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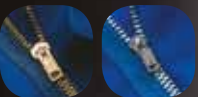
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BOVA garments are easily customisable and can be altered according to your needs, with company logos, embroidery and reflective requirements.

A QUESTION WE SHOULDN'T HAVE TO ASK



GAVIN MYERS

WHICH WOULD YOU RATHER BE WITHOUT - ELECTRICITY OR WATER?

You may notice a theme running through this issue: power, or, more specifically, the lack of it...

With the rolling blackouts (or load shedding, as it's more commonly known) plaguing the country during the early months of the year, it seems this was the only topic of conversation around the watercooler each day as South Africans were up in arms over sudden power cuts, uncoordinated load shedding schedules and the future of the nation.

As if it weren't enough to lose productivity, due to interrupted workdays, and having to spend additional money on entertainment, due to scuppered weekend plans, headlines soon changed from Eskom's inability

to provide a constant supply of energy, to an otherwise unforeseen consequence – a very serious consequence...

From South Africa's energy security focus soon changed to its water security. Yes, the country's ability to manage its water and wastewater treatment was put at risk due to the power cuts!

Power outages impact reservoir pumps, resulting in water cuts along with power outages especially in urban areas with high demand. Power outages also impact the bulk-water and wastewater treatment facilities, increasing the risk of waterborne health and environmental hazards.

Experts in the field of water provision are justifiably outspoken.

"The process of supplying water is critical and forms part of basic human rights. Without a stable power supply, this becomes almost impossible. If load shedding is increased, the whole system will be drastically impacted.

"These systems aren't designed for intermittent use and the impact of fluctuating power will have a drastic effect on the maintenance cost of these systems," comments Gavin Bruggen, MD of Wilo Pumps.

The question of maintenance is another threat to the



on top of a range of issues, such as an apparent lack of will to address key problems, and no punitive measures for those who discharge effluent into rivers."

What's to be done, then? Alternative power sources, such as generators or solar systems, might seem obvious, but they are not viable for major plants in urban areas that have significant power requirements. The experts suggest that investment in water provision is the first solution.

"The necessary technologies, assets and even the funding are available, but we need to see a collective appetite to turn them into solutions. Assets aren't being fully utilised, and there are plants running at a fraction of their capacity. By retrofitting existing plants with new technologies, we could make a great deal of progress," Taljaard suggests.

"Some of the country's conventional treatment plants are 30 or 40 years old, but far better technologies now exist to address new influences in water, reduce chlorination, take up less space and reduce odours," adds Smit.

Tumelo Gopane, MD of East Rand Water Care Company, says: "Lack of coordination is a key challenge. For example, those heading up wastewater systems across the eight major metros do not have a formal collaboration forum. Imagine the progress that could be made through coordinated planning and budgeting in a formal forum."

Yes, imagine... Henk Smit, founder of Vovani Products, which provides technologically advanced products for water treatment plants, sums it up best: "They say with power outages one can always make a plan to generate light and charge devices, but one can't simply improvise when there is no water. For water security, there has to be a long-term strategy and the right equipment in place." **SM**

country's water systems and facilities, which are already under pressure from ageing infrastructure, together with a lack of funding and skills resources.

Wayne Taljaard, MD of WEC Projects, which provides engineering solutions in the water and wastewater treatment industry, comments: "The crisis we face isn't a result of load shedding alone. Load shedding is just another compounding factor

Join SHEQ MANAGEMENT at IFAT Africa between July 9 and 11, where solutions to overcome South Africa's water and wastewater challenges will be showcased and debated. It will be co-located with food & drink technology (fdt) Africa and analytica Lab Africa, assembling a broad value chain to share knowledge and find solutions to water and environmental challenges. Visitors can register at www.ifat-africa.com.

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BEWARE, O₂ CAN KILL...

Morné van Zyl, managing consultant, Marsh Africa, recently pointed out to us that Brian Darlington's article on page 12 of Issue 5 of 2018 (Take a lesson or two from scuba divers), contained a specific error. In the article, reference is made to "checking that oxygen bottles are open". Indeed, a human will not survive a dive when using pure oxygen and our generic use of the term "oxygen bottle" was in no way intended to make readers think this could be the case.



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PIONEERS IN HAND PROTECTION

FOR OVER 60 YEARS, THE JAPANESE-FOUNDED SHOWA HAS BEEN A WORLD LEADER IN THE PROFESSIONAL PROTECTIVE GLOVES MARKET. ITS RESEARCH AND DEVELOPMENT CENTRES IN JAPAN, MALAYSIA AND THE UNITED STATES ARE AMONG THE MOST ADVANCED IN THE WORLD. INVENTOR OF THE FIRST SEAMLESS PVC AND DISPOSABLE NITRILE GLOVES, SHOWA WILL BE EXHIBITING THIS YEAR AT A-OSH EXPO IN HALL 3, STAND D19

The word Showa means "finding a balance between different elements" in Japanese. This principle is at the heart of the company's approach and requires full control of all stages.

Showa exercises 100-percent control over the design and manufacturing process of its protective gloves. Every day, Showa continues to innovate at each stage to provide every wearer with a product that matches expectations. This autonomy, which is impervious to competitor methods and concepts, is based on constantly outperforming what has been done before to ensure that everyone enjoys comfort and optimum safety.

ALWAYS A GLOVE AHEAD

Hand injuries make up around 25 percent of workplace injuries and are the leading cause of lost time, accidents and permanent disabilities. Despite the increasing statistics, many workers still feel that it is more convenient to work without gloves, do not have access to the right gloves, or lack the knowledge of glove properties to enable them to choose the correct gloves.

With this in mind, Showa's team of more than 100 researchers, designers and engineers devote all their energy to developing new solutions to improve resistance to harsh temperatures, aggressive chemicals and cut risks – all while remaining comfortable enough for extended use and repetitive movement.

Once a glove prototype is developed, it is tested under real conditions on customer sites before being rolled out into the market. This ability to anticipate needs and provide solutions that eventually become benchmarks is based on unrivalled technological expertise and a fully autonomous way of working.

SURPASSING EXCELLENCE, QUALITY BEYOND COMPARE

Maintaining full control over its industrial ecosystem gives Showa a decisive advantage over other companies. Beyond its design and production process, Showa also designs and manufactures its knitting machines and yarns, therefore yielding the ability to create bespoke, innovative products.

The secret ingredient to all this is the Showa-made hand formers, designed to achieve the perfect ergonomics of a glove that naturally fits the anatomy of a hand.

Showa performs every possible resistance test in its labs to ensure that each glove is fit for work. No glove enters the market without complying with the necessary regulations in each country, be it the European PPE Regulation 2016/425 or the ANSI/ISEA Safety Standards.

Furthermore, all production units are ISO 9001 certified and each applies a philosophy of excellence: quality control is constant at all stages and on each glove.

INVESTING IN TOMORROW

Showa dedicates a large proportion of its research to biodegradable products and to developing fibres that have no or little impact on the environment.

In 2012, Showa research and development reached a major breakthrough with Eco Best Technology (EBT), the innovation that gave rise to the world's first biodegradable nitrile glove.

Additional efforts to reuse and conserve resources have enabled Showa to obtain the ISO 14001 certification – a global standard in environmental management that helps to continually improve operations.



WHAT MAKES A GOOD GLOVE?

Essentially, a good glove should fit perfectly to the shape of the hand, and offer the best grip and dexterity possible. When handling slippery objects, the glove must have a specific grip coating to ensure a strong hold.

On the outside and inside, and depending on the ambient temperature, a glove must be breathable and

Looking at every type of application in each industry, Showa focuses on how to coordinate all of these key factors to provide the wearer with a glove that it is confident will ensure safety and comfort every time it is worn.

From mining, construction, agriculture or automotive, to petrochemicals or fishing, there is a Showa glove for every pursuit.

By adopting a mentality of "always innovating, never imitating", Showa has pioneered each product category in some way: the world's first single use nitrile glove; the first breathable water-resistant glove (Temres); the first biodegradable nitrile glove; and the only manufacturer to offer a chemical-resistance directory (ChemRest.com) with a free chemical testing programme for customers, to name a few.

The combination of new materials and fibres, such as high-performance steels and synthetic fibres, plus the ergonomic fit and feel of its exclusive hand formers, allows Showa glove innovations to preserve the wearer's health, improve their productivity and reduce the company's costs.

EXCEPTIONAL SERVICE FOR EXCEPTIONAL GLOVES

Beyond the intrinsic quality of its products, Showa's performance would be incomplete without first-class support and services. It is one of the leading glove manufacturers in the world, but it provides its customers with local services.

In order to ensure continued availability locally, all products and systems can be obtained from a network of partner distributors established all over the world. To ensure that all wearers have the necessary information to choose the right glove for them, Showa has developed guides and tools, like ChemRest.com and the Cut Protection Guide. SM

keep the wearer's hands warm if necessary. A good glove therefore results from a compromise between the risks to be prevented, the constraints of the job, the level of protection required and the comfort of the employees, while respecting the standards in force.

PROTECTION FOR EVERY PURSUIT

Innovation makes sense when it actually contributes to something useful. Based on extensive market research and listening to customer's needs, Showa has developed a glove suited to each industry and requirement.

Grouped into seven product categories (general purpose, cut protection, impact protection, chemical protection, insulated, antistatic and single use), all glove models take into account three key factors:

- Working environment (inside, outdoor, use in wet or dry environments);
- Various actions to perform (precision work and heavy part handling);
- Types of protection required (thermal, chemical, electrical and mechanical).

Discover the quality and performance that every Showa glove provides by visiting Showa in Hall 3, at stand D19, during the 2019 A-OSH Expo in Johannesburg, from May 14 to 16.

SCAN HERE TO LEARN MORE



A-OSH EXPO 2019 TO SHOWCASE BEST OF WORKING AT HEIGHTS SECTOR

The local construction industry is known to be a volatile sector – in 2018 two stalwarts of the construction world were placed in business rescue (Basil Read in June and Esor Construction in August) and, more recently, Group 5 earlier in 2019.

According to research company Fitch Solutions, the South African construction industry is expected to emerge from its recent recession during 2019, and even though growth is forecast at only 2.4 percent for this year, it does mean that the sector offers some hope in an economy that is struggling to find its feet overall.

Against this background, it is interesting to look at a few notable construction projects in South Africa.

Cape Town International Airport is set for a R7-billion overhaul with a new runway, as well as new international and domestic departure lounges, due to be completed by 2023.

Construction has begun on Kerzner Estate, an exclusive luxury development on the Atlantic Seaboard owned by South African entrepreneur Sol Kernzer and his family.

In Durban, construction began last year on the multi-million-rand Durban Point Development project, which will extend the famous beachfront promenade and ultimately create around 6 750 permanent jobs.

"We see some hopeful signs coming out of this sector overall," says Sven Smit, portfolio director at Specialised Exhibitions Montgomery, which is once again running A-OSH Expo – Africa's largest occupational health and safety (OHS) Expo – at Gallagher Convention Centre from May 14 to 16.

"Against this background, A-OSH Expo, which turns nine

in 2019, will showcase a number of prominent exhibitors that are involved in construction safety, from personal and protective equipment to all the equipment necessary for working at height in a safe manner."

Smit notes that working at height is an occupational hazard of the construction industry, whether an employee is driving a crane high above a site or working on scaffolding.

"Sadly, it is far too easy to find examples in the news of tragic accidents that have taken place while people were working at height, yet, so often, just by following correct procedures and using the right equipment, such incidents can be avoided. For this reason, we always have great interest from our visitors in the working at heights exhibits and safety features that are offered at A-OSH Expo."

Smit adds that, in addition to various key exhibitors in this area, A-OSH Expo will this year again host the PASMA Working at Height Theatre, which offers an opportunity to gain continued professional development (CPD) points with the South African Institute of Occupational Safety and Health (Saiosh).

"The PASMA Working at Heights Theatre provides a dedicated height safety hub for delegates to access expert speakers and live demonstrations, and is a strong annual drawcard. It's organised by PASMA, the international not-for-profit authority for the mobile access tower industry, which is also joined by various organisations to cover a range of topics.

"For those involved in the construction industry, whether as part of a small business or as a member of a large organisation, A-OSH Expo has something to offer from a working at height safety perspective," he concludes.

A-OSH Expo 2019 is co-located this year with two other shows: Securex South Africa 2019 – Africa's biggest security trade show, now in its 26th year – and, for the first time, the Facilities Management Expo 2019.

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TRADE EXPO TO MAXIMISE BUSINESS GROWTH IN BOTSWANA

Electra Mining Botswana is the Botswana home of Africa's leading mining, industrial and power-generation expo. Powered by Electra Mining Africa, this niche trade show has been specially designed to maximise business growth in Botswana.

Taking place at the Gaborone Fairgrounds from September 10 to 12, this will be an all-encompassing event showcasing the latest technologies, machinery, products and solutions related to mining, industrial and power generation.

The recently launched A-OSH Expo Botswana is taking place alongside this event. Botswana has a growing need for occupational health and safety (OHS) awareness and its importance. There is currently no OHS Act in Botswana and employers are not compelled to comply with OHS standards.

"A-OSH Expo Botswana is an ideal vehicle to promote OHS in Botswana," says event director Charlene Hefer.

"We are excited to have partnered with local Botswana Company, TRM Group, with its focus on promoting a safer, healthier and environmentally friendly workplace, and increasing health and safety awareness in the country as a whole," she continues.

