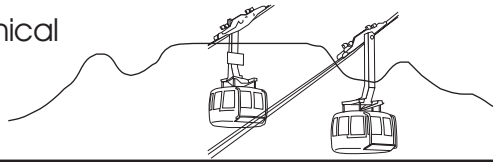


# WCB ENGINEERING BULLETIN

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

P.O. Box 504, Rondebosch 7700



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

## Editorial

The Engineering Council of South Africa is doing sterling work in obtaining recognition for South African engineering qualifications in other countries. Certain international accords have been signed to initiate the process of mutual recognition, and work is proceeding to compare educational qualifications and practical experience. In due course it will be possible for engineers, technologists and technicians to move around the global village using their qualifications to earn and learn and gain varieties of experiences which their families too could enjoy. The only engineering factotum who seems to be out in the cold is the Certificated Engineer who, though fully recognised in his own country, has to stay at home or use one or other of his engineering achievements to move abroad.

The Government Certificate of Competency is a legal requirement in SA and there does not seem to be a corresponding category in other countries. The certificate is unique and was started in the mining industry early in the previous century to ensure that various categories of engineering and technical activity were carried out under the supervision of competent persons. In those early days, when mainly unskilled mine personnel were exposed to the hazards of heavy machinery, it was reasonable and wise that the authorities should provide competent supervision to reduce the dangers and prevent accidents. When one considers that plant of a power rating of 75 horsepower (or about 57 kW) required a certificated engineer one realises how bulky and over-designed the early machinery was and liable it was to cause injury from moving parts. Modern machinery is smaller and more easily guarded or housed. Electrical switchgear is more compact and designed to reduce flashovers and overheating.

The Certificated Engineer is more of a technical manager than an artisan these days, but is well qualified by practical experience and knowledge of the principles of engineering and the requirements of the safety regulations to supervise the safe operation of machinery and plant. His unique qualifications are exactly what is needed where workers are exposed to industrial machinery of all descriptions. Long may he live!

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## Local Branch News

Hello once again everybody.

The AGM, held on 20 February 2003 at the Western Province Technical College Thornton Campus, was attended by 14 persons and there were 3 apologies. The talk on "The Practical uses of Infrared Inspection Services" by Ian Cromarty of Thermomax was most informative. There are a large number of ways that we as engineers could make better use of the Infrared technology.

On 12 March we offered a talk on ECSA by Rod Harker, a Pr Eng who has been involved with ECSA for many years. It was very interesting to catch up on what the latest happenings are at Council. Each and every one of us Engineers need to take note of the changes and how they will affect our future careers. These matters will be dealt with in one of the next ICMEE news bulletins. So keep your interest up!

Further intended programmes for the next few months will be as follows:

- April – Visit to the NASPERS printing works in Montague Gardens
- May – Talk on developments at Athlone Power station
- June – Talk on failures on modern / future diesel engine design by Patrick Swann (ICMEE Member)
- July – Visit to BHS Cotton Mills

[Please note that the programme may change due to unforeseen circumstances]

Ciao

**Chris Schnehage**

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## Joke

Two fathers were discussing their children. "So tell me," said one, "how's your youngest doing at university these days?"

"No man, I think he's doing well." replied the other. "He's studying languages, but it's costing me a fortune. Last month I got an account from the university for R300. It was R50 for Latin. R50 for French and R200 for Scotch."

*Best of South African Jokes*

# Never say die to an old boiler

(Information from Gentalk August 2002)

A South African power station steam boiler commissioned in 1968 and mothballed in 1990 has been sold to an American company. It is capable of generating 113 MW of electric power. The project started at the end of January 2002 and is expected to be commissioned by the end of 2003.

Most of the refurbishing is being done locally before the shipment of the 7500 tons of equipment.

There will in this instance be a saving of 40% compared to the construction of a new plant in America. The refurbished plant will be ready for use in half the time of a new construction. The seller gains in receiving more than the scrap value of the plant. The success of such a transaction also depends on the standard of maintenance of the equipment during its life of service. The exchange rate also plays a significant role.

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## Infra red surveys

A talk and demonstration was given by Ian Cromarty, Director of Termax, a company which undertakes condition monitoring with thermal imaging for pro-active maintenance, at the AGM on 21 February 2003. Ian has been conducting this type of business since 1981.

