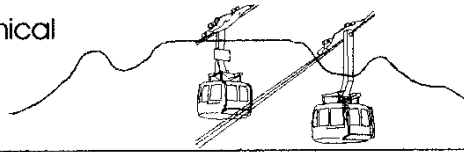


WCB ENGINEERING BULLETIN



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 June Edition reported a huge gas explosion at a factory in Scotland. About a month ago a gas explosion occurred in Kent in which a two storey house was blown apart by a domestic installation. A woman alone in the house was rescued by a neighbour and was taken to hospital in a serious condition. Details have not been made available so the actual cause is not known. On 5 August another domestic gas explosion occurred around the corner in Tonbridge in which a house was extensively damaged and a 92 year old woman died of severe burns.

Gas is used in UK just as widely as electricity and it is a mercy that there are not more incidents of this nature. Gas installations are strictly regulated. Rented houses have to be certified annually and whenever the tenancy is changed, by qualified persons, and the certificate retained. This is the Certificate of Certified Registered Gas Installers (CORGI). A privately owned residence is not required to have an annual inspection, but this is advisable. Natural gas is methane to which is added an odour for detection in the event of a leak.

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Electricity grid UK

The Daily Telegraph reported on June 26, 2004 that the National Grid Transco, a private company, had been criticised by the energy regulator Ofgem for procedural failures that caused two major power blackouts during 2003.

Ofgem conducted investigations into the power failures over a 10 month period. It found that the supply failure in London required the evacuation of 250 000 commuters from the London Underground and that more than 270 sets of traffic lights failed, causing traffic chaos. In Birmingham a 40 minute power failure affected 220,000 customers. One of the causes in both power cuts was due to faulty installation of protection equipment by National Grid engineers.

Although the company would not be penalised this time it will be automatically penalised for similar power failures in the future. They could be fined millions of pounds.

The company made a statement: 'Lessons have been learnt and we have taken a number of steps to improve our procedures to reduce the chances of similar incidents happening again'.

Local Branch News

Hello once again everybody.

We have had a busy 2 months since the last edition of the News Bulletin.

On 9 June we had an interesting paper presented to members by Pete Retief, on "Quality of Power Supply and Bird Streaming on Transmission lines" It was an interesting paper but unfortunately very few members attended. Pete did the paper in association with Gary Atkinson-Hope as part of his B Tech degree.

On 28 July we held a most successful seminar on some Occupational Health and Safety matters. There were 33 persons who attended and from feedback received, the seminar was indeed a success. Once again, a pity more members of our esteemed Institution did not attend. Thank you to those of you who supported us!

On 5 August, a group of members and friends visited Nampak's Bev Cap and Bev Can works in Epping 2. This was once again a very interesting visit.

Planned items to the end of this year are:

August: Talk on concrete repairs

September: Visit to the Faure water purification works

October: Dinner Dance

October: Visit to SAPPI Factory in Montague Gardens

November: Visit to the Athlone Sewerage Works

We look forward to seeing as many of you as possible at these functions, so that we can do some networking.

Ciao for now!

Chris Schnehage

Chris Schnehage

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Albert Einstein (1879-1955)

If A is a success in life, then A equals x plus y plus z. Work is x; y is play; and z is keeping your mouth shut.

When you sit with a nice girl for two hours, you think it's only a minute. When you sit on a hot plate for a minute, you think it's two hours. That's relativity.

How do I work? I grope.

Note. The above quotations are from The Wordsworth Dictionary of Quotations, edited by Connie Robertson 1997.

Steam in the village

Newcomen's steam engine of 1712 was a beam pump for pumping water out of a coal mine. The first steam locomotive, developed by Trevithick, a Cornishman, was built in 1804. Stephenson's Rocket was built in 1825 and operated between Liverpool and Manchester. The Industrial Revolution was well on its way.

