

## Technologists Keep The World Working.

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### No 1. Office News.

As we stated some months back the office is to be relocated. We have moved. Our Postal P O Box address remains as it was and our telephone number is now 062 585 7022. Our Fax number has been discontinued due to no one using Faxes anymore. Our E mail address remains engineer@netactive.co.za.

### No 2. Newsletters.

While we still produce a longer newsletter from time to time we have moved to supplying short E Mailed updates to members on a fairly regular basis as this gets the news out quicker. Our Website may then not have the usual long newsletter on it. The short E News we distribute is for our members and thus may not appear on the Website where anyone including non-members may see them.

### No 3. CPD.

We have sent out a number of notices over the past few months giving details of **CPD courses** many of them being on line or webinars. Most of these courses were relatively cheap and also offered members a discounted cost.

**Some of them are listed below so new members are also aware of our efforts to get affordable CPD courses.**

Business Ethics Webinar by PPS. (Free)

MOBILE ELEVATED WORKING PLATFORMS

COUNTERBALANCE FORKLIFTS

TOWER CRANES

Electrical Cables – Electrical Fields & Stress Control

Earth Electrodes – Types & Earth Resistance

Direct Stroke Lightning Protection Design for Substations

GCC Electrical: Power Factor Correction, O/H Lines etc

GCC Mechanical: Fluid Mechanics  
Substation Design – Layout, Insulation & Switchgears  
Electrical Protection – IDMT Grading  
GCC Electrical: Supply Systems, Transformers  
GCC Mechanical: Strength of Materials  
Electrical Protection – Current Transformers  
Lightning Protection for Overhead Lines  
Cable Ratings: Transient  
Grey Stuff Matters (Cement)

Please convince your colleagues who do not have working E Mail address to get one soon and supply us with the updated contact details.

### **In General.**

On the bright side, South Africans let out a collective sigh of relief recently as President Ramaphosa announced a shift down to level 2 lockdown as of midnight Monday the 17<sup>th</sup> August 2020.

*“It has been said that civilisation is twenty-four hours and two meals away from barbarism.”*

**Neil Gaiman**

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### **No 4. Update on the Nomination of the 6th Term ECSA Council.**

ECSA CEO reported as follows at the recent South African Forum for Engineering (SAFE) meeting; End of March, the 5th term ECSA Council presented to the Minister their recommendations for the 6th term Council. In terms of the act the Minister was supposed to finalise and appoint Council within 60 days, and this has not taken place.

About three weeks ago, the Minister sent a letter to ECSA indicating that she was in approval of the recommendations sent by the outgoing Council. However the Minister has submitted the recommendation to Cabinet to get their concurrence. They are scheduled to sit in a fortnight or so.

This item will be endorsed in the next cabinet seating. If all goes accordingly the appointment letters will reach ECSA towards the end of August.

The Act allows for the current Council to continue until the 6th term Council is brought in.

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### **No 5. The National Diploma is to be phased out Soon!**

The National Diploma will be phased out by end of 2021 and there has been a backlog of students who are still unable to get the required Work Integrated Learning (WIL) to graduate. The COVID-19 has further exacerbated any hopes for these students of finding the WIL.

The proposal was for those students to do a project type WIL similar to the one done by 4<sup>th</sup> year university students. This proposal needs the approval of Engineering Council of South Africa (ECSA) and the department of higher education before this new system can be put in place.

A letter has been written to ECSA in this regard and is waiting on their response.

ECSA verbal response given at the recent SAFE meeting was that this proposal will have to go through the ECSA Education Committee and that a response cannot be given at this meeting.

ECSA was urged to treat this with utmost urgency and take it the issue forward with the Department of Higher Education as they work closer with the department than VAs do. This was also holding up the future of the young learners.

COET's understanding is that the S level ND will be replaced by a new equivalent qualification called the National Diploma. This will be supplemented by a National Certificate and Advanced Certificate which will give the students the academic knowledge of the new ND without the experiential learning component.

As far as is known only Mangosuthu technical university (MUT) and Walter Sisulu university (WSU) are going to offer the new ND.