In addition to new products and live demonstrations, a full programme of free-to-attend seminars will also take place alongside the event. Hefer says: "The seminars will provide an excellent learning opportunity for exhibitors and visitors at the show. Speakers will address a variety of topics

pertinent to both industries, and will add value with their knowledge and expertise."

"With its local and international participants and leading brands on show, Electra Mining Botswana and A-OSH Expo Botswana will be of benefit to exhibitors who want to expand their footprint in Botswana and also to visitors who want to source the latest products and services, and to learn about new technologies and solutions," concludes Hefer.



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The food industry also employs CO₂ for food-processing applications, such as chilling and freezing, modified atmosphere packaging and temperature control for products being stored and transported.

However, as CO₂ is obtained as a bi-product, it must undergo effective purification for suitability as a direct food additive in beverages.

Gas suppliers must, therefore, measure and control the levels of trace impurities in the purified CO₂, and, similarly, CO₂ users have a responsibility to take appropriate steps to ensure that suppliers have met this responsibility.

Nosa Testing's methodologies and facilities for CO₂ testing are now accredited, by South African National Accreditation System (Sanas) under ISO 17025.

Nosa Testing is equipped to provide chemical testing for all CO₂ methods, including:



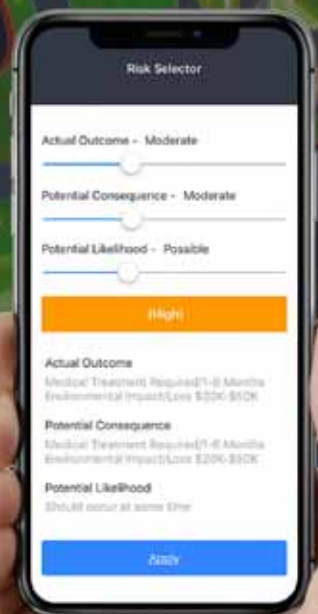
- CO₂ – 204 Determination of total sulphurs in CO₂.
- CO₂ – 205 Determination of permanent gases in CO₂.
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POLYFLOR LAUNCHES QUICKLAY ADHESIVE-FREE SAFETY FLOORING

The Polysafe QuickLay PUR Collection is the latest offering to be launched in South Africa by Polyflor SA, specialists in vinyl flooring and wall-protection solutions.

Polysafe QuickLay is loose-lay safety flooring designed for adhesive-free installation in busy commercial environments that are in need of a quick turnaround and where sustainable slip resistance is a priority.

It can also be used in residential and educational areas and is ideal for circulation and heavy-traffic areas where there are risks of water spillage and other contaminants; such as corridors, dining areas and cafes, classrooms, hospital wards, clinics, laundry and sluice rooms, nursing homes, washrooms, WCs, bar serveries, food preparation areas, kitchens and canteens.

According to Tandy Coleman, CEO of Polyflor SA, Polysafe QuickLay can be used as a temporary or permanent floor covering and achieves the same performance and durability as other Polysafe flooring collections, but with the added benefit of being adhesive-free.

When installing QuickLay, subfloor preparation is considerably reduced as it can be laid directly over a

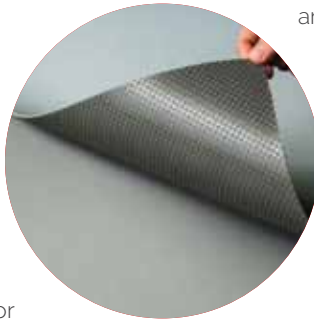
variety of existing floor coverings, including new concrete substrates of up to 97 percent RH. The special Studded Emboss works as a barrier and allows moisture to escape from the subfloor.

The QuickLay system works by simply applying the specially designed QuickLay tape provided around the perimeter of the room, underneath seams and doorways, to secure the flooring in place.

After thermal welding, the floor can be used for traffic immediately. The adhesive-free installation also promotes excellent indoor air quality and low volatile organic compound (VOC) emissions, which provides a healthy environment that can be used straight away.

The Polysafe QuickLay features the exclusive Polysafe PUR reinforcement for optimum appearance retention and superior cleaning benefits. The collection is available in a tonal colour bank of 12 contemporary shades with a matt surface finish.

It conforms to EN 13845 and 50 000 cycles abrasion test and sustainable wet slip resistance is assured throughout the guaranteed life of the product.



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- Short Course in Spirometry Refresher
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- Short course in Ethics and Professionalism in Nursing
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- Short Course in the Medical Evaluation for Professional Drivers
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ARE WE OUR OWN WORST ENEMY?



IT IS A COMMON CLICHÉ: SAFETY IS A LINE RESPONSIBILITY, RIGHT... HOWEVER, IS THIS REALLY UNDERSTOOD?

Nobody is more equipped with the authority and influence to change the safety culture of employees and contractors than line management. Obviously, health, safety and environment (HSE) professionals have an important role to play in developing the desired safety culture, however, their role is to coach and guide the process.

They can, however, be their own worst enemies at times, as they tend to take over the responsibility from line management in managing the safety and health of the teams.

They do this for a number of reasons: a desire to get things done, to build relationships with line management, not wanting to challenge the structures or process of the company, and because some still believe that managing safety is the responsibility of HSE professionals.

On the other hand, line management is often just too happy to let the HSE professionals take on the responsibility for the safety and health of their teams, as this frees them up to focus on other issues, including productivity and machine efficiencies.

Safety and health issues of the production teams is not an add-on to the responsibilities of line management, and it's not uncommon for line managers to call on the HSE professionals when they feel safety and health needs to be a focus.

Line managers should, however, integrate their roles related to safety and health into their daily activities of running of the business.

Companies should do away with the slogan "safety first" and rather move towards "safe production first" or "safe engineering first", as this promotes the integration of safety and health issues.

WHAT TO DO TO TRANSFER THE ROLES AND RESPONSIBILITIES

HSE professionals need to understand what items are their responsibility as well as their role in coaching and guiding

line managers to take responsibility for the safety and health of their respective teams.

Making line managers responsible does not diminish the role of the HSE professional. However, when line managers understand their areas of responsibility and they are given the tools and the know-how, this strengthens the safety culture, and, in turn, makes the job of the HSE professional easier.

To ensure maximum impact, HSE professionals cannot just transfer the responsibility and believe they have done their job. They need to ensure that there is a common understanding of who is responsible for what, and to ensure clear understanding of exactly what is required. To do this, companies should:

- conduct a workshop with senior line management and HSE professionals to agree on who should be responsible for what elements of health and safety;
- avoid using only off-the-shelf/generic answers and develop the roles and responsibilities that are aligned to the company structure and maturity level;
- obtain full buy-in and support from senior management;
- develop a clear guide on who is responsible for what elements, including what support should be provided by the HSE professionals; and
- train the various leaders and the HSE professionals in their respective roles and responsibilities.

KEY ROLES AND RESPONSIBILITIES

There is no defined list when developing and agreeing on the key roles and responsibilities. However, these could be categorised into three elements:

- administrative issues;
- operational issues; and
- auditing, follow-up and improvement-related issues.

Sites could even split the roles and responsibilities into three categories of management to ensure a clearer understanding of who needs to do what. This would

include line managers, first line managers (supervisors and foremen), and HSE professionals.

The tables below provide some examples that can be listed as part of the three elements of roles and responsibilities. The complete guide needs to be tailored to the company or site-specific requirements, structures or maturity level and should be broken down into sub-elements.

The guide could also provide details of what documents should be referenced to provide additional information for each of the elements where applicable.


WHAT SHOULD COMPANIES DO?

In order to shift the mindset from the HSE department being responsible for safety to making it a line responsibility, it is

important to have clear guidelines on who is responsible for what elements of the overall safety and health programmes.

This change will not happen overnight and will take time to entrench in the way business is run, however it will be more difficult to change the safety culture and move to the interdependent phase of safety culture if the roles and responsibilities are not clearly defined, understood and supported by all levels of management in the company.

The tables provide only a few of examples of what could be included in the roles and responsibilities guideline.

Full support and backing for this approach is needed by senior management to ensure success. This is also not a fix-all option, but it is more than likely to contribute to developing the desired safety culture and, in turn, assist in achieving continuous improvement in the safety performance. 

ADMINISTRATIVE ISSUES

Task	Line responsibility	Manager	Supervisor	Health safety and environment (HSE) support
Safety and health improvement plans	<ul style="list-style-type: none"> Develop and communicate safety and health vision. Develop the plan with clear objectives, responsibilities and targets. Ensure plan is communicated to all stakeholders. 	x x x		Ensure plan is aligned with the company HSE strategic plan. Provide support in developing the strategies related to HSE. Ensure top risks are considered when developing the HSE plan.
Reference	Company safety and health strategic plan			
Development of safety operating procedures (SOPs)	<ul style="list-style-type: none"> Appoint teams to conduct the assessments. Ensure SOPs are developed for routine tasks and revised on a regular basis. Approve SOPs (developed and reviewed). Ensure SOPs are revised as part of the overall risk-management approach. 	x x x	x x x	Provide guidance as required. Provide support in the principles of good quality SOPs. Conduct quality checks on selected tasks to ensure standards are being met.

OPERATIONAL ISSUES

Task	Line responsibility	Manager	Supervisor	HSE Support
Conducting of risk assessments	<ul style="list-style-type: none"> Ensure that company risk management methodology is understood and implemented. Ensure task risk assessments are conducted for all tasks. Participate in selected risk assessments. Conduct audits of risk assessments as part of risk-based focused audits. Conduct quality checks on risk assessments conducted by the teams. Ensure risk revision project is defined and adhered to. Ensure resources are available to conduct/revise the risk assessments. 	x x x x	x x x	Provide specialist support on principles of conducting risk assessments. Participate in selected risk assessments where and when possible. Conduct quality checks on risk assessments conducted by the teams. Check that the tasks with potential fatal and life-altering risks have been assessed. Maintain a risk register for the site.
Reference	Company risk-assessment methodology			
Developing the desired safety culture	<ul style="list-style-type: none"> Understand the methodologies and critical controls. Communicate the safety message continuously. Take responsibility for injuries in area of responsibility. Develop own safety habits. 	x x x x	x x x x	Coach leaders in their role in developing the safety culture. Arrange training to provide support to line in developing a safety culture. Develop own safety habits.



AUDITING, FOLLOW UP AND IMPROVEMENT

Task	Line Responsibility	Manager	Supervisor	HSE Support
Management of risk-focused audits	<ul style="list-style-type: none"> Ensure all managers participate in the audit programme. Ensure audits are focused on the critical controls such as permits, risk assessments, lock-out-tag-out. Conduct feedback session and report findings. 	x x x		Provide risk-focused audit training. Participate in risk-focused audits with the management team. Take notes during feedback sessions and provide details to relevant managers. Follow up if agreed actions have been closed.
Reference	Guidance note safety indicators			
Follow up on action items, close out and effectiveness (audit reports, meetings, risk assessments, incident investigations)	<ul style="list-style-type: none"> Conduct follow-up audits to ensure action items have been closed out. Conduct follow-up audits and discussions with stakeholders to ensure actions taken are effective and have not added additional risks. 	x x	x x	Conduct follow-up audits to ensure action items have been closed out. Conduct follow-up audits and discussions with stakeholders to ensure actions taken are effective and have not added additional risks. Report action items open and closed by due date on the reporting system.
Reference	Guidance note safety indicators			



Brian Darlington is the group head of safety and health for the Mondi Group, based in Vienna, Austria. He has filled the role since 2012 and is responsible for safety and health in more than 30 countries. Brian started working at Iscor before joining Mondi in 1987, working in Gauteng. In 2000 he transferred to the Kraft Division in Richards Bay. During 2005, Brian transferred to Europe, taking up the position of business unit SHE manager, responsible for SHE in paper mills in Austria, Hungary, Israel, Slovakia, Poland, South Africa and Russia, as well as forests operations in South Africa and Russia.

RTMS DRIVES ROAD SAFETY

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It's Simply Doing The Right Thing

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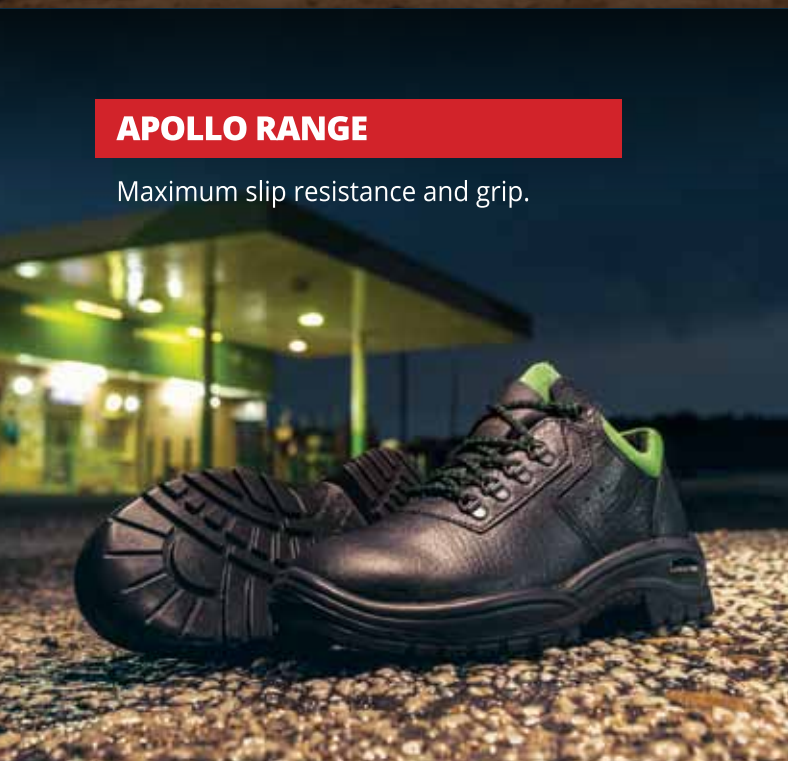
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FEAR: THE ULTIMATE MOTIVATOR?