Farming also entered a revolution. The multiplicity of small landowners was slowly being replaced by owners of large estates. The small landowners, who were the poor, became landless wage earners as their land was incorporated into large enclosures. The population was growing at a rapid rate as employment improved and people moved to the large industrial towns. More people needed to be fed so agricultural productivity had to be increased.

The various activities of farming had been carried out by waterwheels, windmills, horse-drawn implements and hard manual labour. But as the building of steam engines developed most of these activities could be done by steam power. The first agricultural application of steam was an engine designed and built by Trevithick in 1812 to power a fixed threshing machine. Here the engine replaced a team of oxen yoked to a roundabout. [This engine operated for 67 years and is now honourably remembered in the Science Museum in South Kensington].

As more and more industrialists became wealthy many used their money and facilities to develop farm implements and steam engines. At first portable engines were used mainly to drive threshing machines, an important part of agriculture. Then ingenious systems were invented for ploughing and cultivation, initially by rope and winch, with the farmhand steering the plough while the steam operator minded the engine at a distance.

About the middle of the 19th century portable engines were made self-propelling by the addition of a chain and sprocket drive. These early traction engines were not robust, being only 2 to 4 HP with limited farming application. They could not continually withstand the shocks of travel and overloading. Larger engines were more expensive to build and operate. Engineers with an eye to business saw that larger engines could be contracted out with its own crew to more than one farmer. And so the need for sturdier traction machines arose. These tractors consisted of a boiler and smokebox surmounted by the engine with its flywheel which also became the driving pulley. An early model was called the "Farmer's Engine", built for Ransome of Ipswich.

The traction engine of 6 to 8 HP became the workhorse not only for farmers but for counties. On farms they ploughed, threshed, cultivated, stacked hay, sawed timber and pumped water. They delivered produce to market, transported heavy machinery and when necessary could pull another engine out of a ditch. For counties they could transport grit for roads, steamroll tarmac, load timber, collect refuse, cart night soil and empty cesspools.

Showmen also used steam tractors to transport their equipment. A train of about five carriages containing fairground equipment and living quarters could be drawn by an 8 HP engine. When one considers that this power equates to 6 kW one realises that time was not a vital element of those days!

[Information extracted from STEAM IN THE VILLAGE by RA Whitehead 1977]

COMMERCIAL MEMBERS

• Schneider SA (Pty) Ltd	Tel:	(021) 464 4240
• Globe Engineering Works (Pty) Ltd	Tel:	(021) 448-4640
• Dorbyl Marine (Pty) Ltd Ship Repairs	Tel:	(021) 447-5170
• Drake & Scull (Pty) Ltd	Tel:	(021) 683-7056
• Sappi Cape Craft (Pty) Ltd, Milnerton	Tel:	(021) 552-2127
• John Thompson Boilers, (a division of ALSTOM SA (PTY) Ltd)	Tel:	(021) 959-8532

The microwave oven



An American, Dr Percy Le Baron Spencer, was working on a radar-based research project in 1946 when a peanut bar in his pocket melted. As he was working in the vicinity of a magnetron he suspected that the high frequency radio emissions had been the cause. It was known that radio frequencies caused heating. Being curious to find out more he sent a lad to buy a packet of popcorn. He placed it close to the magnetron and the popcorn exploded!

Next morning he set up a simple experiment. He cut a hole in the side of a kettle and mounted a magnetron next to the hole. He placed a raw egg inside the kettle. He switched on the magnetron. An interested colleague looked into the kettle to see the effect and the egg exploded in his face! (Here was someone who literally had egg on his face.)

More work was done on the discovery. Spencer's company Raytheon filed a patent in 1946 and produced a prototype oven which was set up in a Boston restaurant. The first commercial microwave stove was sold in 1947. It was 1,6 m high and weighed more than 340 kg. The magnetron was cooled by water. The first domestic air-cooled model appeared in 1965 at a cost of one-tenth of the early models.

Editor's Note. I had the same experience when I tried to boil an egg in the microwave. What a mess!