The other Universities of Technology are only opting the new Bachelor of Engineering in Technology Degree (BEng Tech) which replaces the current B Tech degree.

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#### **No 6. Request to do experimental learning.**

My name is Captain Wisani from the Department of Defence Force and I am currently in a process of registering with ECSA as a Candidate Technician , I have National N Diploma in Electrical Engineering. I kindly request to do experimental learning at your institution.

Kind regards

Cynthia Wisani 0731421828

Ed; If anyone can assist please contact the candidate directly. Pass on if appropriate.

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#### **No 7. Update on ECSA CPD.**

ECSA sent out letters to the Voluntary Associations inviting applications to be appointed as CPD licenced bodies.

It seems that ECSA has received round 15 applications including our own associations' application.

ECSA has verbally indicated that these are to be presented to the Education Committee of ECSA. Response to the VA's is only expected after that meeting. It is unclear when results can be expected.

A VA may be a Licenced Body and / or a CPD Provider, however the latter rules and process is not clear and we await ECSA to clarify this as phase 2 of the process.

It appears that all CPD courses on the ECSA list remain valid for the time being. Courses submitted after the cut-off date are not yet approved and credits may not be given.

*Ed. So much like the Army the rule is hurry up and wait!*

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#### **No 8. NSTF Awards Gala Event**

The 2020 NSTF-South32 Awards gala event was presented online for the first time ever. It took place on Thursday, 30 July 2020. The winners' outstanding contributions to science, engineering and technology (SET) and innovation were awarded and celebrated live by about 500 viewers. The theme for the evening was Plant Health in recognition of the United Nations' declaration of 2020 as the '[International Year of Plant Health](#)'. Find the full list of winners [here](#).

For more details see [www.nstf.org.za](http://www.nstf.org.za)

***If links do not work please cut and paste or type into your Web browser.***

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## **No 9. Services Offered By Members.**

Please visit our Website

<http://engineersdirectory.co.za/>

For all details.

If links don't work please type in the text into your internet browser.

**Wherever possible support your fellow members!**

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## **No 10. Interview of an IPET Member.**

We interview IPET Member Grant Gilbert (*Pr Tech Eng*) a mechanical engineer based in Cape Town who specializes in Air Conditioning and Ventilations systems and is assisting building owners / managers with improving their buildings HVAC systems to combat the COVID-19 pandemic. A busy man he agreed to answer 5 questions.

**Hi Grant, tell us how you go about this?**

Hi Viv, well we are basically trying to ensure that the buildings are as well ventilated as possible to help dilute any possible COVID-19 viral load, and to reduce the rebreathed air fraction. It is a documented scientific fact that proper ventilation reduces the possibility of staff getting infected.

To achieve this, I generally start by inspecting the buildings HVAC drawings first and familiarizing myself with the general layout and design specifications. (Unfortunately, this is not always possible as a surprisingly large amount of buildings in Cape Town do not have any or all their HVAC systems design drawings.)

We then do the site inspection by walking and inspecting the building – comparing it to the drawings (if available). I walk into every room, office, toilet, basically every single area. I confirm the number of windows, staff, A/c and ventilation systems layout and I visualize the movement of air in each area paying specific attention to any possible ‘dead spots. I simultaneously do a photo survey, in order to build a portfolio of evidence to prove I have been in every single area and for possible reference uses later. I also inspect every single AC unit, fresh air and toilet or canteen extraction fans etc, paying particular attention to any air filters and the overall running condition of all equipment in general.

Back at the office, I then compare my observations and notes with the building drawings again to double check that I have not missed anything. I also try check the clients service agreement to see if all the units I located are included in their contract, the frequency of services and technical level of the service providers staff. Once completed, I write up a comprehensive ‘**COVID-19 HVAC Biohazard report**’ listing any problems found with proposed solutions going forward.