ANDREW SHARMAN AND DARREN SUTTON EXPLORE THE PARADOX OF SHOCKING PEOPLE INTO ACTION, AND WHAT ONE NEEDS TO UNDERSTAND IN ORDER TO CREATE SUSTAINABLE EXCELLENCE IN SAFETY PERFORMANCE

Niccolo Machiavelli was a philosopher of the Renaissance period and many consider him to be the father of political science even to this day. His maxim "it is better to be feared than to be loved" continues to be repeated at business schools around the world. But is fear the ultimate motivator, or is leadership in the 21st century a different story?

Thankfully, there have been other philosophers who have encouraged people to think differently, but we do need to get under the hood of what Machiavelli meant if we are to properly understand how people behave today.

In the late 1970s and early '80s (yes, the 20th century), teenage violent crime in the United States of America (USA) was a real concern. The reality is that little has changed today. In fact, evidence suggests that teenage violent crime has grown and spread to many other areas of the world where it has almost become the norm in large urban areas.

Newsfeeds in the United Kingdom, Europe and across Africa are filled with tragic bulletins of fatalities and life-changing injuries sustained through knife crime, shootings and even acid attacks in broad daylight – and in very public places.

All this occurs despite the fact that we now have much better surveillance and facial-recognition systems in place to monitor and check people's behaviour. One might think that these factors would deter people from behaving this way.

What can we learn from these failed interventions to prevent crime that will assist us to improve workplace safety?

Let us first examine a famous (or perhaps now rather infamous) campaign that was used as an intervention back in the 1970s in the USA to deter teenagers from choosing violent crime as a lifestyle choice.

A nationwide campaign was initiated to attempt to "Scare Straight" the teenagers who were considered the most likely to follow a life of crime. It was thought that the best way to persuade these youngsters to stay away from crime was to, quite literally, scare them into action by showing them the fearful consequences of being sent to prison for their future actions.

The campaign was called the "Scared Straight Programme" and teenagers (who were not yet criminals) from areas where violent crime was high, were taken in small groups to the most notorious of prisons (Rahway) and penitentiaries throughout New York and New Jersey.

They were exposed to all the trauma and discomfort of life in jail and told powerful stories from hardened criminals about precisely how bad things would be if they didn't change their behaviour and found themselves behind bars.

Notice here that the teenagers weren't taken to see the victims of violent crime; they were taken to see the characters that were the perpetrators of violent crime. There is a key difference here that we will explore later in this article.

THE SCARED STRAIGHT RESULTS

The campaign was initially declared a great success and was celebrated widely without properly gathering rigorous empirical evidence to support such claims. As such, the initiative attracted huge funding and was replicated throughout America and in Europe as it was felt to be the obvious thing to do.

There was a whole TV series based on the programme, and the public were in general agreement that fear as a motivator works very well indeed and should have been used several years earlier.

However, this is only the start of the story. As Mathew Syed (a well-respected British journalist and author) describes in much more graphic detail in his best-selling book *Black Box Thinking* (a cracking read for any safety professional), there were many flaws and confounding factors throughout this research.

Syed discovered that a much more rigorous longitudinal study, conducted by a significantly more credible research fellow of criminal justice (professor James Finckenauer), suggested that the programme actually encouraged some of the teenagers to continue their criminal behaviour, and many went on to serve lengthy custodial sentences for particularly violent and sex-related crimes.

The Scared Straight Programme had played a part in creating some of the most infamous violent criminals of recent times and had only a limited effect on reducing low-level crime.

GENERATING THE REVERSE EFFECT

There are several reasons suggested as to why this programme failed so badly and had the opposite effect on the behaviour of the people it targeted. Among these reasons are that the visit to the jails had a desensitising effect on the teenagers. The more they were exposed to the awful conditions in the jail, the more that it became "their norm" and, in some cases, the conditions didn't seem so scary at all.

There's also a widely held belief that the shock tactics encouraged the teenagers to convince themselves and their peers (sub-consciously at least) that they were tough enough to tolerate such conditions.

Some of them saw it as a challenge and they needed to prove that they weren't really that scared of what they'd seen, and some time in jail with these characters could be an opportunity for them to learn from the people that they most admired!

WHAT CAN WE LEARN FROM THIS FOR SAFETY PERFORMANCE?

Organisations that we work with, especially those in high-risk environments, ask us if it's possible to psychologically profile their workforce to ascertain their likelihood to take risks in safety.

The truth is that it can be done. However, the data gathered from such an exercise would tell employers very

little about people's actual personality or character, and it couldn't possibly predict with any surety how people might behave when under pressure and in hazardous conditions.

If an employer would like to be able to "profile" people according to their risk or rule-breaking propensity when it comes to compliance in safety, in our experience people tend to fit one of three categories (see table).

How would these categories of people react to the Scared Straight Programme and what can we learn for at-risk behaviours in safety? Well, many of us will have seen and heard of similar situations in safety. We wonder why people take unnecessary risks, despite seeing all the films of what can happen to them. The same people have attended lectures and seminars and even heard first-hand evidence from survivors of such tragic accidents.

THE "COMPLIERS"

Thankfully, the compliers wouldn't have even been enrolled in the Scared Straight Programme. There was no need for them to be, as they were the "good kids". In safety, we almost don't need to be too concerned with these people, either. We just need to make sure that they are properly trained, made aware of all the rules and procedures and they'll do their very best to comply.

Occasionally, we might need to stick a few signs up in key places to remind them of what they should do. If these people "fail" in safety, it's most likely to be either a

THE COMPLIERS	IT DEPENDS	THE REBELS
We've all met these people.		
They just don't break <i>any</i> rules. They wouldn't dream of breaking the speed limit while driving.	In reality, most people sit right here.	We know these people, too!
They wouldn't even steal a croissant in a hotel if they were a bit late for breakfast in the morning.	When it comes to compliance and safety, sometimes they will comply and sometimes they won't.	They almost purposely break the rules and procedures just to see what will happen!
Their values and belief systems are set up for them to obey the law and any rules or procedures.	They "swing both ways" and it's interesting to ascertain the many factors that determine which way they will swing in any given situation.	They do this to see if anyone has the moral courage to challenge them and possibly even to experience the consequences of their actions.

knowledge-based mistake or a slip or lapse in concentration. As safety professionals we can work with that.

THE "REBELS"

Now, here's the important bit. The Scared Straight Programme was aimed very strategically at these rebels and, typically, these are precisely the people that we most want to change. However, we need to be very careful in how we try to change their behaviours. Just as in the Scared Straight Programme, there is a risk that by trying to "shock" them into changing, we might create exactly the same kind of reverse effect that was observed in the teenagers.

These rebels aren't shocked too easily, and they can quickly become desensitised to the shocking films and even real-life stories that they see and hear. They will find ways of convincing themselves that these things "won't happen to them", or that, even if they do, they will find ways of coping or finding new positives from any potential bad consequences.

We can all probably recall how these rebels react and behave when they are threatened with punishment for their actions. Even back from our schooldays when the head teacher warned the children NOT to fight or else they would be given detention, banned from school completely, or even threatened with the cane!

None of these things are really seen to be as that bad for the rebels. They will see these threats as challenges that they can overcome, or as opportunities to explore. Of course, it becomes a similar scenario when they get access to the workplace and we try to influence their behaviour through fear, which is definitely NOT the right thing to do for these people.

THE "IT DEPENDS"

Now these people are overwhelmingly in the majority. There aren't too many real rebels out there, nor are there too many habitual compliers.

These people are perhaps the most interesting to study

and to work with in terms of creating behavioural change. They can be much more easily persuaded to do something according to their situation or their environment and even the people that are around them.

This is why we all get so focused on creating the right kind of culture and leadership within our organisations, as it's these factors that will determine what the "It Depends" group will do today. Nudge theory and some of the principles of behavioural science will also impact effectively on the behaviours of this group of people.


WHAT CAN WE LEARN FOR SAFETY?

Exactly the same principles apply here. The effect on behaviour following such experiences, whether it be in the training room or conference hall, is often short term at best, and we run exactly the same risk of desensitising and encouraging the very people that we are trying to influence most to continue to undertake unsafe behaviours.

There are much more effective ways of influencing behaviour and driving performance these days, which are more reliable and sustainable, than trying to shock people into action.

As safety professionals, we need to understand the things that can really start to motivate people in order to intrinsically shift their safety mindset from "have to", to "want to" and then "we're proud to". A real shift from compliance to care for ourselves and others.

So, what about our esteemed and learned friend Machiavelli? Well he had a point, didn't he? To some – often those that we most want or need to influence – fear itself can be like a drug and actually have a reverse effect on their performance or outcomes. It can encourage people to do more of the things that we are trying to shock them into stopping!

For these people, we need a much more innovative and holistic approach if we are to persuade them to join us in our quest for safety excellence. 



Professor **Andrew Sharman** is Chief Executive and Darren Sutton is Senior Partner at RMS, consultants on leadership and cultural excellence to a wide range of blue-chip corporates and non-government organisations globally. Find out more at www.RMSswitzerland.com. RMS's IOSH-approved and certified Behavioural Safety Leadership online learning programme takes a mindful approach to developing safety leadership and provides a low-cost, practical and easy-access route to building a robust safety culture in an organisation. E-mail us at: team@RMSswitzerland.com and mention this article to find out more and receive a free gift and special offer when you begin your online programme.

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Kusasaletu Mine Adopts State-of-the-Art MSA Multigas Detection System

In the setting of a modern mine, simply having a working gas detector has now become insufficient. As traceability and accountability for worker safety come into sharper focus, the need to keep up to date with new and improved technologies has become evident

As they are at the forefront of decision-making, it is the South African mine owners' ethical responsibility to implement practices and technologies that maximise worker safety and operational efficiency.

Practices such as ensuring workers wear the correct equipment when entering the mine, checking that the gas detectors have passed a daily "bump-test" (a function check to ensure they respond correctly to known gas concentrations) and making sure that all instrument data is downloaded and stored at the end of each shift, are crucial to the success of any mining operation.

With all of the above having to be incorporated into daily working practices, there are clearly two major requirements for a modern gas detector: simplicity and efficiency.

These requirements are what led Harmony Gold, owners of Kusasaletu mine – located in the West Rand of Gauteng – to purchase 1 001 MSA ALTAIR® 4X Mining and 30 MSA GALAXY® GX2 calibration test stands from Mine Safety Appliances's (MSA's) long-standing channel partner, PSA Africa.

New MSA technology makes mining safer and speedier

After designing, building and installing a system for Harmony Gold – that smoothly integrated the ALTAIR® 4X Mining and GALAXY® GX2 into the Kusasaletu mine access system, and simultaneously kept things simple for the miners who made daily use of this process – industry safety equipment experts, PSA Africa, noticed a marked improvement in the speed and efficiency of mining procedures, as well as a decrease in bottlenecks on entry and exit to the mine.

The new system's allowance for random instrument assignment during the issuing process was partly responsible for this. In addition, the system's use of radio-frequency identification (RFID) tags, which are embedded in the instruments, helped automate processes such as keeping track of who has each instrument, and carrying out safety-gear checks before permitting underground access.

Furthermore, the MSA/PSA system also checks the integrity

of each gas-detection instrument through the pre-shift testing process, which, in turn, reports back to the access-control system to alert the system if the instrument has passed or failed the pre-shift test. If it fails the pre-shift test, the miner will not be permitted underground entry.



At the end of each shift, miners can now dock their instruments into the GALAXY® GX2 to download the data from their instruments to the MSA Link™ Pro management software. Any alarm conditions will be reported at this point. Should an alarm condition be reported, the system will notify the lamp room staff that they need to download the periodic data. These systems and processes can be integrated into existing mine access systems, simplifying and streamlining mine management.

The successful implementation of this new system has afforded Kusasaletu mine more time to concentrate on other aspects of the organisation, safe in the knowledge that their workers always have the correct operational equipment at hand.

MSA's product expertise together with PSA's integration expertise have helped ensure Kusasaletu miner safety is state of the art, future-proofed and user-friendly.

For more information visit www.psafrica.co.za or email enquiries@psafrica.co.za.



COME ON ANDY

OFTEN IT IS THE EMPLOYEES THAT CAN INFLUENCE RELATIONAL DYNAMICS IN THEIR WORKPLACE - BUT KNOWING HOW TO DO SO SUCCESSFULLY IS KEY

My primary focus is on how to have a direct influence on staff performance and impact their safety culture.

However, the other night I was watching *The Devil Wears Prada*, a cute feel-good movie that revolves around Andrea Sachs (played by Anne Hathaway), an aspiring journalist who is trying to make it in New York. She eventually lands a job at *Runway*, a leading fashion magazine.

Miranda Priestly (played by Meryl Streep), the senior editor in chief, is a tyrant. She is rude, abrasive, dismissive, unsympathetic and condescending. Everything my previous articles argue that a boss should not be.

In one scene, Miranda gets stuck in Miami because of a hurricane. In spite of the fact that all aeroplanes have been grounded, she unforgivingly takes it out on Andrea. Naturally, Andrea is distraught, annoyed and frustrated. In a mood, she vents to Nigel, Miranda's right hand man, about her boss's maliciousness.

