Maximum equivalent noise level? (1)

Ans: *ERW 7(1) - 85 dB(A).*

(f) Define 'hearing protectors'. (4)

Ans: *ERW 1 - Ear muffs or ear plugs approved by chief inspector. Efficiency test as per SABS 572 conducted by SABS or approved inspection authority.*

(g) What is the minimum permitted interval between impulses of a fence energiser? (1)

Ans: *EMR 11(1) - 0,75 sec. o*

A Double Check May Save a Life

A harbour quay wall was being extended. The concrete mix delivery trucks were delivering concrete mix at the rate of 50 loads per day. The drivers were skilled and the discharge chute assistants were very experienced. The work went on like clockwork. The very regularity of the procedure contributed to this particular accident.

A concrete mixer truck had discharged its load into a former box. The truck had to drive up a timber ramp which was hinged to a horizontal timber platform. The gap between the ramp and the platform was usually closed by means of a length of 4"x3" timber, but was opened to enable the tyres to grip the ramp better when there was rain. There was minimal room on each side of the platform.

This particular truck had poured its second load. The driver left the hydraulic controls which he had been operating at the left rear of the vehicle and climbed into the driver's seat. His assistant who was at the right rear of the vehicle repositioned the chute and signalled to the driver by whistling that he could reverse. The driver with his door open looked over his right shoulder to see when he would reach the commencement of the ramp. He moved slowly keeping the clutch partially in engagement. The assistant walked across the rear of the vehicle but his left leg slipped through the gap in the timber boards and the truck went over him causing internal injuries to which he later succumbed. A witness

nearby shouted to the driver to stop and move forward again. The driver climbed out and that was the first he knew of the incident. He had allowed time for the assistant to move over to the other side but was not aware of the fall into the gap.

The driver expected the assistant to cross the rear of the truck without interruption, as he had done on numerous times before. He allowed ample time for him to cross, but made no allowance for any irregularity. Although the truck was fitted with a left hand mirror, he did not use it because his attention was on the right hand side.

The personal cause of this accident is considered to be a joint fault, in that the assistant walked across the rear of a vehicle which he knew was about to move (because he had signalled the driver to do so), and the driver did not satisfy himself that the assistant had reached the other side. Both persons took for granted that there would be no hitch in the procedure.

The presence of the large gap was because it was at the hinged joint of the ramped platform. It was usually closed by a length of timber, but this was removed to provide additional tyre grip in the event of the wet weather.

What can be learnt from this incident?

- It is risky to cross behind even a slowly moving vehicle.
- An assumption needs to be checked where conditions are potentially dangerous.
- The assistant could have remained in the view of the driver.
- The driver could have insisted on having the assistant in view while reversing. o

PATRON MEMBERS

Schneider SA (Pty) Ltd	Tel: 531-1722
Globe Engineering Works (Pty) Ltd	Tel: 448-4640
Cape Automation Systems CC	Tel: 511-2382
Improvair (WP) (Pty) Ltd	Tel: 797-9131
Dorbyl Marine (Pty) Ltd Ship Repairs	Tel: 47-5170
Drake & Scull (Pty) Ltd	Tel: 683-7056 Fax: 683-7088
Circuit Breaker Industries Ltd	Tel: 931-3125 Fax: 931-3120
We welcome a new Patron Member:	
African Products (Pty) Ltd, Bellville Contact person: Roy Thorsen, Operations Director	Tel: 951-2151 Fax: 951-5627

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client at the time of the time of the incident that you were not injured in any way. Is that correct?" The plaintiff explained: "Me and my . . .". "Answer the question", said the attorney. The judge interrupted: "Let the plaintiff have his say". The farmer proceeded: "Me and my mule and my dog were walking along the road. This truck came along and knocked us into the ditch. The driver took his gun and went over to the dog who was bleeding badly and shot it. He then went over to the mule which had two broken legs and shot it. He then stood over me as I lay on the ground and asked how I was. I said, 'I've never felt better in my life' ". o