**Viv - What are the most common problems you are finding?**

1. No HVAC layout drawings available and the building owners and management have no idea who designed or installed the original systems. This is deeply concerning because very often when I dig deeper into this and do some of my own research, I often find a large amount of building HVAC systems have not been designed by an ‘*Pr Eng*’ or ‘*Pr Tech Eng*’ as legally required, but rather by the HVAC contractor themselves and the ‘design’ was never passed on to the Municipal authorities for approval. These illegal HVAC system ‘designs’ often have serious design flaws and do not meet the minimum legal requirements.
2. Many older buildings that have 20 or 30 installed Split A/c units with no fresh air mechanical ventilation supplies. These buildings are completely reliant on opening windows for fresh air which is concerning because in my experience I have found that once a split A/c unit has been installed the windows will probably never or hardly ever be opened again. Which brings me to my next point.
3. Windows in some buildings are screwed or pop riveted closed and in one case all windows had been welded shut! This was apparently done to prevent office staff from opening the windows and allowing air-conditioned air to escape, so as to lower the buildings electrical A/c running costs.

4. Outside / fresh air fans that are part of an HVAC economy cycle AHU type system and clearly failed years ago, but no-one picked it up or if they did, never bothered to repair it. If the AHU system runs and cold or hot air is coming out the diffuser, everyone in the workplace just assumes the overall system is fine.
5. Office areas designed for limited staff in the 1990's now holding double the amount of people that the area was originally designed for, but with no upgrade to the buildings fresh air systems.
6. Open plan office areas that have been altered to single enclosed offices by means of dry walling with no alterations done to the original A/c layout. One finds a diffuser in the far corner of this office and the RA grill in another office far down the line. What amuses me the most is when the building contractors get 'clever' and build a drywall right in the middle of a diffuser, RA grill and even a split A/c unit! It is now impossible to open the split unit and remove the air filter.
7. Large amounts of 'building add-ons' like pre-fab offices or shipping containers etc, which aren't meant for long term use as many do not even have any openable windows. The door is literally the only openable object. Cape Town industrial buildings and factories in particular seem to have a habit of building prefab or dry walled offices in their workshops as their admin staff expand and will go as far as adding an A/c unit for the staff but sadly not fresh air or openable windows. (Even if they do have openable windows, the 'office' is still inside the factory so the staff keep the windows closed to avoid factory noise, smells and smoke, etc.)
8. Air filters in A/c units and fresh air supplies that are either completely missing, solidly blocked or incredibly old and worn out. Also, air filters that have been incorrectly sized and not fitting well with obvious bypass.
9. Another serious concern I am noting is that a large amount of buildings appear to have seriously downscaled their service agreements due to financial constraints and in some cases completely abandoned any form of maintenance - just running on breakdown repairs only. I have also found quite a few buildings that have strange service agreements, like the split A/c units are serviced every 3 months but the outside fresh air supply system and air filters are only cleaned every 6 months? Or in one specific case - I found that the fresh air filters were on contract to be cleaned only once a year!
10. Unqualified or not properly compliant on-site maintenance staff. It appears common in Cape Town for some A/c contractors to tender on providing a qualified artisan with the appropriate SAQCC GAS license as a full time on-site HVAC maintenance technician but then send out a semi-skilled man with lower level SAQCC GAS license instead. The end client does not understand that the man supplied is only ½ as qualified as the technician originally quoted for and you end up with a semi-skilled operator looking after chillers and complicated HVAC systems.

***Viv - How do older buildings from the 1970's, 80s and 90s compare to the later 2010+ buildings?***

Surprisingly, we have found many of the older buildings are actually better suited to deal with the COVID-19 pandemic. The buildings were more spacious, often have large powerful ducted systems to begin with and most importantly, many of them have openable windows which most newer buildings do not seem to have any more. Many of the newer buildings A/c and ventilation systems were designed and built according to **SANS 10400–XA 'Energy Usage in Buildings'**. These regulations were added to the National Building Regulations for energy usage in buildings to improve the energy efficiency of our country's buildings and reduce the load on ESKOM to help limit load-shedding.