Portable appliances under electricity at work regulations (1989) - UK

- Class 0 Non-earth equipment whose live parts insulated with basic insulation only.
- Class 01 No earth terminal on metalwork, twin supply cable, plug has no earth pin.
- Class I Basic insulation, casing earthed and protected by circuit protective conductor (ELP).
- Class II Double or re-inforced insulation, two core cable, no c.p.c.(ELP).
- Class III Separate Extra Low Voltage source, not more than 50V, isolating transformer, no earth wire (earth pin plastic).

NOTES

- Maximum earth leakage current across insulation 3,3mA at 250 V.
- Class I insulation resistance 0,5 Megohm at 500 V.
- Class II insulation resistance 1 Megohm at 500 V.
- BS 1363 allows fuse and cord size for appliances:
 - up to 700 W - 3 A, 0,5 sq mm.
 - 700 - 3000 W - 13 A, 0,75 - 1,5 sq mm.

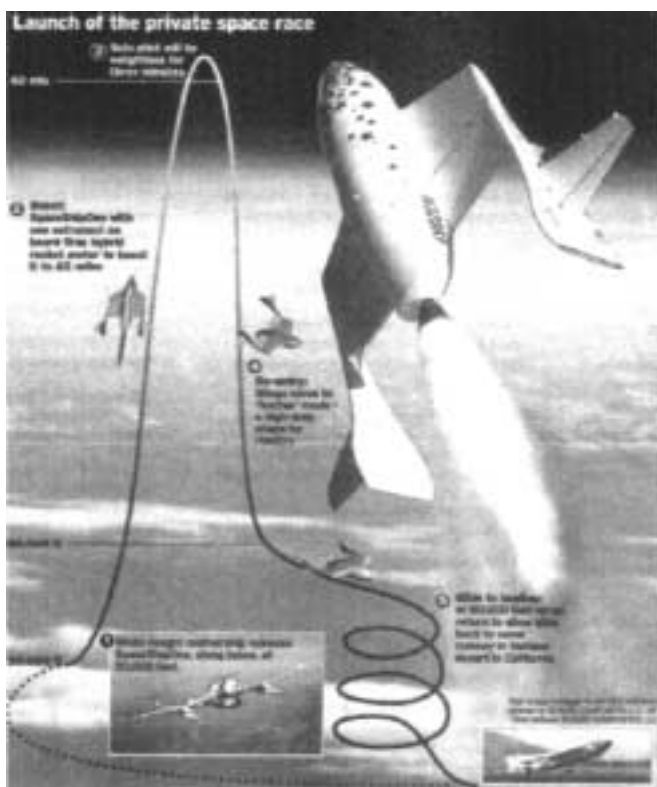
Man in space

On 21 June 2004 SpaceShipOne made history when test pilot Mike Melvill reached 62 miles (100 km) or more precisely 328,496 ft above earth in a rocket ship which blasted off from a mother ship. The White Knight mothership released the SpaceShipOne at 50,000 ft, the space ship fired the hybrid rocket motor which boosted it to 62 miles. Clear of the earth's atmosphere the pilot was weightless for 3 minutes, then followed the descent and re-entry with the wings moved to feather mode, a high-drag shape to slow the craft. At 80,000 ft the wings were returned to glide mode and the craft glided back to the same runway from which it was launched.

The Daily Telegraph commented in an editorial: "Manned space exploration and long-distance air travel are both stuck in a rut. Civil aviation has become dominated by considerations of cost; manned space travel by safety. Fortunately private-sector pioneers can take their own chances". This project has been funded by Paul G Allen, co-founder of Microsoft, and engineered by Scaled Composites.

P G Allen said at Mojave Airport, 95 miles north of Los Angeles, where the event took place: "Burt Rutan and his team at Scaled Composites are part of a new generation of explorers who are sparking the imagination of a huge number of people worldwide and ushering in the birth of a new industry of privately funded manned space flight. Manned flight does not require mammoth government expenditure".