Unexpectedly, Nigel does not take her side. Instead, he points out that she is whining and that if things are that bad, then she should quit.

Nigel points out how clear it is that Andrea does not care about the company and has not poured her heart and soul into her work. Boom, she gets it, and with an immediate attitude change steps up to the plate.

With a new work ethic, it does not take long before she becomes a valuable asset to the company and even gains Miranda's respect.

It is all too common to hear subordinators gripe about their bosses. There are many stories about how autocratic and insensitive they tend to be, micromanaging at every opportunity. How they constantly place unreasonable demands from the comfort of their offices, without having any comprehension of the realities on the floor.

The worst is when leaders who, while giving lip service about safety, continually push for production in a way that compromises safety.

Unfortunately, besides complaining, these subordinates, who are often leaders in their own right, do nothing about it. They passively accept the status quo.

Michael Useem advocates a call to action by leadership. He places the burden on leaders to get results, and to embrace a "whatever-it-takes" attitude. This is because what leaders do matters. It's not about trying to score brownie points or about getting a promotion.

It's wise for employees to build trust and gain respect of their boss in order to effectively do their job. They have to help and guide their superiors by influencing them. This includes intentionally and proactively taking charge of the relational dynamics.



For this article, I would like to give attention to how people can be more successful in leading. Here are three practical recommendations:

DO YOUR JOB

Just as subordinates moan about their bosses, the most frequent irritation leaders express is the unwillingness of their subordinates to take ownership of their work. They feel forced to micromanage, and at times jump in and do the work themselves. Leaders love people who stand up and take responsibility.

Employees should not give their boss any reason to be on their back. They should rather get the job done without making a fuss. When the boss makes an executive call, an employee should respond with a willing heart and not grudgingly. They should meet and exceed their manager's expectations just like they would expect their own subordinates to do.

When there are setbacks or challenges, employees should avoid telling their boss about the problem, but rather about how they plan to solve it. Leaders would

prefer to hear about solutions rather than problems.

Employees should always bring something to the table and not wait to be told what to do. Be efficacious, take initiative and find solutions to meet the deadline. Then keep managers in the loop by updating them about progress that has been made.

ADD VALUE TO YOUR LEADER

Employees have skills, experiences, insight and potential that can make them indispensable. They should look for ways to relieve the pressure from their bosses and be their go-to player by going the extra mile and picking up the ball when necessary.

Employees should learn to work with their boss's weaknesses and avoid resisting instructions even when they are unreasonable, they should rather listen attentively and try to appreciate their boss's perspective.

Employees should communicate in a way that shows commitment and support for their boss's vision and expectations. They should always talk in a positive way about their boss and refuse to tolerate any unfair criticism or gossip.


REACH OUT AND BUILD RAPPORT

Remember bosses are also human. Employees do not have to become their boss's best friend, but should find out what is important to them by showing interest, asking questions, listening and being engaged. They should learn to speak their language and express appreciation when they do well. Where appropriate, they should show interest in their personal lives, especially when it comes to their family and hobbies.

As this trusting relationship develops, employees should know when to push back and challenge and when to step back and be agreeable. They should take the appropriate opportunities to share what is important, including ideas for improvements and concerns, especially when it comes to safety.

Some bosses may feel that employees who behave this way are being fake and are sucking-up, or even that they are being weak and compromising.

I believe the adage, "If you want different results to what you are getting, you have to try different approaches," applies here.

Employees should not be doing this to make a new best friend, but because what they do is important, because they are ambassadors and have a responsibility to be a change agent and because they are refusing to allow anyone to get hurt under their care. 



Dr Brett Solomon is the CEO of The Kinetic Leadership Institute and is a recognised leader in combining neuroscience, change management and leadership theory to drive cultural transformation processes. Brett specialises in neuroleadership, especially when it comes to an understanding of what motivates human behaviour and how to influence it. He has been involved in numerous culture change and leadership development initiatives throughout Africa, Australia, Canada, Saudi Arabia and the United States.

FOREWARNED IS NOT ALWAYS FOREARMED

FROM NATURAL ENVIRONMENTAL DISASTERS TO THE IMPACT ON THE ENVIRONMENT BY HUMAN ACTIVITY, THERE ARE COUNTLESS FACTORS TO CONSIDER WHEN IT COMES TO THE MANAGEMENT OF ENVIRONMENTAL RISKS

During January 2019, the World Economic Forum published the 14th edition of the *Global Risks Report 2019*. The report highlighted that extreme weather conditions continue to be a threat.

In March 2019, the world watched Cyclone Idai hit Mozambique, Malawi and Zimbabwe, leaving shocking devastation in its unforgiving path.

When looking at the report, the nature of environmental concerns to which we should be paying attention is clear. Why is it that we are undermining or underestimating these threats?

DOWNPLAYING ENVIRONMENTAL RISK ANALYSIS

Unlike other disciplines, such as occupational health and safety, which have applied risk analysis practices, there is some way to go when it comes to the environmental discipline.

When conducting an environmental risk analysis, the objective is to understand the type of risk, its source and related consequences if it happens. Cyclone Idai might be seen as a single event that has had a devastating impact that will be felt for a long time to come.

Nonetheless, the saying "history repeats itself" cannot be underrated – because environmental risks are always in sight.

Organisations that are implementing ISO 14001:2015 environmental management systems could also use ISO 31000:2018 Risk management – Guidelines, as a yardstick.

Among others, the guidelines indicate that risk analysis should consider factors such as:

- the likelihood of events and consequences;
- the nature and magnitude of consequences;
- complexity and connectivity;

- time-related factors and volatility;
- the effectiveness of existing controls; and
- sensitivity and confidence levels.

ANTICIPATE A SCENARIO IN YOUR ORGANISATION

An organisation's environmental performance might be enhanced by conducting an environmental scenario analysis. It is likely that some scenarios might not be easy to quantify. For example, the health impact due to contamination of a water catchment basin. In 2018 we saw various news headlines pertaining to the sewage spillage in the Vaal Dam. *Times Live* ran the article titled: Troops battle Vaal sewage 'invasion'.


Scenario analysis will be a good input for decision-making when it comes to determining the likelihood and potential consequences of the identified environmental risks, not forgetting risk-treatment strategies.

WHY FOREWARNED SHOULD BE FOREARMED

The foundation of an organisation's environmental-management system rests on compliance to applicable legal and other requirements, pollution prevention and continual improvement.

The manner in which an organisation's operations and activities interact with the environment might pose significant environmental risks, or opportunities.

Organisations should continually evaluate the actual or potential impacts that their activities may have on the environment. When this is done, they should not downplay the environmental risk analysis phase.

On a lighter note, we are spoilt for choice with all the information available, notably from various risk reports. It is also not late to take lessons from Cyclone Idai. 



Hope Mugagga Kiwekete is a managing consultant at the Centre for Enterprise Sustainability. Previously he was a principal consultant risk management at Transnet Freight Rail, a management systems specialist and senior EHS auditor at the South African Bureau of Standards. He has practised as a management systems consultant, trainer and auditor in the fields of risk management, environmental, energy, occupational health and safety and quality management in various industry sectors in eastern and southern Africa and Southeast Asia.



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A PROUD HISTORY

SAIOSH CEO, NEELS NORTJE, TAKES US DOWN MEMORY LANE AND CHRONICLES THE HISTORY OF OCCUPATIONAL HEALTH AND SAFETY IN SOUTH AFRICA

Although there was a "duty to care" in terms of common law as well as some safety regulations prior to 1941, South Africa's first formal occupational safety legislation was the Factories, Machinery and Building Work Act, 1941 (Act no. 22 of 1941). This Act placed duties and responsibilities on users of machinery, occupiers of factories as well as builders.

Some 40 years later, we saw the introduction of the Machinery and Occupational Safety Act, 1983 (Act no. 6 of 1983), followed ten years later by the Occupational Health and Safety (OHS) Act, 1993 (Act no. 85 of 1993). What was notable about this Act was the introduction of occupational health.

There is currently a Draft Occupational Health and Safety Bill that, according to the Department of Labour, will be published shortly for public comment.

Other related occupational health and safety legislation in South Africa are the Mine Health and Safety Act, 1996 (Act no. 29 of 1996), the South African Maritime Safety Authority Act, 1998 (Act no 5 of 1998), the National Railway Safety Regulator Act, 2002 (Act no. 16 of 2002), the Civil Aviation Act, 2009 (Act 13 of 2009) and the National Road Traffic Act and Regulations, 1996 (Act no. 93 of 1996).

It is interesting to note that, except the Occupational Health and Safety Act, 1993 (Act no. 85 of 1993), all these Acts came about post democracy in South Africa

The introduction of the Nosa Rating System came about because the Sugar Millers Association, which held an annual safety competition, was displeased by a directive issued by the Nosa board in 1966. The directive prevented competition marks from being divulged or published (coded individual marks).

The Millers Association management was adamant that they needed to know how well, or otherwise, each mill had fared. Wyn Burgers, the then Natal Nosa regional safety organiser, needed to somehow satisfy them while remaining within the parameters of the new Nosa Directive.

The solution he came up with was the Nosa Rating System, which was approved by then GM of Nosa, Godfrey Terry, in December 1967.

The system was introduced and explained at a Nosa Natal Region group meeting, held in Durban in February 1968, and was received with enthusiasm by both the sugar milling industry as well as the rest of Natal Nosa membership. In order to avoid a clash with the star rating system used by the hotel industry, initially alphabetical grading symbols were used.

The first ever firm in South Africa to be rated was Amcor in Newcastle, Natal. The first "A" rating was obtained by African Oxygen followed by SA Tioxide at Umbogintwini, Natal.

When the rating system was introduced nationally by Nosa in 1970, the Vaal Region appointed an ad hoc committee to consider the implementation in that region. The committee recommended that the system be changed to a star rating system.



OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM

The National Occupational Safety Association (Nosa) was established in 1952, it was funded by the then Workmen's Compensation Commissioner (WCC).

Nosa's purpose was to advise management on accident prevention and loss control. In doing so, Nosa developed a 72 Element Management by Objective (MBO) Five-Star system.



LEFT: Saioosh engages with industry and its 12 500 members through various industry events.

BELOW: Nortje and Saioosh president, Sanjay Munnoo.



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OCCUPATIONAL HEALTH AND SAFETY INSTITUTE

The South African Institute of Occupational Safety and Health (Saioh) had its origins in the Natal Safety Officers group that was established in 1957. Just as the group was considering a constitution and a role as a professional safety institute, it was beaten to it by a Cape Town group called the SA Institute of Industrial Safety Officers (SAIISO).

The Natal group joined SAIISO and established the SAIISO Natal Branch.


In 1970, SAIISO decided to change its name to the Chartered Institute of Industrial Safety Engineering (ChIISE). The Natal group did not go along with this and named itself the Institute of Safety Management (ISM). The acronym later changed to IoSM.

On February 11, 2010, the IoSM KZN Coastal Branch committee stepped away from the IoSM to establish Saioh.

In 2013, Saioh achieved recognition from the South

African Qualifications Authority (SAQA) as the professional body to register occupational health and safety (OHS) practitioners in South Africa in terms of the NQF Act, Act 67 of 2008.

With more than 12 500 members, Saioh is today one of the largest OHS professional bodies in the world and the leading source of information and networking opportunities within the OHS profession in South Africa. Saioh members are from a wide range of industries from the private and public sector.

Saioh is a non-profit organisation representing individuals and organisations that are committed to the enhancement of the OHS discipline. Saioh is the choice for OHS practitioners in Southern Africa, dedicated to the advancement of the OHS profession, through research, promotion, education, upliftment, training, guidance and strong relationships with other OHS organisations. 



Neels Nortje is a founder and the CEO of the South African Institute of Occupational Safety and Health (Saioh). He has been practicing occupational health and safety for more than 30 years. He started his working career with Eskom in 1981, where he qualified as an architectural draughtsman, and in 1986 changed his focus to safety risk management and qualified with Eskom as an occupational health and safety risk management officer. He holds a N6 Mechanical and Electrical Engineering qualification as well as a National Diploma in Safety Management. He was appointed by the minister of labour to serve on the Minister's Advisory Council for Occupational Health and Safety (ACOHHS). He is a Chartered Member of Saioh (CMSaioh) and a Chartered Member of IOSH (CMIOSH).



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MAN BECOMES MACHINE

IN THE QUEST TO REDUCE MUSCULOSKELETAL DISORDERS (MSDS), EXOSKELETONS HAVE BECOME A TECHNOLOGY THAT'S CATCHING MANY AN EYE - AND NOT ONLY BECAUSE THEY LOOK RATHER SPACE-AGED... GAVIN MYERS FINDS OUT MORE

"Work smarter, not harder", goes the old adage. When it comes to manually intensive work – such as bending, lifting or carrying heavy objects – working hard is sometimes unavoidable.

Sure, many hands make light work (unless you're Eskom – sorry, couldn't resist) and we have developed equipment such as lifts, trollies and dollies to make moving heavy objects less strenuous... But, with one slip or a bad grip, injury can still occur.

Exoskeletons (usually powered) have been used for some time in military and medical applications. These include increasing stamina and the capacity to carry heavy objects, as well as to aid in rehabilitation of injury, or to improve quality of life for individuals who have lost limbs. In recent years, applications in the workplace have been found for them.