The problem is: Those regulations called for virtually air-tight buildings (often with no openable windows) so that A/c units do not over work and conserve energy BUT air-tight buildings are not good when fighting the Corona Virus. Although most new buildings have several Fresh air systems, kitchen extraction systems and toilet extraction systems – these were all designed to be big enough to comply with SANS 10400 Part O, but also as small as possible to reduce electrical load so as to comply with SANS 10400 Part XA. There is now little spare capacity, so the SANS 10400 Part XA appears to have back fired on us a bit. The newer systems are so tightly regulated that there is hardly any extra outside fresh air available. The ventilation systems are already running at maximum supply capacity but are in fact performing at the minimum fresh air requirement, so there is virtually nothing extra left to rely on.

As an example, we recently had a case where the main fresh air fan for a brand-new building we designed failed – just a rare fan factory fault covered under warranty. (Even the odd brand-new TOYOTA gives problems sometimes). The problem was that this large fresh air fan supplied the entire building and with the

COVID-19 shipping import / export slow down the fan supplier did not receive his next expected stock delivery, so they were not able to immediately replace the fan and the building had no openable windows! We basically had to advise the building staff to evacuate the building until a new fresh air fan could be sourced as it was too dangerous to work in the building during the height of the COVID-19 pandemic. Without fresh air the A/c systems in the building would just be recycling the same air and any possible virus again and again. The client was not happy!

Eventually we improvised a solution whereby the client would allow half their staff to work from home and we jury rigged up a temporary rental fan in place of the faulty fan using sheet metal offcut pieces and duct tape until a new fan arrived and could be installed.

I learnt an important lesson here – never put all your eggs in one basket. In future I will rather design a minimum 2 x fan system for any building so that if one fan fails at least ½ the building can still be used. Until the COVID-19 pandemic hit – a faulty fresh air fan was not such a serious issue, but now it could lead to deadly life-threatening consequences.

### ***What do you see in the future for HVAC designs and COVID-19?***

A lot has been written in the news about HEPA filters but personally I do not believe it is a financially viable option for office and factory buildings to go this route. HEPA filters are awfully expensive, and the fans and equipment required are much bigger which come at a larger cost too.

To my mind the best bet so far seems to be UV technology, which is well proven and reliable. The company I work for, ERASE, has for many years been deeply involved in the maritime HVAC industry doing work on oil rigs, ships etc and we have often come across UV lighting systems in marine HVAC systems. This is because you cannot have a sick sailor or rig roughneck come back to the vessel / oil rig and infect the entire crew - because who is then going to run and drive the rig / vessel if most of the specialized crew are sick in their bunks? Maritime companies have therefore long known about the benefits of using UV lighting systems in air ducts to prevent viruses been spread amongst the crew. This knowledge and experience can therefore be easily brought over for use in modern office building HVAC systems too.

### ***Viv – Last question – What brand of A/c unit do you as an HVAC specialist engineer have in your own home?***

LOL! - Sorry I can't answer that because ERASE are agents for over 40 different brands and I don't want anyone to think that one brand is better than all the rest.

However, I will say that apart from the split A/c unit in my bedroom, I also have my own design, custom-built positive pressure fresh air system with TRIPLE air filtration. (3 stages of air filters). I run this 24/7 so my entire bedroom is constantly filled with the very cleanest and freshest air available and I always wake up feeling super refreshed and recharged!

Unfortunately many South Africans go to sleep at night with all the doors and windows closed because of crime concerns but this results in them breathing the same air over and over again, which increases the Co2 levels and that in turns results in them waking up feeling all groggy and tired. My system overcomes that – best value for money I ever spent!

***Viv - thank you for your time Grant.***

You're welcome Viv.

### ***No 11. Snippets.***

*The following mini articles, notices and news follow the trend of interesting scientific, engineering developments and general interest items that we come across. Read and enjoy!*

*Please feel free to contribute by sending your items to share with our members!*

*Ed*

## # CSIR Reports on ESKOM.

The Council for Scientific and Industrial Research (CSIR) has reported that load-shedding during 2020 had already surpassed that of 2019 and 2019 had previously been the country's worst-ever year for load-shedding.

It warned that without urgent action, the risk of load-shedding would worsen and persist for at least two more years, but possibly to 2025.