Mike Melvill has become the first civilian to fly out of the atmosphere and the first pilot to earn astronaut wings.



There are others looking ahead to the finish line for the first privately planned and funded flight into space. The most promising for now is the Canadian The da Vinci Project. The all-volunteer group, based in Toronto, has invested more than 100,000 personnel hours in the project. The project also has regional teams elsewhere in Canada at Montreal, Regina and Vancouver, and in St. Petersburg, Russia.

The da Vinci Project's Wild Fire rocket will be lifted from a launch site near Kindersley, Saskatchewan, by a reusable helium balloon to an altitude of 80,000 feet near space from where the rocket engines will fire and propel pilot Brian Feeney on the 62-mi.-high suborbital space ride. A Wild Fire launch is planned for October 2, 2004.



Harrier Jump-jet Crash

An inquest was held on 9 July 2004 into the fatal crash of a Royal Navy Harrier jump-jet which occurred some time ago. The incident occurred at RAF Wittering, Cambridgeshire in UK during take-off when at 50 ft a rotor blade snapped, causing an explosion which turned the aircraft into a fireball as it plummeted into the ground. Both pilots ejected but unfortunately one of them was forced into the ground by his ejector seat and was killed instantly. The other, who had ejected a fraction of a second earlier, survived with minor injuries.

Investigation established that the rotor blade which snapped had a nick 8 hundredths of an inch deep and 18 hundredths of an inch long, almost invisible to the human eye.

A verdict of accidental death was returned by the jury.

Information published by The Daily Telegraph on July 10, 2004

The demise of the slide rule

A German friend of mine was the Certificated Engineer working for a large engineering company. (This story goes back some decades.) A German engineer with a doctorate was appointed over him. The newcomer was very personable and impressive. He carried a slide rule in his dust coat pocket and on occasion would whip it out with a flourish and make a quick calculation. As time went on my friend noticed a number of small lapses on the part of this flamboyant man. He decided to observe him more closely. His suspicions were confirmed when one day he was nearby whilst the doctor was using his slide rule. He realised the man did not know how to use it!

He privately made contact with the university in Germany from which the doctor purported to have obtained his degree - the person was not known there! He was duly exposed and fired.

The slide rule is based on logarithms, which in turn are based on indices, where a product of two numbers brought to the same base (common logs '10' and natural logs 'e') enables the indices to be added, making a large number calculation easier.

The English mathematician William Oughtred in 1621 used the principle of logarithms, invented by the Scottish mathematician John Napier some years earlier, to make a circular slide rule. He failed to publicise his invention until 1633. A former student of his, one Richard Delamain, however, claimed to have invented a circular slide rule in 1630. Oughtred was, however, credited with inventing the straight version because he had illustrated the principle of it in 1621.

Stephen Hawking (1942-)

The behaviour of the universe on a very large scale seems to be simple and not chaotic.

If we find the answer to that [why it is that we and the universe exist], it would be the ultimate triumph of human reason - for then we would know the mind of God.

(A Brief History of Time - second quotation)



Cruising up and down a UK canal

A UK experience which I found most enjoyable was traveling a canal in Hertfordshire, reminiscent of early English life. About 200 years ago canals were a means of transporting coal and many other domestic and trade commodities between towns. Rivers could take boats and barges down stream but upstream was another matter. So man-made canals and locks were one answer.

My wife Estelle and I were in a party of 57 (the maximum capacity of the coach) mostly oldies, who drove from Kent, NW to Hertfordshire, skirting London by its ring road. Hertfordshire is where the Chiltern Hills are found. These hills are composed of chalk and are 276m at their highest point at Coombe Hill. We traveled for about two hours, mostly on the M25, the London ring road. We went through the village of Tring at a gap in the chalk hills to the village of Aldbury and paused for morning coffee and biscuits at the Greyhound Inn. Here the party had the option of placing orders for lunch to be taken later.