Some systems seem to have found particular favour: the Chairless Chair, the Laevo exoskeleton and the Exo-Jacket are just some of the many examples. It's important to note upfront that there are two differing types of exoskeletal devices – active, which uses powered motors to actively assist the wearer's movements; and passive, which simply supports the body.

PASSIVE SUPPORT

Having gained popularity with over 100 countries around the world (Swiss company Noonee developed the concept in close cooperation with Audi over two years), the Chairless Chair can be attached around the

individual's ankles, thighs and waist, and allows the wearer to "actively sit".

Interestingly, Noonee claims that the Chairless Chair is not an actively supporting exoskeleton, but an "ergoskeleton". As soon as the wearer bends to a certain angle in a sitting position, the mechanism engages to support him or her. Noonee claims this is less tiring than standing up and removes 65 percent of the pressure from the knees and feet.

"The chair offers great relief wherever there are standing workstations that involve a regular change from standing to sitting," comments Lars Schilling, CEO of Noonee, which describes itself as the world's first supplier of "wearable ergonomic mechatronic devices".

Weighing just 3,3 kg, the device is adaptable to an average range of adult body size and heights (it can support up to 130 kg and fit adults measuring between 1,6 and 1,95 m), is compatible with safety shoes, and takes less than a minute to put on.

The height of the seating position can also be adjusted which means that posture is maintained. The Chairless Chair has been designed to not limit mobility.

Of course, a solution such as the Chairless Chair has limitations in its application – it cannot be used in scenarios such as kneeling or climbing stairs. This is where a device such as the Laevo exoskeleton comes in.

Developed in the Netherlands, this wearable chest and back support is designed to transfer force from the wearer's back to their thighs when leaning forward. In doing so, it supports the wearer's body weight, whether standing,

kneeling or squatting, thus reducing the stress on their back by up to 40 percent.

The device is made to measure and the wearer simply dons it like a jacket. It underwent testing with German company Hermes Einrichtungs Service. The devices were fitted with motion sensors for monitoring and analysis.

"The Laevo exoskeleton is a passive system that uses a spring mechanism to relieve strain on the back muscles. We noticed significant relief (among the wearers) with lifting," explains Nadia Uliana, director of project "Exoskeleton" at Hermes Einrichtungs Service.



ACTIVE SUPPORT

A device like the Exo-Jacket comes into its own when heavy lifting or overhead work is required. The device's electric motors support the wearer's limbs and aid movement.

At Audi, again, the potential for these devices to aid ergonomic work has been explored.

Ralph Hensel, ergonomics expert in industrial engineering at Audi, says: "It is, for instance, no longer possible to rotate the car once it reaches the end of the assembly process, because it has already been filled with liquids. That is where an exoskeleton can, for example, assist in easing the burden on the person's back while the work is being carried out."



While the advantages are obvious, simply adding four motors (and their batteries) to the shoulders and elbows means the wearer has to carry about 10 kg of weight, according to Urs Schneider, who designed the Exo-Jacket.

This type of system seems more suited to lower-body application. Peter Heiligensetzer



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Man-made Mineral Fibre Counting	Pre-packed filters including sizing and counting of man-made mineral fibres in accordance with AIA RTM1 and MDHS 59.	38 hours

SILICA

Analysis	Sampling Media	Method Based On	Size
Crystalline Silica	Polyvinyl Chloride (PVC) Filters	NIOSH 7602 or MDHS 101	37mm, 5µm

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designed the German Bionic Cray X, which uses two motors at hip level to assist in lifting up to 15 kg tirelessly and without damaging the lower back.

"The wearer's forward tilt is detected by sensors, which also measure muscle tension on the arm. When the person picks something up, the support system is activated and he is pulled up via backpack straps," explains Heiligensetzer. This, he says, reduces muscle tension in the lower back by 40 percent.

DIRECT HEALTH BENEFITS

A 40-percent reduction in tension is not to be scoffed at, especially when lost days due to complaints associated with MSDs amount to millions each year, worldwide.

In her dissertation: Repetitive strain injury among South African employees: Prevalence and the relationship with exhaustion and work engagement, Gillian Schultz notes that MSDs are "the most common occupational-related form of ill-health".


Her study of more than 15 000 employees found that, of those who indicated that they experienced MSD symptoms sometimes and frequently, 47 percent indicated experiencing neck, shoulder and back pain and 24 percent

experienced muscle stiffness.

Similarly, in his research titled: Assessment of musculoskeletal disorders and absenteeism at a foundry, SA Society of Occupational Health Nursing Practitioners (SASOHN) member Petro de Beer found that there was a correlation between musculoskeletal complaints and absenteeism, with 55,3 percent of participants reported to be absent from work due to MSD complaints.

Of the foundry workers surveyed, the most common body part affected by pain was the back (71,1 percent), followed by the shoulders (68,4 percent). The most common body part affected by stiffness was the fingers (13,2 percent), followed by the wrists and shoulders (10,5 percent).

"Participants standing for the entire shift were found to have the majority of complaints related to the back and shoulders," he states. "All the participants took rest breaks; however, 78,9 percent suffered from muscle stress and 60,5 percent from muscle fatigue."

While the picture in worksites around the world is similar, there can be no denying that support devices such as exoskeletons can go a long way to reducing the impact on workers' bodies, and their productivity. After all, why work harder when you can work smarter? 

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ALTHOUGH MORE WOMEN ARE ENTERING NON-TRADITIONAL SECTORS, THERE REMAINS VERY LITTLE PERSONAL PROTECTIVE EQUIPMENT (PPE) SPECIALLY DESIGNED FOR WOMEN. MARISKA MORRIS REPORTS

Although women have been in the mining, construction and manufacturing industries for decades, recent years have seen the numbers of women employed in these sectors increase.

There were an estimated 53 179 women working in the South African mining sector in 2017, compared to only 11 400 in 2002. In 2018, there were 40 065 women-owned contracting companies working in the construction sector.

These women will undoubtedly face some challenges, but PPE should not be one of them. Often, women in these sectors have to rely on PPE designed with their male peers in mind. The ill-fitting PPE can result in an accident instead of keeping the employee safe.

Vanessa Ronald, senior brand manager at Sisi Safety Wear – a division of BBF Safety Group that addresses the need for PPE designed for women, notes the harm men's PPE can cause women in her opinion piece titled: The practical problems of working women in working men's clothing.

"When it comes to safety footwear, the hazards may include slipping, falling objects, corrosive chemicals and solvents, sharp protruding metals and shavings and anti-static charges, just to name a few. If we look at a typical woman's foot, the contours differ to that of a man's in that the female foot is generally narrower," Ronald explains.

"A man's shoe may fit a woman's foot from toe to heel, however, it would typically be too wide. As a result, her foot may oscillate within the shoe. Over time, the oscillation puts strain on her ankle, which leads to strain on the knee and subsequent strain on her hip."

While at first the female employee might experience only minor discomfort, the injury can quickly escalate to something more serious. On a day-to-day basis, the


employee will be distracted by the ill-fitting footwear, which can affect her productivity. It can also distract her from paying attention to her surroundings.

"In the case of workwear (such as overalls), the difference between the shape of a man's and a woman's body is more evident. Despite this, there is still a trend of procuring men's or unisex workwear for women. I believe that this is due to the fact that the consequences and daily struggles of ill-fitting workwear for women are not understood," Ronald says.

She adds that women tend to have wider hips and a more pronounced posterior. Trousers designed for men, or both sexes, will not easily fit the shape of a female employee. The pants will be either too small and sit uncomfortably, or too big and expose the woman's body while working.

Some women try to counteract the latter by wearing nylon tights underneath the pants, but this can lead to bacterial infections, as the nylon is not a breathable material, as well as cause the woman to overheat in the double layer of clothing – especially in the summer months or warm working conditions. Other less obvious challenges for women might be the position of buttons.

"For women who have given birth through a caesarean section, there are often complaints that a button places unwanted pressure on the scarring area causing major discomfort," Ronald comments. Jackets pose a similar challenge, as a woman's upper body is very different to that of her male peers.

Ronald notes: "With more and more women entering into areas once deemed the preserve of men, there needs to be a shift in the way that PPE is procured for the workforce, if productivity is to be maximised." 



A KEY FACTOR IN ROAD SAFETY

OLIVER NAIDOO, CERTIFICATION MANAGER AT JC AUDITORS, DISCUSSES THE HEALTH AND WELL-BEING OF LONG-DISTANCE TRUCK DRIVERS

Driving heavy vehicles is probably one of the most stressful jobs in South Africa, especially considering the many challenges on the road. These include high traffic volumes, poor roads in some parts of the country, inadequate or ineffective law enforcement and a general lack of compliance by road users.

Truck drivers are continually under pressure to be on the go and make those deliveries despite the many constraints and challenges they face.

Truck drivers, especially long-distance drivers, have quite unpredictable routines with associated irregular sleeping patterns, while often relying on a truck stop "pie and chips special" to keep them going. Unlike people in most regular jobs, a driver can't exactly have a leg stretch, or step out for a break or quick chat with a colleague to break the monotony.

In addition, truck drivers need to constantly focus and can't hit the "undo" or "delete" key if they make a mistake. In fact, a single mistake by a truck driver can – and often does – have severe consequences on the road.

There are many factors that play a direct role in a truck driver's ability to be safe, compliant and efficient on a public road. One of the crucial factors is driver health and wellness, which is too often not given the attention that it deserves.

Transport companies that incorporate driver health and wellness into their operational processes minimise their

risk and enhance their sustainability. Fleets are likely to see a reduction in accident rates, which limits the likelihood of injuries and fatalities, lowers operating costs, improves morale and protects the company brand.

There is very little formal research in South Africa on the impact of driver health and wellness on heavy-vehicle crashes and incidents. There are, however, some quite interesting and often alarming research results from other countries.

Once such study, led by investigators at the School of Medicine at the University of Utah, in the United States, found that commercial truck drivers with three or more medical conditions have a double to quadruple chance of being in a crash when compared to healthier drivers.

This study, published in the *Journal of Occupational and Environmental Medicine*, also found that two specific indicators of poor health management – high pulse pressure (a blood-pressure measurement) and fatigue – were "highly associated" with truckers' crash risk (as was the use of cellphones while driving.)

This research also highlighted a core underlying matter: truck driver health is not well managed. Nearly 24 percent of the 797 long-haul truckers surveyed were found to have high blood pressure that had not previously been diagnosed and which was not being treated medically.

The researchers also found that (as in previous studies) 62 percent of the drivers were obese – compared to 35

percent of the general adult population, according to the Centre for Disease Control.

The situation in South African is no different and may even be a lot worse. The conservative estimate is that there are 500 000 active heavy-vehicle drivers in South Africa, of which an estimated 100 000 are in the extra-heavy category involved in long-distance trips.

If one considers the percentage of drivers in this population that could have unmanaged or undiagnosed chronic illnesses, then there is, indeed, cause for alarm. In addition to these health concerns (especially management of drivers with chronic illnesses), the risks related to driver wellness (such as inadequate nutrition, sleep, fatigue management and lack of exercise) are severely neglected in our country.

Many believe that the lack of attention to driver health and wellness is a significant contributing factor to the high accident rate in South Africa. So, what can transporters do to mitigate the risks associated with driver health and wellness?

The development of a structured driver health and wellness programme is essential to address the identified risks. Such a programme should make provision for medical screening, management of chronic illnesses

(including training), alcohol and drug screening, driver fatigue management and defined wellness training initiatives.

The Road Transport Management System (RTMS) is a South African national standard (SANS 1395), that, among other requirements, provides guidance on driver health and wellness. This can be referred to when developing a wellness programme.

To ensure that a wellness programme is as effective and successful as possible, it is important to align it with drivers' needs. Find out from drivers what is important to them and what challenges they are struggling with when it comes to health and wellness. Involve them as much as possible when developing a programme, so that they feel a sense of ownership and accountability.

It is also important to create an environment that allows drivers to communicate feedback, questions, concerns and any additional needs they feel are important.

Drivers are the backbone of the transport industry. Supporting their overall well-being will have a direct impact on the reduction of accidents and will improve the safety and sustainability of a road-transport business and, most importantly, create safer roads for all road users in our country. SM



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With the benefits of renewable energy so clear, but not yet fully leveraged, the theme for this year's event was "Africa's Energy Potential". Topics on the agenda included energy access and security concerns, innovative financing solutions, disruptive business models, regional integration (energy pooling), the impact of digitisation, as well as potential business opportunities in the energy space.

Besides renewable energy, discussions included sustainable, cleaner and more affordable energy, as well as energy-efficiency, energy security and the development of applicable skills for the future.

Speakers at the AEI included project developers, financiers, industry experts, energy users, government officials and energy industry manufacturers.

As was the case in previous years, participating exhibitors had the opportunity to promote their businesses to local industry players, international investors, buyers and governments worldwide.

This year the Indaba was held in collaboration with international partners including the World Energy Council (WEC), the New Partnership for Africa's Development (Nepad) Agency and the South African National Energy Association (SANEA).

SETTING THE FRAMEWORK

The Sustainable Development Goals, read in conjunction with the African Union-sponsored Agenda 2063, sets out a framework to end poverty and hunger, preserve the planet and provide affordable and clean energy.

The AEI keynote address was issued by Minister of Energy, Jeff Radebe, who recognised that the economic development of any country cannot be accelerated without a secure supply of electricity.

Radebe began by congratulating Eskom for connecting another 80 000 households to the national grid since 1994. This gives us a figure of 81 percent total electrification, but there are still three-million people without access to electricity in South Africa alone.