The CSIR released its latest load-shedding analysis as Eskom issued a fresh alert on August 12, warning that the system was severely constrained, owing to a combination of delays in returning five units to service and the breakdown of two additional units, at a time when unplanned maintenance stood at 11 000 MW and planned maintenance at 5 500 MW.

The CSIR analysis, compiled by Dr **Jarrad Wright** and **Joanne Calitz**, shows that load-shedding for the year to date stood at 1 383 GWh, or 661 hours of outages. This was already higher than the 1 352 GWh shed in 2019, which was regarded as the country's most intensive year of load-shedding, with Eskom having taken the unprecedented step of declaring Stage 6, or 6 000 MW of cuts, on December 9.

Dr Wright said that, during the country's Level 5 lockdown, peak demand slumped to 27.4 GW against an expectation of 31.2 GW, while minimum demand fell precipitously to only 13.8 GW.

Demand had since returned, along with the threat of load-shedding, with the rotational cuts instituted in July pushing it to levels higher than those experienced last year.

Overall, the Eskom expects that residual electricity demand will reduce by 12 terawatt-hours (TWh) in 2020, to about 209 TWh, relative to forecasted residual demand of 221 TWh for the year.

Source CSIR.

*Ed. So be prepared for more load shedding and less manufacturing.*

## # OECD Survey.

The Organisation for Economic Cooperation and Development's (OECD's) latest survey of South Africa shows that higher levels of infrastructure investment are required to increase the country's growth potential. Released in July, the report warns that the South African economy could contract by as much as 8.2% in 2020 and that both domestic risks, such as ongoing electricity load-shedding, and external risks, such as new Covid-19 outbreaks that affect South Africa and its trading partners, would affect the country's economic prospects.

It argues that a sound growth strategy – which includes reforming product markets and State-owned enterprises, boosting investment, developing public infrastructure and pursuing trade policies that augment the benefits from participation in global value chains – could deliver “quick wins” in terms of job creation and increased potential growth.

On public infrastructure, the OECD argues that the decline in investment in this area in recent years had contributed to lower growth in a context of declining private investment.

It warns that the quality of infrastructure is deteriorating, that maintenance and project preparation is inadequate, while the speed, quality and efficiency of public investment projects also needs to improve.

Government, in notes, plans to spend R526-billion on infrastructure investment over the next three years and establish an infrastructure fund to support blended-finance projects and attract private financing.

The report has been published ahead of the finalisation of government's economic recovery and reconstruction plan, in which increased infrastructure investment is expected to be a core feature.

President **Cyril Ramaphosa** has repeatedly described infrastructure as the “flywheel of economic growth” and had welcomed the emerging consensus of the social partners that the country's recovery should be led by infrastructure development and maintenance.

Separately, Public Works and Infrastructure Minister **Patricia De Lille** published a Gazette notice that included 50 Strategic Integrated Projects and 12 Special Projects that would be given priority attention by government.

The list included 15 transport projects valued at R47-billion, 11 water and sanitation projects valued at R106-billion, 18 human settlements developments valued at R138-billion, two agricultural and agro processing projects valued at R7-billion, three energy projects valued at R58-billion and a digital infrastructure initiative valued at R4-billion.

*Source OECD.*

**“The only true wisdom is in knowing you know nothing.”  
Socrates.**

**# Statistics South Africa (Stats SA) has reported that mining production decreased by 28.2% year-on-year in June.**

The largest negative contributors were platinum-group metals (PGMs), with output down 42.5% and contributing -10.6 percentage points; and iron-ore, with output down 54.2% and contributing -6.7 percentage points. Coal also dragged down mining production in June, with output down 10.9% and contributing -2.7 percentage points, while the production of ‘other’ non-metallic minerals was down 38.2% and contributing -2.4 percentage points.

Seasonally adjusted mining production decreased by 1.4% in June compared with May. This followed month-on-month changes of 46.6% in May and -37.8% in April.

Moreover, Stats SA says seasonally adjusted mining production decreased by 30.2% in the second quarter of the year compared with the first quarter.