The extremely expensive radiometer which is the heart of the business is used in both electrical and mechanical applications. It looks like a video camera but measures temperatures by infra red radiation from objects at a distance. Types of applications are the detection of: the latent heat of rocks at night, temperatures at various spots on a human face, poor circulation in limb extremities, breast cancer in women, effectiveness of airconditioning recording the temperature of by black plates hung in a room, bearings of machinery (temperatures plotted over time give history of a bearing). It can measure conveyor bearings at 100 m, effectiveness of lagging around exhausts, poor workmanship on electrical connections, refractory failure in drying ovens, effectiveness of glue on wooden doors, hot spots on lightning arrestors, hot spots on cable bushings, etc, etc.

Of interest: the device can show that eyes don't sweat, more heat is radiated from the human head, the ears are cold, loose clothing keeps heat in, bricks are hotter than mortar, it is the white phase that runs hot, etc. Perplex absorbs heat but steel does not.

Infra red survey is good for *preventive maintenance and proactive maintenance*.

The use of the camera, however requires training and experience. It does not compete with vibration monitoring; it is an early warning system.

The radiometer will indicate a 0.2% variation in temperature.

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## Plant Engineering (factories)

June 2002 (4) (a) Exam Question

Define "Angular Momentum" (3)

This is the type of question that makes me sometimes wonder what the examiner has in mind or what the examiner sees in it to ask the question in the first place. Surely he is not testing the ability of a young future engineer by asking this type of question. What he is testing is the memory of the student only. I would still understand if the next question would have been a working out question with relation to angular momentum, but it is not. It is a completely different topic that I will answer next. But as I always say, the question is here, there is nothing we can do about it now, and therefore let's deal with it.

**Answer:**

"Angular momentum" or "moment of momentum" of a body about its axis of rotation is the moment of its linear momentum about that axis.

$$\text{Angular Mom.} = I_g.W + m.v.h \quad (\text{kg. m}_2/\text{sec.})$$

Students are advised to consult any text book on Elementary Mechanics to go a bit deeper on this subject, just in case they have a follow up to this question in the next exam. Who knows? If the examiner asks this type of questions, we will never know what he will be asking next.

June 2002 (4) (b) Exam Question

State the functions of a receiver tank for a reciprocating air compressor. (5)

Ha, this is more like it!!!!

**Answer:**

A receiver tank usually consists of a cylindrical shell of steel plate and may be with or without tubes for cooling water. It has pipe connections to the compressor and air main, a pressure gauge, safety valve, drain cock and a manhole. They may be either vertical or horizontal.

The principal functions of a receiver are:

- 1) to eliminate the pulsating effect of the strokes of the compressor piston and thus prevent rapid fluctuations of pressure,
- 2) to minimise the frictional loss attending the flow of air through the air mains by maintaining a more constant velocity,
- 3) to serve in some degree as a reservoir of power,
- 4) to cool the air before it passes into the main, thus causing it to deposit a part of its moisture in the receiver, whence it is drained off.

This is all for now. I hope it will be of some help for future papers. I will be back with more next time.

Jorge Pereira

Cert. Eng.

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## The College of Cape Town

It is our pleasure to update and inform you of the changes occurring in the Technical College Sector. Clustering has been approved by Province as well as Central Government.

Western Province Technical College is pleased to announce that it will be clustering with three of the most respected Colleges in the Western Cape. These Colleges are Athlone College, Cape College and Sivuyile College. From a geographical point you will see that the Cluster is well positioned to meet all your on going educational needs.

The 4 Colleges will all operate as individual campuses under the new name of The College of Cape Town - with the various Campuses.

The College of Cape Town would like to take the opportunity of ensuring you of our ongoing high standard of theoretical and practical expertise which you have come to expect over the years. We as a College can only highly recommend this cluster, as we are able to expand our services and courses through the expertise of the well-trained and educated lectures in the fields of Commerce, Art, Business and Technical studies.

Assuring you of our continued support and ongoing services and look forward seeing you all at The College of Cape Town in the not so distant future.