Occupational Health & Safety Act No 85 of 1993

Issue No 18 - General Safety Regulations (GSR) *continued*

- GSR 11: Supervision of Building Work
- GSR 11: A fulltime employee with 2 years' experience (1 & 2) must be appointed in writing to supervise building work.
- GSR 11(3): Subordinate employees may be designated in writing to work under the "senior" supervisor without derogating from the latter's responsibility.
- GSR 12: Roof Work
Workers on pitched roofs must be provided with roof-ladders, duck-boards or crawling boards or safety belts, the latter only on non-fragile material.
- GSR 13: Demolition & Excavation
- (a) - Parts of structure not to be overloaded by debris
 - Take precautions to avoid collapse of structure
 - Use shoring to prevent accidental collapse or damage to adjacent structures
 - (b) Excavation of more than 1,5 m deep to be shored if there is danger of collapse
 - (c) Shoring to be strong enough
 - (d) Ensure stability of adjoining structures
 - (e) Isolate services such as electricity, water, gas to ensure safety of persons
 - (f) Excavations of more than 1,5 m deep to have safe access at not more than 50m intervals
 - (g) Excavations to be inspected before every shift and after rain
 - (h) Excavations accessible to the public and next to public thoroughfares to be
 - protected by a barrier at least one metre high and
 - provided with warning lights at night and in poor visibility conditions. ○

To be continued

Good News!

Jesus died for sinners, good & bad.
The Bible

Lay up Treasure in Heaven

A true story. A man drew a large sum of money from his bank account. He planned to go on a holiday but did not want to take all that money with him so thought where he could safely hide it in his house. After some consideration he decided that the best place would be in the roof. He found a suitable place under the hot water cylinder and placed the money there.

After a nice holiday he came home and climbed up to collect his treasure. And what did he find? A mouse had built its nest out of his fifty rand banknotes under the warm cylinder! The note had been almost decoratively shredded to form a cosy maternity ward for the baby mice. Hopefully he retrieved his "nest egg" and proceeded to the bank where he spread his misfortune before the astonished bank manager, only to be told that the "money" was no longer money and was past redemption. A nest fit for a Queen of Mice! ○

More on the Y2k Bug

Extract from Elektron April 1999 Issue

Millenium bug hardware add-on:

The Millenium Y11K - RTC add-on card ensures correct operation of PC time and date functions through and beyond the year 2000, by removing any reliance on the "faulty" motherboard Real Time Clock.

The Y11K - RTC board resets the motherboard RTC chip with the correct time and date each time the PC is booted. This process occurs automatically before DOS or Windows has been loaded and cannot be disabled or bypassed by the user. No software needs to be loaded or installed for this process to happen.

The Millenium Y11K - RTC card is an ISA card which corrects Year 2000 problems associated with the RTC and BIOS of a PC. It has a Y2K compliant RTC chip on board and can therefore provide the system with the correct time and date at any moment.

The Y11K - RTC card will intercept any further requests for time and date information by the operating systems or other software, after the boot process, to ensure that correct time/date information is received. The "faulty" motherboard RTC is also updated with correct time/date information every 24 hours in a situation where the PC is not rebooted regularly. Contact details: Rhys Taylor of Diamond Network Technologies, Tel (012) 804-0080

Fax (012) 804-1250. ○

Continued from Page 1 col 1

does he know and has he had experience of every piece of machinery on the premises? Very likely not. But because of his thorough knowledge of the principles of engineering and his experience on similar types of machinery, before long he will know all he needs to know for the safe operation of those particular machines whatever they may be. That is why he has been appointed. And because he is aware of his responsibility for the safety of personnel and to prevent damage to his employer's equipment and to keep in step with the Law he will go out of his way to do his work well - also for his own pride as an engineer.

In the light of this new requirement for registration, he asks himself: What is the value of my certificate? Are there other machines for which I should be certified? What about passenger and goods elevators? Leave that to the specialists. The goods hoist I can manage, because like the boiler and pressure vessel I can see its component parts. Electronic control equipment may need some study or call in a specialist. For CE's who feel strongly about the above issue it may be a good idea to write to the SA Quality Control Committee and voice their objections to the examination aspect. The SAQCC has set the rules. These have not been entrenched in law. The SAQCC is the final arbiter for certification. A flood of forceful letters should bring about a re-think. The more fashionable mass action can be considered later!

The address is South African Qualification & Certification Committee:
P O Box 527
Crown Mines
2025

A copy should also be sent to the Chief Inspector, Department of Labour, Private Bag X117, Pretoria, 0001. ○

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Plant Engineering

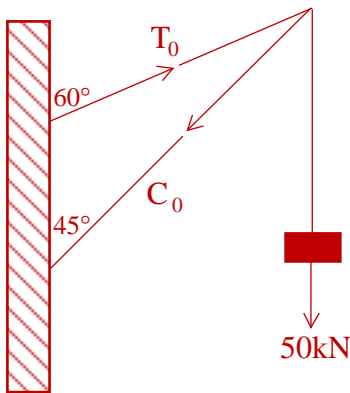
NOVEMBER 1992

Question No 5(a)