The speed of any further recovery in the industry will depend on how quickly the country moves through the various stages of lockdown towards some semblance of normal operations.

Asset manager Investec quotes data from a presentation made by Minerals Council of South Africa - in support of Business for South Africa's initiative to revitalise the South African economy - which finds that if eight essential actions are undertaken by government, it could lead to a marked \$3.6-billion increase in 2024 primary mineral sales, as well as 26 000 more direct jobs by 2024.

These actions include regulatory reform, modernisation of the industry, reliable energy supply, rail and port capacity infrastructure development, exploration strategy and community investments.

*Source Stats SA.*

**# Warming Greenland ice sheet passes point of no return  
Even if the climate cools, study finds, glaciers will continue to shrink:**

Nearly 40 years of satellite data from Greenland shows that glaciers on the island have shrunk so much that even if global warming were to stop today, the ice sheet would continue shrinking.

The finding, published in August, in the journal *Nature Communications Earth and Environment*, means that Greenland's glaciers have passed a tipping point of sorts, where the snowfall that replenishes the ice sheet each year cannot keep up with the ice that is flowing into the ocean from glaciers.

Michalea King, lead author of the study and a researcher at The Ohio State University's Byrd Polar and Climate Research Center have found is that the ice that's discharging into the ocean is far surpassing the snow that's accumulating on the surface of the ice sheet.

King and other researchers analysed monthly satellite data from more than 200 large glaciers draining into the



ocean around Greenland. Their observations show how much ice breaks off into icebergs or melts from the glaciers into the ocean. They also show the amount of snowfall each year -- the way these glaciers get replenished.

The researchers found that, throughout the 1980s and 90s, snow gained through accumulation and ice melted or calved from glaciers were mostly in balance, keeping the ice sheet intact. Through those decades, the researchers found, the ice sheets generally lost about 450 gigatons (about 450 billion tons) of ice each year from flowing outlet glaciers, which was replaced with snowfall.

The researchers' analysis found that the amount of ice being lost each year, started increasing steadily around 2000, so that the glaciers were losing about 500 gigatons each year. Snowfall did not increase at the same time, and over the last decade, the rate of ice loss from glaciers has stayed about the same -- meaning the ice sheet has been losing ice more rapidly than it's being replenished.

That means that even if humans were somehow miraculously able to stop climate change in its tracks, ice lost from glaciers draining ice to the ocean would likely still exceed ice gained from snow accumulation, and the ice sheet would continue to shrink for some time.

Shrinking glaciers in Greenland are a problem for the entire planet. The ice that melts or breaks off from Greenland's ice sheets ends up in the Atlantic Ocean -- and, eventually, all of the world's oceans. Ice from Greenland is a leading contributor to sea level rise -- last year, enough ice melted or broke off from the Greenland ice sheet to cause the oceans to rise by 2.2 millimeters in just two months.

This work was supported by grants from NASA. Other Ohio State researchers who worked on this study are Salvatore Candela, Myoung Noh and Adelaide Negrete.

*Source*

**Journal Reference:**

Michalea D. King, Ian M. Howat, Salvatore G. Candela, Myoung J. Noh, Seongsu Jeong, Brice P. Y. Noël, Michiel R. van den Broeke, Bert Wouters, Adelaide Negrete. **Dynamic ice loss from the Greenland Ice Sheet driven by sustained glacier retreat.** *Communications Earth & Environment*, 2020; 1 (1) DOI: [10.1038/s43247-020-0001-2](https://doi.org/10.1038/s43247-020-0001-2)

# **Hottest temperature ever recorded.**

Some days back It emerged that the hottest air temperature ever recorded. Death Valley, California, a scorching 54.4°C was measured.

*"Any society that will give up a little liberty to gain a little security will deserve neither and lose both."*

**Benjamin Franklin**

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**That's all Folks!**

**Part 12.**

**Unsubscribe Option.**

As a member of IPET you should want to receive the E News. If however u do not want to receive the IPET E News as an E Mail then you have the option to unsubscribe.

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**Part 13.**

**O. & O. E.**

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