# legal knowledge

Occupational Health & Safety Act (November 2002)

## Question 1

- (a) Define the following terms as given in the Act:
- (i) Inspection authority
  - (ii) Medical surveillance (7)
- (b) An inspector has notified an employer of the date of a formal inquiry into an accident which has occurred at his/her factory and which resulted in the death of one and the injury of three employees.
- (i) List FOUR categories of persons who may have an interest in the inquiry. (7)
  - (ii) Who must be informed by the employer about this inquiry? (2)
- (c) List the functions that a Health and Safety Committee has to perform. (4)

[20]

## Answer

- (a) A person or body approved by the Chief Inspector who, with specialised knowledge and equipment, renders a service to make special findings which are objective re: health of persons safety or risk compliance with a standard incorporated into the Act.  
(See definitions before the main Act)
- (b) (i) Chief Inspector, Attorney General, SAPS, CEO, family of deceased and injured, Workman's Compensation Commissioner.  
According to s 32 (c) the following categories of person may have an interest in the inquiry:  
injured person
- employer or user of machinery
  - a person who could be held responsible for the accident
  - a trade union
  - owner or occupier of the premises
  - anybody who could prove an interest.
- Note: On the last point, a retired civil engineer asked to give evidence at an inquiry in which a 62 ton concrete beam on a bridge under construction fell on a car and killed the driver. He suggested that wind eddies had caused the beam to vibrate at its resonant frequency until it loosened the clamps on the reinforcing which secured the beam.
- (ii) s 13 (b) of the Act requires the employer to inform the health and safety representatives.
- (c) s 20 (1) of the Act requires the H&S Committee to:
- make recommendations for safety to employer or, if no action, to an inspector.
  - discuss an incident and possibly report it to an inspector
  - keep a record of the recommendations made.

## COMMERCIAL MEMBERS

Schneider SA (Pty) Ltd	Tel: (021) 464 4240
Globe Engineering Works (Pty) Ltd	Tel: (021) 448-4640
Cape Automation Systems (Pty) Ltd	Tel: (021) 447 0996
Dorbyl Marine (Pty) Ltd Ship Repairs	Tel: (021) 47-5170
Drake & Scull (Pty) Ltd	Tel: (021) 683-7056
Circuit Breaker Industries Ltd	Tel: (021) 931-3125
African Products (Pty) Ltd, Bellville	Tel: (021) 951-2151
Sappi Cape Craft (Pty) Ltd, Milnerton	Tel: (021) 552-2127
John Thompson Africa (Pty) Ltd, Bellville	Tel: (021) 951-2271

# A bi-monthly column on Project Management

Caesar Alexandre

## Part 5 ASSET-BASED APPROACH

The alternative to the needs-based approach is to also look into the capacities, skills and social resources of poor people and their communities, starting out from what the community has rather than only from what it does not have.

In spite of their needs and problems, all poor communities do have some resources, but these tend to be forgotten when the focus falls on their overwhelming needs and problems. Furthermore, the focus on resources within the community does not necessarily ignore the external context of and constraints on poor communities, nor does it imply that these communities do not need additional resources from outside. Rather the 'asset-based' approach suggests that outside resources can be more effectively utilised if the community has already mobilised its own resources and defined the agendas for the utilisation of external resources.

There is therefore a need to focus not only on what the poor do not have, but also on what they do have, and to forge strategies that promote opportunities for, as well as remove obstacles to, effective resource management.

Project Management has encouraged community development experts to understand the systems relationships present in a project environment.

We can't ignore an external system, such as a social system, that can be disruptive. Sustainable means environmentally, socially and technically sustainable.

By applying a project management mindset, we can lay the whole thing with good rational methodology, appraise the project, and know enough of the variables that it can succeed.

The human factor plays a critical role in business and governance success.

If they are to be effective, the entire makeup of employees, and the way we manage them, has to be taken care of, including their knowledge, skills, values and attitudes.

Why then this gulf between two disciplines - Project Management and community development - with so much to gain from each other?

Partly, it's an artifact of an educational system built in silos. Community development people tend to enroll from the Social Sciences, Economics or Public Health programmes, and Project Managers, traditionally have been in a building on another part of the campus. Schooled to separate professional dialects, they can find it hard to communicate with each other.

Write "end user" in a proposal and the community development person will likely cross it out and write "beneficiary".

Then, too, in the atmosphere of big government grants that reign supreme, there is little emphasis on getting the right things done right the first time, on time and on budget.