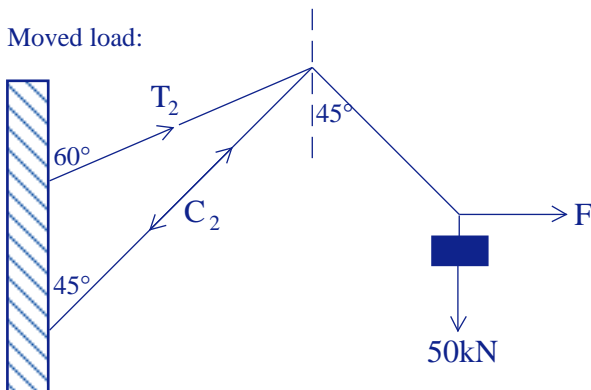
A load of 50kN is raised vertically by means of a simple, single plain frame. the frame is indicated in the figure. when raising the 50kN load vertically the tie bar of the frame has a factor of safety of 5. While raising a 50kN load the load is displaced laterally so that the hoisting rope is at an angle of 45° to the vertical.

The candidate is to calculate the factor of safety of the tie bar of the frame while the 50kN load is laterally displaced, with the hoisting rope 45° to the vertical.

Load in original position:



Moved load:



Load in original position:

For equilibrium :

$$\Sigma \text{ vertical forces} = 0$$

$$\rightarrow (\cos 60^\circ) + 50 = C_0(\cos 45^\circ)$$

$$\rightarrow C_0 = \frac{T_0 H \cos 60^\circ + 50}{\cos 45^\circ} \dots\dots\dots 1$$

$$\Sigma \text{ horizontal forces} = 0$$

$$\rightarrow T_0(\sin 60^\circ) = C_0(\sin 45^\circ)$$

$$\rightarrow C_0 = \frac{T_0 H \sin 60^\circ}{\sin 45^\circ} \dots\dots\dots 2$$

$$(1 = 2) \rightarrow \frac{T_0 H \sin 60^\circ}{\sin 45^\circ} = \frac{T_0 H \cos 60^\circ + 50}{\cos 45^\circ} \quad (\sin 45^\circ = \cos 45^\circ)$$

$$\rightarrow 0.866T_0 = 0.5 T_0 + 50$$

$$\rightarrow 0.366T_0 = 50$$

$$\rightarrow T_0 = 136.6 \text{ kN}$$

Moved load:

For equilibrium :

$$\Sigma \text{ vertical forces} = 0$$

$$\rightarrow (\cos 60^\circ) + 50 = C_2(\cos 45^\circ)$$

$$\rightarrow C_2 = \frac{T_2 H \cos 60^\circ + 50}{\cos 45^\circ} \dots\dots\dots 3$$

$$\Sigma \text{ horizontal forces} = 0$$

$$\rightarrow T_2(\sin 60^\circ) = C_2(\sin 45^\circ) + 50$$

$$\rightarrow C_2 = \frac{T_2 H \sin 60^\circ - 50}{\sin 45^\circ} \dots\dots\dots 4$$

Note: due to the 45° angle it can be seen that $F = 50\text{kN}$

$$(3 = 4) \rightarrow (T_2 H \sin 60^\circ - 50) \frac{T_0 H \sin 60^\circ}{\sin 45^\circ} = T_2 + 50$$

$$\rightarrow T_2 H \sin 60^\circ - T_2 H \cos 60^\circ = 100$$

$$\rightarrow 0.366H T_2 = 100 \quad \rightarrow T_2 = 273.22 \text{ kN}$$

Now to work out the safety factor : (originally $SF = 5$)

$$SF_2 H T_2 = SF_0 H T_0$$

$$SF_2 H 273.22 = 5 H 136.6$$

$$\rightarrow SF_2 = \frac{683}{273.22} = \underline{2.5}$$

Jokes

Golfer: "I'd move heaven and earth to be able to break a hundred".
Caddy: "Try heaven. You've already moved most of the earth".
Tal D Bonham

"I'm sick and tired of being left alone every week-end," grumbled the golf widow. "If you think you're going to play today, you've got another think coming".
"Nonsense," replied the husband, reaching for the toast, "golf is the farthest thing from my mind. Now, would you please pass the putter?"
Tal D Bonham

Note: The above question illustrates a very practical situation which has in the past been the cause of accidents.

E.g. A jib crane collapsed when an inexperienced workman employed by the firm which hired the crane allowed the full load to swing beyond the radius of the jib and additional compressive stress was placed on the jib. The owner of the hired crane wanted a mere R500 to repair it but the company denied responsibility and the case went to civil litigation which enriched the lawyers and made both the plaintive and the defendant considerably poorer.