On the continent at large, there are at least 600-million people without access to electricity. Radebe stated that the "business as usual" approach applied in the energy sector has not been successful in delivering universal access to electricity.

At the same time, Africa has some of the highest levels of infrared solar radiation (sunlight) in the world, yet is lagging behind the rest of the world when it comes to implementation of solar photovoltaic (PV) technology and other renewables.

With the decreasing cost of renewable energy technology and its capacity to be brought online quickly, in isolation of the grid, it is considered the ideal solution for rural electrification.

"For South Africa, a just transition from coal must take into account the need to minimise job losses through reskilling where possible, including the appropriate support mechanisms for mining towns that are at risk," said Radebe.

MARKET DYNAMICS

A number of trends and clean energy influencers are seen to be stimulating change in the energy sector with the collective drive towards a safer, more environmentally friendly, reliable and sustainable future.

Among these forces are population growth, rising consumption, urbanisation, transportation, energy storage, market dynamics, trade, climate change, CO₂ reduction, technological developments, as well as policies and regulations and a desire to alleviate poverty.

Macro, micro and off-grid solutions are a type of localised power generation that can be set up independent of the national grid. The company Bushveld Energy is currently satisfying a need for off-grid power in areas not catered for through traditional power distribution models.

The company's hybrid PV solar storage facility in Diepsloot, Gauteng, makes use of vanadium flow batteries instead of the more common lead-acid or lithium-ion batteries. Mikhail Nikomarov, CEO of Bushveld Energy, said that, over the past three years, the price of PV solar technology has come down 25 percent year on year.

In terms of the renewable energy value chain, he noted that there will be some sectors of the industry where South Africa can compete and others where the mass economies of China and the United States won't be beaten.

"We must concentrate on the areas where we can compete," said Nikomarov. As a case in point, Bushveld Energy mines the vanadium needed for its flow batteries and assembles locally.

"Without energy storage, PV solar or wind energy can only work when the sun is shining or the wind is blowing. I believe that within the next five years the industry will be able to set up hybrid plants with the capacity to supply base-load energy at less than one rand per megawatt hour."

In the European Union, countries are able to trade energy with each other should one or the other be experiencing a shortage or excess in supply. In Africa, rapid investment in renewable technology in Kenya and Ghana has resulted in excess capacity, while some of their neighbours have almost no power.

However, the current situation is actually a burden on consumers, who are required to pay for the excess electricity because it cannot be easily stored. With an integrated grid, this energy could be sold to the highest bidder.

Projects like the Grand Inga in the Democratic Republic of Congo (for which Eskom has already demonstrated its commitment with the signing of a memorandum of understanding) guarantees Eskom's purchase of power once the 30 000 MW hydro power plant goes online.

ENERGY CHALLENGES AND OPPORTUNITIES

In rural areas, the cost of transmission infrastructure (power lines) outweighs the potential return on investment, making it unviable. Luckily, renewable energy plants can be set up where the energy is required without having to link to the national grid...

Until recently, funding for renewable energy plants was seen as risky and banks were hesitant to lend money to small independent producers. Now, evidence of the profit-making potential is there, and there are a number of support mechanisms available to interested parties.

In sub-Saharan Africa, rapid urbanisation is expected to continue over the next 20 to 50 years. With this will come a need for more energy, as well as millions of new jobs. Again, renewable energy does not require the technical skillset required at traditional utilities and workers can be more easily trained to assemble and maintain renewable energy plants.

In South Africa, uncertainty surrounding the revised Integrated Resource Plan (IRP), and the role that independent power producers (IPPs) may play, resulted in the failure of the industry to invest in renewable energy over the past three years.

A major challenge at Eskom is municipal debt and a culture of non-payment. It is important to note that a large percentage of those not paying are people that can afford electricity, but feel indemnified from paying claiming a "social revolt".

Currently, about 90 percent of South Africa's energy generation comes from coal-fired power stations, and 80 percent of the country's total emissions can be attributed to power generation. The IRP is expected to make provisions to raise the renewable energy mix to four percent.

DISRUPTION

Ever since Albert Einstein arrived on the scene, the model used for the distribution of power has remained the same. "However, with the ability to feed power back into the grid, consumers become producers," said Professor Anton Eberhard, representing the University of Cape Town.

In the future, smart metering will be paired with smart energy-efficient devices. So, if there is a problem with supply, the utility can communicate with fridges and washing machines and command a "shut down" until demand has eased.

Paul Holwaeber, of Vestas (a wind turbine manufacturer) noted the importance of communication technology. "The biggest 'taxi' business in the world (Uber) doesn't own any cars, the biggest online retailer (Amazon) doesn't keep any products and the biggest hotel chain (Airbnb) has no hotels.


"The best way to stay ahead is to look at what technology is doing in other sectors and to make a link," commented Holwaeber.

Cindy Poulton, a general manager at Eskom, said: "There has been a slowing of demand for electricity and Eskom is selling less power now than it did in 2007. This is because people are using power more efficiently.

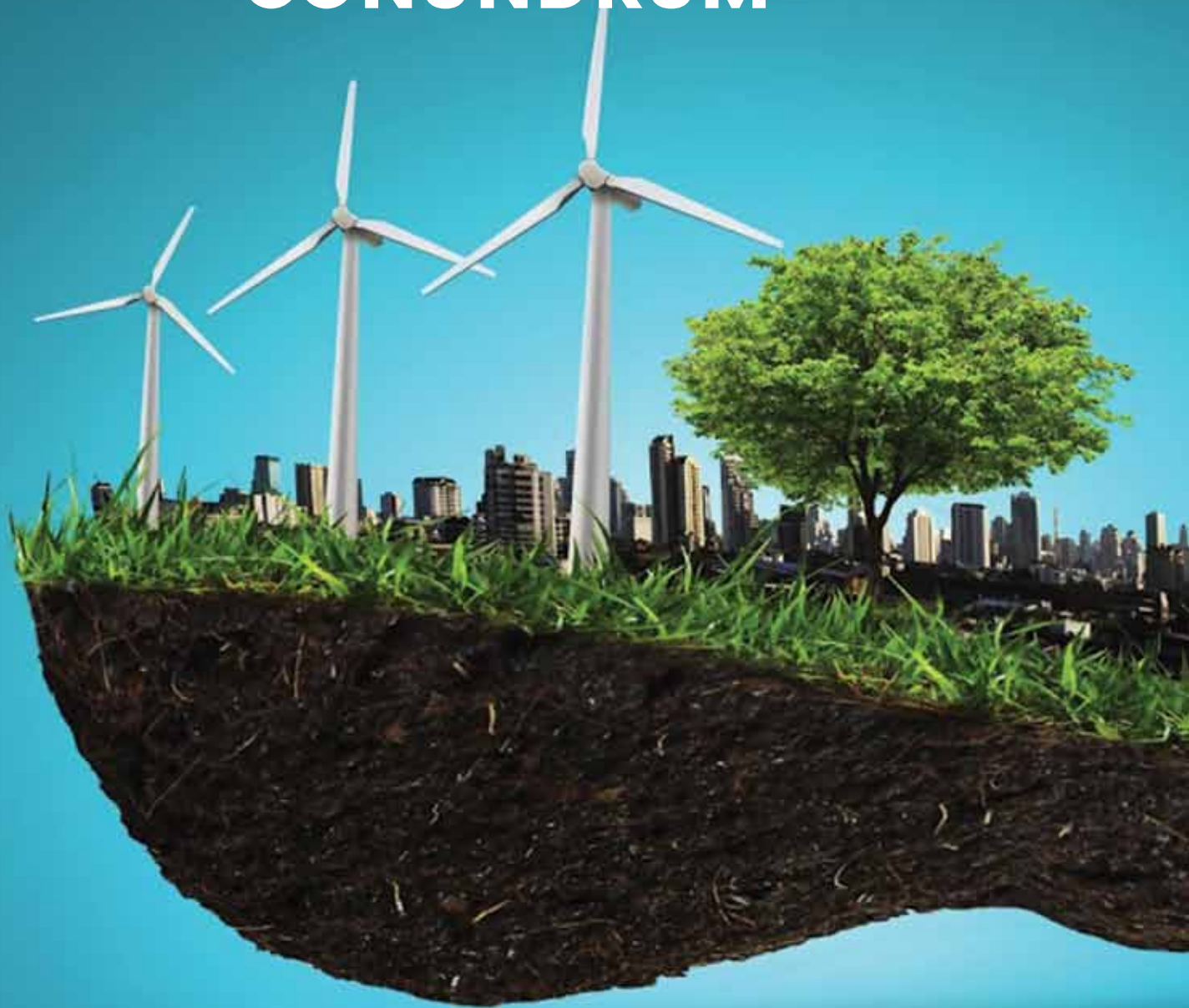
"Eskom will need to compete with companies previously not involved in the energy sector. It will no longer have a monopoly and will need to work closely with IPPs.

"Eskom will also have to develop a range of products to cater for specific markets," said Poulton. "Some renewable energy producers have chosen not to sell power by megawatt, instead they sell a system, or connection, able to power a number of appliances. The most basic system may have space for a cellphone charger, two lights and a fridge, for example."

Eberhard stated that disruption need not be a bad thing. "By putting more power in the hands of consumers, an impetus for reform is created and a conflict of interest is prevented. Here, we may see an unbundling of utilities and other SOEs as suggested by President Cyril Ramaphosa in his State of the Nation Address."

While coal will remain a vital part of our energy mix for some years to come, the 2019 Africa Energy Indaba has suggested a roadmap to ease our transition to renewable energy while improving the lives of citizens. 

ENERGY STORAGE CONUNDRUM



IT WASN'T LONG AGO THAT RENEWABLE ENERGY TECHNOLOGY WAS UNREALISTICALLY EXPENSIVE FOR PEOPLE LIVING IN AFRICA, BUT THINGS ARE CHANGING QUICKLY

Anton Eberhard, from the University of Cape Town, concurs stating: "Energy from independent power producers (IPPs) used to be the most expensive way to increase capacity. However, over the last five years, renewable-energy technology has come down 80 percent in price.

"Now, some of the renewable-energy projects currently on the go in South Africa will produce energy at some of the lowest rates in the world."

Christoph Frei of the World Energy Council Switzerland goes on to explain that, due to the decreasing cost of

renewable energy technology, larger renewable-energy plants have been able to produce energy at two cents (United States dollar) per kWh over the past 18 months.

ADDRESSING THE SHORTFALL

However, critics of renewable energy are quick to point out that the technology can be unreliable. This is complicated by the fact that, once produced, energy cannot be easily stored and must be used immediately or be lost forever.

While it's true that there are limited hours of sunshine and the wind doesn't always blow, there are several

ways of overcoming this shortfall in the technology. The preferred method is to pair renewable-energy systems with energy storage. This enables energy to be stored in times of excess capacity and used later on when the wind slows down, or there is no sun.

In the European Union, where renewable energy has been deployed at a much faster rate, an integrated smart grid has been set up. This means that if there is no wind or sunshine in, say, Germany, utilities there can communicate with, and trade energy with another country in Europe that has excess capacity.

Another way to overcome this inherent "unreliability" is to pair the renewable-energy system with a more traditional power-generation method. For example, power from the grid may be used, or a diesel generator can be incorporated to act as a substitute, when there is a lack of renewable energy available.

BATTERY TECHNOLOGY

While still expensive, the cost of energy storage will eventually come down. A report released by the International Renewable Energy Agency (IRENA) stated that the cost of battery storage for

Unlike prominent solid-state batteries, such as lead-acid and lithium-ion, flow batteries use a liquid electrolyte to store energy. This allows for near unlimited recharging (cycling), easy scaling by just adding more electrolyte and negligible performance deterioration over long periods of time.

Other advantages of vanadium, in particular, lie in its ability to exist in four different oxidation states and its water-solubility, allowing for a simpler battery with fewer inputs and no toxic elements. As a result, flow batteries may one day provide the most cost-effective means to store energy for daily energy storage of a few hours.

SUSTAINABLE ENERGY

According to the United Nations, sustainable energy is defined as: "meeting the needs of the present without compromising the ability of future generations to meet their own needs".

In South Africa, coal-fired power stations are responsible for 90 percent of power generation. Eskom, with its coal-fired power plants, is the biggest emitter of carbon emissions in Africa and contributes toward 80 percent of the carbon emissions in South Africa.

At the same time, it wasn't long ago that South Africa begun building two of the largest coal-fired power stations in the world – Medupi and Kusile. The loans for these plants are still being paid off and, when construction has been completed, the energy coming from them will remain crucial to the economy of South Africa.

In addition, we have a number of open-cycle diesel generators, which are needed in times of peak demand. This situation does, however, place future generations at risk as the effects of climate change become ever more apparent.


This signifies the need for cleaner technologies based on existing infrastructure and there are a number of programmes ongoing.

In South Africa, a company by the name of Clean Coal Technologies (CCT) is in the process of commercialising technology based on the Fisher Tröpsch method.

Today, the joint venture between South African and Chinese experts is at the forefront of providing viable and more environmentally friendly coal-to-liquids technology.

CCT technology can be applied to gas-to-liquid, coal-to-liquid and well as a new combined feed process. Overall, the technology offers utilities the opportunity to reduce CO₂ emissions, reduce capital outlay and lower operating expenses.