Leaving Aldbury we were taken on a circular tour of the area. As we traveled our guide narrated the fascinating history of the Rothschild's family who had lived in the area during the 19th century and later. Meyer Amschel Rothschild (1743 – 1812) was the German banker who opened a bank in Frankfurt and whose five sons after him controlled banks in Frankfurt, Vienna, Naples, Paris and London. His son Lionel was the first Jewish of the British Member of Parliament. Lionel's son Nathan (1840 - 1915) was the first Jewish British peer. The Rothschild dynasty was very generous towards the local population in the area through which we were traveling, in those early days building schools, homes for the poor and charitable institutions. We passed an old building with the letters HR cast in cement on the wall, the initials of a daughter Hannah who had performed many good works for the community in her day.

Back at the Greyhound Inn for lunch Estelle and I sat at the duck pond under a tree that kept most of the light drizzle of rain at bay. We walked through the cemetery of a Norman design church, the Church of St John the Baptist. All very sombre and peaceful.

A short drive to the locks where a very large number of boats were moored, indicative of a thriving business in tourism. Apart from a houseboat or two we were the only group on the canal. (This was the Grand Union Canal joining the Midlands system and the Thames.) We watched, intrigued, as we approached the first lock, at the simplicity of the operation. Behind us a young lad and lass, part of our crew, closed the lock gates. They then walked the short length of the lock to the top end and each with a metal handle wound up a sluice gate (penstock) in each swing gate, and the water in the lock ahead gushed out and our boat

started to rise. When the levels were the same the young operators pushed the horizontal counterweight arms of the gates through 90 degrees and the gates were opened to let us through, after which they wound up the sluice gates on their racks and pinions and swung the heavy wooden gates closed.

As we chugged through the five locks our guide pointed out the remaining evidence of tow paths along which horses towed the barges of old. There were deep grooves on the iron protected corners of the walls where the hardened ropes had abraded the corners. At the top of our hill we espied two large reservoirs of water which are needed to make up the loss of water each time the lower level is raised and that due to leakage through the gates. A leisurely stroll around the top of our hill and then the slow descent through the locks to our point of departure. During the descent tea and cream scones and jam were served. The return coach trip was uneventful. Arriving home we had all enjoyed our 12 hour outing to the full.

From about 1850 the canal traffic fell into disuse as steam transport on road and rail increased.

More on the Chernobyl disaster

A British scientist, Dr Alan Flowers, claims that 4000 square miles of Belarus in the Russian Federation was sacrificed to protect Moscow from the fall-out of radiation from the disaster at the nuclear power station in Chernobyl. This was done by "seeding" clouds to produce rain over Belarus which the radiation then contaminated, thus diverting it from settling over Moscow. Dr Flowers has carried out research in the area for 12 years. He spoke publicly on 1 May about the evidence he had obtained to prove his assertion. On 7 August he was given 48 hours to leave the country.

At 1:23 am on April 26, 1986, reactor 4 exploded at the Chernobyl nuclear power station in Ukraine. The blast killed 31 people but the effects of radiation continues to this day. A wind was driving the fall-out in a NE direction over Gomel towards Moscow. Witnesses observed planes flying overhead and soldiers firing rockets into the air. A little later black rain came pouring down, drenching Gomel, which is 26 miles from the Russian border and 300 miles from Moscow. Thyroid cancers have increased enormously and now genetic effects of lung, liver and kidney cancer are appearing.

Information reported in The Sunday Times (UK) 8 August 2004

Henry Brooks Adams (1838-1918)

A teacher affects eternity; he can never tell where his influence stops.

One friend in a lifetime is much; two are many; three are hardly possible. Friendship needs a certain parallelism in life, a community of thought, a rivalry of aim.

Practical politics consists in ignoring facts.

No man means all he says, and yet very few say all they mean, for words are slippery and thought is viscous.

(The Education of Henry Adams)