Continued on page 4

So, a culture developed of sinking money into three or five years projects that looked good on paper and then sending someone out to evaluate whether or not the project had succeeded, when the money was gone.

People in development agencies have got so used to not having any impact at all that they can't believe they might actually have an adverse impact on the beneficiary.

- Project outcomes must please the customer, but they should also bring value to the organisation and the country.
- Many Projects fail because they do not fulfill customer's expectation, even though they were well executed.
- Instead of seeing projects as jobs to get done, projects should be perceived as major vehicles for organisational and societal prosperity.
- Project managers can no longer afford to be detached from the organisation's strategic and long-term goals.
- Project definition, planning and success assessment should all become an integrated part of strategic planning and strategic management in organisations.
- Project success should be assessed along at least four distinct dimensions: project efficiency, impact on the customer, direct and business success, and preparing for the future.
- Project Managers must have long term benefit in mind and must rectify any gap between project perceived performance and actual customer needs.
- Delivering projects predictably and successfully requires not only competent project management. It also requires a set of systems, processes, structures and competence, that enable an organisation to undertake the right project and to support them organisationally.

Service providers are mostly seen as "the enemy" who has to be outwitted.

Generally service providers show no respect for their customers and their problems.

Officials have not been properly trained to deal with the beneficiaries, and departments understaffed and overloaded with bureaucracy have no means of providing an efficient service.

There is mostly no evidence of service providers wanting to help their customers.

This in turn, results in disrespect for the service provider, which is often expressed in fraud and non payment. By creating an environment of negotiation and good communication, where the providers express a genuine desire to listen to their beneficiaries and understand their needs and expectations and find solutions to the mutual benefit of all parties involved, a climate of respect and trust is generated.

It is only in such a climate that a win-win solution can be created and any project can be considered successful. Although the expenses in terms of effort, infrastructure, staff and time are considerable, in the long run a system of solidarity will reap financial benefits.

At the same time, the benefits of gaining an excellent public

image can never be measured against financial input. The past social disintegration in SA will not disappear with the institution of a democratically elected government, as some people would like us to believe. On the contrary, a democratically elected government will have greater difficulties dealing with lawlessness, criminality and irresponsibility, because it is likely to have a greater responsiveness to populist demands and critiques. Ramphele (1991:15) In her article, Ramphele analyses the causes and consequences of social disintegration in South African communities. Among the symptoms of disintegration she lists the following:

- Family breakdowns with increasing divorce rates, separation, single parenthood and teenage pregnancy.
- Breakdown of the authority of parents and teachers.
- High unemployment and unemployability rates.
- High alcohol and drug abuse.
- Low performance in all spheres of life including school and skills training.
- High crime rates and endemic violence at all levels of social interaction.
- Despair and acceptance of the victim image.
- Flight of skills and positive role models from the townships into higher-income areas.

The causes of social disintegration in black communities are complex, and include colonial conquest, subordination and repression, dispossession and impoverishment, rapid and massive urbanisation following the lifting of restrictions on movement, inadequate social services and infrastructure, forced removals and other disruptions of communities, the flight of potential role models from the townships, the destruction of family life by migrant labour and conditions in the hostels, the system of Bantu Education, disruption of schools, and indifferent or hostile job markets. Ramphele also points to a number of social and political developments that helped speed up the process of disintegration. These include the progressive alienation of young people from adult leaders and parents following the Sharpville massacre, the involvement of children in the front-line of resistance, the politics of making South Africa ungovernable, school boycotts, people's courts, and the brutalisation of both victims and perpetrators by widespread political violence. As one would expect the degree of disintegration to vary between communities, community-based development may be appropriate in some communities, but not in others. Within this context it would be useful to assess the social capital resources of a community before embarking on a community-based project or programme. Another approach might involve helping to build the social capital of the community before proceeding with the project.

END

*The Editor would like to thank Caesar Alexandre for this valuable document on Project Management that has provided food for thought for managers.*

Papa Bear: "Somebody's eaten all my porridge!"

Baby Bear: "Somebody's eaten all my porridge!"

Mama Bear: "Nag! Nag! Nag! I haven't even made it yet!"

Rose Young - from Reader's Digest June 1991