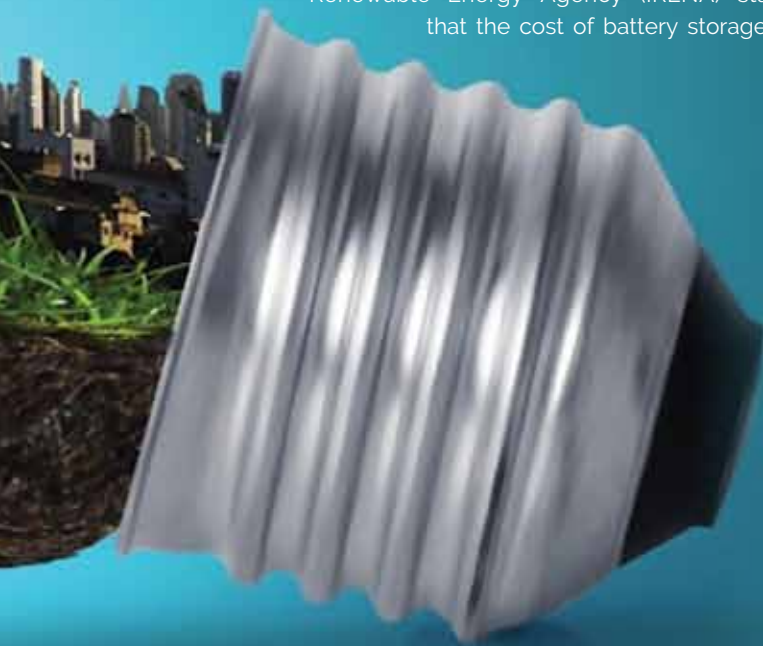
In conclusion, energy-storage technologies are viewed as the final stumbling block standing in the way of the acceptance of renewable-energy generation throughout Africa.

Reliable energy storage will facilitate the management of renewable power intermittency, demand-response services and the distribution of stable, clean and sustainable power into local or regional grids. 

stationary applications could fall by up to 66 percent by 2030. This has made the economics of energy storage more appealing to investors, grid operators, utilities and end-users.

Research into safer, more reliable and cost-effective energy-storage solutions is ongoing. Some of this research is being undertaken locally. For example, a company called Bushveld Energy is in the process of manufacturing and testing the effectiveness of vanadium redox flow batteries (VRFB) locally.

The company explains that the technology combines the performance advantages of flow batteries with the simplicity of using just one natural element – vanadium.



LOAD SHEDDING IS AN OPPORTUNITY!



SOUTH AFRICANS SHOULD STOP COMPLAINING ABOUT LOAD SHEDDING AND SEE IT AS AN OPPORTUNITY. THAT'S ACCORDING TO MARTIN EMRICH, A CONSULTANT FOR GERMAN-BASED LEADERSHIP DEVELOPMENT AGENCY MANAGEMENT CENTRE EUROPE (MCE) ... CHARLEEN CLARKE FINDS OUT HOW ON EARTH HE CAN VIEW LOAD SHEDDING IN A POSITIVE LIGHT (NO PUN INTENDED)

No one knows the exact reason for the Eskom crisis. As Chris Hattingh, a researcher at the Free Market Foundation, so aptly notes: "If you counted every hair on your head, that amount would probably not add up to the amount of times you have read and heard about the causes of the Eskom crisis."

He adds: "Corruption and state capture have been identified as the bedrock reasons why South Africans have been thrown into darkness. A few people have pinpointed the unions as the cause of the problem, because they are enraged about President Ramaphosa's announcement that Eskom will be unbundled. Others have laid the blame on transformation policies, specifically black economic empowerment."

There is, however, one thing that we all seem to agree on: load shedding is here – and it seems set to stay (or maybe even intensify).

This sorry state of affairs has had most South Africans up in arms. People are concerned about the impact on the economy. Some fear that businesses will go under – specifically thanks to load shedding.

Emrich, a senior associate at MCE and a man who has developed leadership development programmes for companies such as Daimler, Hugo Boss, eBay, Adidas and Toshiba, disagrees. "It would be easy to join the ranks of other small to medium-sized companies blaming challenges such as load shedding for a loss in production and revenue. However, this is the easy way out," he insists.

Like most South Africans, Emrich does have concerns about the impact of load shedding. "Of course it is an economic threat to all South African organisations – especially small to medium-sized companies, which are more substantially affected than bigger organisations, and the situation is quite serious.

"Ted Bloom just said in an interview with the German newspaper *Handelsblatt* that load shedding may continue

until the year 2025. I can see how this is highly frustrating for many entrepreneurs in South Africa," he comments.

However, he says that load shedding is a challenge that must be viewed holistically. "One problem I see is that the South African electricity market depends strongly on coal. So, in the short term, South Africa needs more coal to produce more energy and, thus, electricity again.

"I firmly believe, however, that this should be just a short-term solution. In the long term, South Africa needs to invest more in alternative power generation. Alternative technologies such as geothermal power, wind power, hydro power and biomass power must be developed and exploited as quickly as possible.

"This is where smaller businesses come into play. Some spin-off companies from big South African universities are in the process of developing promising research projects in some of these areas of alternative energy resources," he reveals.

Above all, Emrich calls for a complete change in thinking. "Companies cannot operate in the same manner that they have in the past, because the circumstances and playing field have changed," he points out.

That's all very well, but what should companies do to deal with the challenge of load shedding? "Get the whole team involved and come up with implementable solutions. A great mechanism to make use of is what we call 'business model innovation'. This helps to establish a culture of change in a company.

"By combining theory and practical application, individuals are guided towards coming up with solutions for their business environment. Techniques like generative reasoning, causal modelling, assertive enquiry, design thinking and integrated thinking are used to obtain optimum results.

"Business model innovation involves reinventing two or more components of a business to deliver value in a new way. Developing new ways of looking at old problems to

create new choices can be one of the most fundamentally powerful techniques any business executive can learn.

"Thanks to load shedding, companies and organisations increasingly find themselves in uncharted waters and it is vital that they become comfortable with this complexity, so that their daily operation is less about crisis management and more about efficient and effective leadership," he stresses.

Practically speaking, Emrich says small to medium-sized companies can adapt their trading/operating hours in order to deal with load shedding. "With the ample information around load shedding schedules, small to medium-sized companies can focus on increasing output during those periods when the power is on, even if it means opening the doors earlier or closing later.

"They need to adapt or die! The opportunities for small to medium-sized companies to capitalise on the needs created by the power outage crisis are growing by the day. If they are creative, inventive and willing to think out the box, they will be successful," he insists.

In fact, Emrich contends that opportunities for start-up companies, especially for small to medium-sized businesses, have never been so good in South Africa.

"The Eskom crisis has created masses of opportunities. Once again, it's about looking beyond the problem and finding a solution. What do consumers need as a result of the load shedding problem? To name a few; batteries, solar power, generators and there are many more. Develop a solution for a current problem and you will never have to look

back," he urges.


Emrich believes that South African companies are living in times that can best be described with the acronym, VUCA. "Today's economy is characterised by volatility, uncertainty, complexity and ambiguity (VUCA). In this VUCA-economy, a big size isn't always a competitive advantage. It's not an economy of scale. It's not about mass production. It's not about who's bigger.

"Rather, it's about who's quicker and more agile. It's about who has the better guerrilla marketing idea, and who is able to grasp what the clients really want within the blink of an eye. This is the chance for small to medium-sized companies. They need to be small, creative and quick!" he stresses.

Going forward, Emrich says: "I believe anything that takes a company out of its comfort zone can be considered a blessing in disguise. This forces people to think out the box and come up with creative ideas to overcome challenges," he maintains.

In fact, Emrich goes so far as to say that – despite load shedding – South Africa is ready for the next giant leap forward towards a more prosperous future. He concedes that this may not be a popular point of view.

"I am aware that many economists may challenge my position. I am very optimistic when I think about South Africa's future, and I am not an economist; I am a psychologist. As a psychologist, I am impressed by the creativity, agility and inner strength of the South Africans I have been privileged to meet in this country.

"I believe that, with such great people, everything is possible, and I hope I can contribute to this massive growth that we will see within the next couple of years," he concludes. 

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TURNING A LEAF ON LOAD SHEDDING

LOCATED IN SOSHANGUVE, FILADELFIA SPECIAL NEEDS SECONDARY SCHOOL IS UNIQUE IN A COUPLE OF WAYS...

First, it's the only school in South Africa to cater for three specific disabilities, namely for those who are deaf, blind and physically disabled. Second, through an innovative back-up system, it is immune to the load-shedding scourge that has engulfed the country.

Founded in 1985, Filadelfia Secondary School first opened its doors to 130 pupils. Now, in 2019, it boasts 470 learners and a boarding establishment. It proudly offers a flexible academic curriculum complemented by a comprehensive sport programme that includes wheelchair tennis, baseball, basketball, rugby and chess.

Filadelfia is heavily dependent on reliable energy. As the pupils are disabled, load shedding has a greater impact on this school compared to those catering for able-bodied mainstream learners.

For example, sign language cannot be conducted without adequate lighting, and during power outages – other than the obvious inability to use computers – simple daily operations such as cooking and washing become a challenge. It is also difficult for some students to manoeuvre around the school when there are no lights.

With several energy outages a month, lasting from a few hours to sometimes the entire day, the school was reliant on gas and generators to maintain a constant power supply, creating a safety risk for the learners, as well as the very real hazard of the school burning down. The welfare and safety of the students and staff therefore became a concern to the community.

This is where Nissan South Africa stepped in to assist, supplying the school with a functioning back-up solution during power outages and periods of load shedding.

Nissan's Wonga Mesatywa, director of corporate affairs, stresses that in line with its global sustainability strategy, the company is committed to being part of the solution that improves the lives of people in the areas in which it operates, with a focus on "zero emissions".

The innovative and flexible solution offered by Nissan Energy combines second-life batteries from the Nissan LEAF electric car with solar panels to generate sustainable power. In total, the system generates 54 kW comprising 15

XStorage Home units, with each unit generating 3,6 kW. Each unit has 4,2 kWh storage which equates to a total of 63 kWh of battery capacity.

The system supplies power for lighting the hostels, library, administration, school hall and the computer centre as well as powering the computers.

Says Nissan facilities manager, Francois Greeff: "The system is configured not to run at maximum load, to ensure the lights stay on for at least the duration of typical load shedding – at least 2,5 hours. However, the calculations show it provides close to 3,2 hours of light for the hostels while the library and computer centre have power for 1,5 hours."




ABOVE LEFT: The energy system affords wheelchair-bound (and other disabled) pupils the ability to learn and move around during power outages.



TurnKey Energy provided the 330-W solar panels, as well as labour and materials for installation as part of its social responsibility initiatives.

The XStorage units have an expected life of seven years if they are used every day. "The less load shedding we have, the longer they will last," Greeff adds. The 90 panels have a 25-year life and the XStorage units come with a five-year warranty, after which they will be sent back to Europe for recycling.

The launch of the school system coincided with global Earth Hour, the environmental movement that unifies people to act on climate change through symbolically switching off their lights.

This mission aligns closely to Nissan's focus on creating a "cleaner, safer, fairer" world, and the company is addressing the issue of energy resilience through a variety of pilot projects around the world. 

RAND-AIR'S SCRUPULOUS SAFETY SAVES CUSTOMERS RAND AND MAKES GOOD 'CENTS'

In industry, good safety is characterised by the absence of damage to assets or injury to people. Over the past 46 years, Rand-Air has grown its business on the basis of "exceeding customer expectations" – and going beyond customers' safety expectations is a key part of this ethos.

"At Rand-Air, constant ongoing training ensures that everyone working for the company is their own personal safety officer," explains Rand-Air general manager, Louwrens Erasmus.

All Rand-Air employees are expected to ensure their own safety and that of their colleagues and then, most crucial of all, ensure that every customer enjoys the peace of mind derived from a safe working environment.

Rand-Air recognises that when using diesel generators and compressors, there is the potential for risk, as diesel fuel, electricity and compressed air can pose hazards if not handled correctly.

All of Rand-Air's rental units are as close to being new as is economically feasible and are sourced from Atlas Copco, a world leader in terms of equipment quality. When necessary, this equipment has features added that further enhance customer safety and convenience. For example, distribution boards fitted to Rand-Air's mobile generators increase ease of use and safety for customers.

By hiring out state-of-the-art equipment, Rand-Air ensures that customers have the advantage of using the very latest technology. On building sites, there are many potential hazards that become amplified when construction contractors have to work at night. Rand-Air ensures contractor safety by hiring out mobile lighting rigs featuring the latest technology.


These rigs are fitted with LED lamps that are longer lasting and more reliable and, importantly, are less power-hungry. This means that building contractors are ensured of the very best – and safest – low maintenance night-time lighting that will quite literally "never leave them in the dark".

A key part of Rand-Air's safety drive lies in its technical team. No equipment is allowed to leave Rand-Air's premises before being submitted to a checklist to ensure that it meets all safety and reliability criteria.

Once the equipment is on site, many variables come into play, and issues

might arise. In this event, Rand-Air's staff are available to their customers 24-hours a day. Should a customer require assistance with a Rand-Air equipment item, a phone call will ensure that an appropriate Rand-Air technician is rapidly on-site with an effective solution.

In addition, Rand-Air is able to create risk-assessment files for those customers who request them.


"We are aware that Rand-Air exists because of those customers who hire from us, so ensuring that they do not sustain any form of loss or injury simply makes good 'cents' – and rand – both for our customers and ourselves," Erasmus concludes. 

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ELECTRIC CARS: TO DIE FOR?

ELECTRIC VEHICLES MAY BE GOOD NEWS FOR THE ENVIRONMENT, BUT THEY CAN BE BAD NEWS FOR THE PEOPLE WHO WORK ON THEM. IN FACT, AS CHARLEEN CLARKE EXPLAINS, THEY CAN BE DEADLY

The headlines in British newspaper *The Independent* on January 16, 2016, were scary: "Electric cars: mechanics with no specialist training risk death when tinkering with the vehicles" the newspaper proclaimed.

Now we all know the British press; they just love sensationalism. However, that headline amounted to much, much more than scaremongering. The reality is this: an untrained vehicle technician (as we like to call them here) can quite easily die if he or she works on an electric car.

This is confirmed by Britain's Health and Safety Executive (HSE). "Voltages present in electric and hybrid vehicles are significantly higher (currently up to 650 Volts direct current, or DC) than those used in other vehicles (12/24/48 Volts DC). In dry conditions, accidental contact with parts that are live at voltages above 110 Volts DC can be fatal," it warns.

Tom Denton, author of the book *Electric and Hybrid Vehicles*, concurs. "The voltages on some electric vehicles can be several hundred volts, which is almost three times the mains voltage in our houses. If the human body experiences a current of just fifty thousandths of an ampere (50 mA, which is not very much) for over two seconds, it can be fatal. Some automotive technicians are going to be killed by the high voltages on electric vehicles," he warns.

According to the HSE, electric vehicles introduce numerous hazards into the workplace. These include:

- the presence of high-voltage components and cabling capable of delivering a fatal electric shock;
- the storage of electrical energy with the potential to cause explosion or fire;
- components that may retain a dangerous voltage even when a vehicle is switched off;
- electric motors, or the vehicle itself, that may move unexpectedly due to magnetic forces within the motors;
- manual handling risks associated with battery replacement;
- the potential for the release of explosive gases and harmful liquids if batteries are damaged or incorrectly modified;
- the possibility of people being unaware of vehicles moving as they are silent in operation when electrically driven; and
- the potential for the electrical systems on the vehicle to affect medical devices such as pacemakers.

"Accordingly, additional skills and training will be necessary to allow people to work safely with electric vehicles," it warns.

Jaguar Land Rover (South Africa), which recently launched the full-electric I-Pace in this country, is one company that has had to manage the risks associated with the servicing of electric vehicles. According to Brian Hastie, the company's network director for South Africa and sub-Saharan Africa, a massive amount of preparation was required before launch.

"We started preparing just over 18 months prior to launch.

We were fortunate to be able to plug into a global project plan. All the global markets were working in parallel, even though we had slightly different launch dates. So, we were fortunate in that we had the benefit of being able to tap into broader knowledge. This was very helpful with anything and everything ... from special tooling to technician training," he tells SHEQ MANAGEMENT.

Prior to launch, the company embarked on a massive training campaign. "The minimum pass rate for technicians was 87 percent – and some of the technicians, especially the older guys, didn't manage to achieve this. So we have got people back, continued with training and now we are seeing pass rates of over 90 percent," he reveals.

That training can save those technicians' lives. "It's obviously very important that the technicians stick to what they have been taught. Working on an electric car is an extremely process-driven procedure. First, the vehicle must be powered down. Only once this has happened is it safe to work on the car. In doing this, the technician has to follow a number of steps. Measurement along the way is very important," Hastie stresses.

The HSE confirms: "High-voltage systems should be isolated (that is the power disconnected and secured such that it cannot be inadvertently switched back on) and proven dead by testing before any work is undertaken," it advises.

Naturally, our workshop staff also received training in operating procedures for this equipment," Hastie reports.

The risks of working on electric cars are, however, not contained within a workshop. They are also there when a vehicle is involved in an accident; one cannot simply start cutting into an electric vehicle, for instance.

"We have done a lot of preparation in this regard as well," says Hastie. This included the development of a handbook and guidelines for first responders. "Our contracted road response teams have all received proper training in terms of what to do in the event of an accident."

However, it's not only the company's in-house teams that are potentially at risk. "Accordingly, we will continue on this path and engage with all the incident response teams, including those providing emergency services and vehicle recovery. This includes the municipal services. They are quite receptive to us talking to them. It's obviously for their good. Thanks to the advent of hybrids, this field is not all completely new," Hastie points out.

There are some areas of the car that are completely out of bounds to recovery crews. "The engine bay carries high-voltage cabling, for instance. The battery and all the electric equipment sit at the very bottom of the car. There are no cables above seat height so, in theory, the roof could be cut off quite safely," he reveals. Towing can be tricky – because dangerous voltages can be generated by movement of the drive wheels.

Once a vehicle has been recovered from the scene of an accident, technicians will inspect the vehicle before anyone starts working on it. "The vehicles will need to be checked visually for signs of damage to the high-voltage electrical components or cabling. We need to ensure that the battery is in a stable condition. One of our qualified technicians will do this.

"If necessary, the car will be placed into quarantine (because the battery could be volatile, so there could be a fire). If there is any doubt, the vehicle is placed in quarantine for 48 hours. There are quarantine areas close to all the dealerships," Hastie says.

Clearly, the Jaguar Land Rover (South Africa) team has the situation under control – for now. But what happens when there are thousands of electric vehicles on our roads? This isn't a situation that's likely to materialise any time soon. At this stage, the electric vehicle parc in South Africa is tiny. The grand sum of 66 electric vehicles were sold in this country last year – versus 1.1 million in China.

However, assuming that government ever supports the sale of electric vehicles (instead of making sales punitive via taxation), we could see sales rise. We will also see the electric vehicle parc ageing, and we could see vehicles being worked on by staff at non-franchised dealers. Those staff probably won't have the necessary training, and – sadly – that's when someone will almost certainly die. SM

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If the technician deviates from the process, he could lead himself down the path where there is a live charge. This is not a good situation. Does this mean that the technician could electrocute himself and die? "That's a worst-case scenario, but, yes, it is possible," Hastie says.

Obviously, that's something that Jaguar Land Rover (South Africa) doesn't want to see happening – and it has taken every possible precaution in this regard. "We have made substantial investments in specialised equipment. Our investment, per dealership, is R300 000. Just one of the many specialised pieces of equipment is a defibrillator.



GAS DETECTION DONE RITE

JUSTIN GOLDBLATT, GENERAL MANAGER OF RUNRITE ELECTRONICS, GIVES ADVICE ON HOW TO SELECT THE RIGHT GAS-DETECTION SOLUTION

There are many gas-detection products on the market that might appear to be the same, but a closer inspection of specification, functionality and features reveals major differences in what products can do and the potential value they can offer. Similarly, individual applications are also unique in their respective designs, needs and processes undertaken.

KNOW YOUR SITE RISKS

Before beginning to consider gas-detection equipment, a risk assessment needs to be conducted. Any company employing staff has the obligation to conduct risk assessments to identify potential hazards. These can include potential toxic or flammable gas, vapour or oxygen-deficiency risks. If gas hazards are identified, gas detection is applicable as a method of risk reduction.

IDENTIFYING THE PRIME OBJECTIVE

Depending on the processes being undertaken and the gases being detected, remote or off-site alarm notification, together with event data logging/reporting, may also be required for health and safety management records. Other factors impacting on the need for enhanced reporting

functions might be regulatory compliance, or a condition of insurance.

ASK THE RIGHT QUESTIONS

Having identified the primary objective, the suitable equipment is selected by asking a number of key questions. These fall into three broad categories (which will be discussed in their own sections further on):

- The gases to be detected and where they may come from;
- The location and environmental conditions where detection is to take place; and
- The ease of use for operators and routine servicing personnel.

IDENTIFY THE GASES TO BE DETECTED AND WHERE THEY MAY COME FROM

The gases to be detected should be identified by the risk assessment. Experienced gas-detection equipment manufacturers or their approved distributors are often able to help in this process, based on their experience of similar applications.

However, it is important to remember that it is the end-user's responsibility to identify all potential hazards. For example, identify toxic gas to prevent health risks, corrosive

gas to prevent asset damage, or flammable gas to mitigate fire risk.

It is also essential to identify the potential source of a gas release, as this helps determine the number and location of detectors required for a fixed gas-detection system. However, a fixed system alone may not be sufficient and a combination with portable gas monitors may prove more effective.

CONSIDER THE ENVIRONMENTAL CONDITIONS

The performance, accuracy and reliability of any gas-detection equipment will be affected by the environmental conditions to which it is subjected. Temperature, humidity and pressure levels at the location all have a direct bearing on the type of equipment that should be selected. Honeywell manufactures a range of patented sensors that mitigate against such environmental factors.

UNDERSTAND PRODUCT FUNCTIONALITY

The next area of consideration relates to additional product functionality. Aspects like wiring configuration are important, especially when retrofitting into an existing application. If the apparatus is being integrated into a separate safety system, certain communication protocols may also be required such as HART, Lonworks or Modbus. The Honeywell

Analytics range of gas detection devices fulfils the needs of industrial standard communication protocols.

Consideration will also need to be given with regard to the requirement for local displays on transmitter units and local configuration of the unit. Gas displays may also be a useful addition.

MEASURE THE EASE OF USE FOR OPERATORS AND ROUTINE SERVICING PERSONNEL

Routine maintenance is another important consideration. Some gases and vapours can be detected with a number of different sensing technologies; for example, flammable hydrocarbon gases with catalytic beads, or nondispersive infrared (NDIR) sensors.

Honeywell's latest innovations include Bluetooth communication for simple and easy set up and can be maintained remotely using a smartphone app. This allows the end user the freedom to maintain equipment without the need for specialised tools or advanced training. 

FIND OUT MORE ABOUT RUNRITE EQUIPMENT'S
GAS-DETECTION SOLUTIONS





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FRESH AIR AND SUNLIGHT FOR THE OFFICE

ENVIRONMENTAL FACTORS SUCH AS AIR QUALITY AND LIGHTING ARE OFTEN OVERLOOKED WHEN EMPLOYERS ADDRESS THE ERGONOMICS IN AN OFFICE. MARISKA MORRIS INVESTIGATES THEIR IMPORTANCE

When ergonomics is mentioned, employers often think about whether the office chairs are comfortable, or whether a computer screen is within an employee's line of vision. However, ergonomics includes a lot more than just these basic elements. The physical environment in which an employee works can have a huge impact on their productivity.

In mining or construction, the physical environmental factors are easy to isolate and correct. If an employee working in a mine doesn't have adequate lighting, they won't be able to see or tend to their work.

In the construction industry, employees need to be provided with masks if there is a lot of dust or other particles in the atmosphere. It is obvious if this is an issue as the employee will cough.

The office is often considered safe and these environmental factors become harder to pinpoint, or they are overlooked completely. However, things such as the air quality and adequate lighting can greatly impact on the performance of employees in an office.

"A study conducted by the American Society of Interior Design indicated that 68 percent of employees complain about the lighting situation in their offices," says business productivity and efficiency consultant Andrew Jensen.

"The fact that such a substantial number of employees disliked the lighting in their offices enough to complain

about it implies that many employers could be making the same mistakes. The two most common scenarios for poor office lighting are those that are too dim or too harsh."

Dim lighting can result in strain on the eyes, cause headaches, drowsiness and result in a lack of focus. Harsh lighting – especially florescent lighting – can trigger migraines, cause strain on the eyes and distract an employee.

"The best alternative to harsh and dim lighting systems is natural light. In a study, it was shown that windows were the number one determinant of the occupants' level of satisfaction with a building," Jensen recommends.

Natural light assists in providing softer lighting, but can also impact an employee's well-being. "Where natural lighting has been provided, this has shown to result in happier workers, less absenteeism and fewer illnesses. Because better lighting encourages satisfaction among workers, it also results in increased productivity," Jensen explains.

In addition to the quality of light, it is also important to consider where the lights are positioned in the workplace. Employers are advised to keep the lighting on an employee's desk to a minimum and rather focus on placing strategic overhead lighting to minimise the glare on the computer screen or monitor.

How the computer screen is positioned in relation to a

window is also important, as natural light can also cause glare on a computer screen. Avoid flashing lights and chose a neutral colour lighting to reduce strain on the eyes. If it is not possible to have natural lighting in the office, employees should be encouraged to spend 15 minutes a day outside in the natural light.

Dr Pragya Agarwal, in an article for *Forbes*, writes: "Often just 13 to 15 minutes of exposure to natural light is enough to trigger the release of endorphins or 'happy hormones'."

Air quality is just as important as lighting. Chris Stokel-Walker, in an article for the *BBC*, writes: "According to the United States Environmental Protection Agency (EPA), air pollution indoors is often between two and five times greater than outdoors – and can get at its extreme up to 100-times worse than the open air."

Simply opening a window when the office gets stuffy is not enough to ensure adequate air quality in the office. Opening a window could result in pollution and noise from outside entering the office and causing potentially even more distractions.

While air-conditioning does offer numerous advantages, it only really benefits a company if the filters are cleaned on a regular basis. Stokel-Walker comments: "Having air-

conditioning doesn't help unless the system includes proper filters, as the outdoor air – potentially filled with pollutants – is sucked indoors and circulated around the office."

"An estimated 800 000 people die every year due to poor air quality in their workplace," Stokel-Walker adds, noting that air quality can cause sick-building syndrome, headaches and lead to a loss of productivity.

“ Just 13 to 15 minutes of exposure to natural light is enough to trigger the release of endorphins or 'happy hormone'.

The correct approach to ensuring air quality indoors is installing air-filtration systems, such as those supplied by Airlabs, which remove 95 percent of air pollution and harmful gasses. If an air-filtration system is not an option, companies should consider regularly cleaning the filters of the air-conditioning system in the office. SM



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