stainless steel
the journal of the southern africa stainless steel development association
ISSUE 2 2022

BOLDLY GOING WHERE NO METAL HAS GONE BEFORE

DOES NICKEL VOLATILITY HERALD A NEW ERA OF STAINLESS INNOVATION?

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contents

ISSUE 2 2022

HEADLINE SPONSOR

COLUMBUS STAINLESS [Pty] Ltd

features

advertorials

Innov-X-Africa
EMV Africa

adverts

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ISSUE 2 2022

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IT'S TIME FOR A BRAVE NEW OUTLOOK

In our March edition, we reflected on the impact of COVID-19 and the early signs of a 'return to normal'. But just as the road to recovery was in sight, the situation in Europe changed from stability to all-out war, almost overnight. This led to drastic increases in the nickel and fuel prices and once again, the clouds of difficulty for our industry were building. Since then, more bad news has come in the form of uncertainty about the stability and availability of local electricity supply and it would seem that we are just not yet able to turn the final corner towards full recovery.

Against this backdrop, we have been fortunate to receive statistics from our sources that put the current global and local state of the industry into perspective. Whilst the global stainless steel industry is showing renewed activity, it remains subject to the longer term effects of the nickel price volatility as experienced this year. Global logistics are still not allowing the free flow of products globally as before the pandemic.

LOCAL VIEW

Our July member survey shows an upswing in our members' perception of the local stainless steel industry for the next three months, from a low of 44% at the beginning of the year to a much more positive 54% in July. All respondents were still concerned with electricity supply, but the demand for stainless steel products in specific sectors is seemingly good and fabricators, in general, have good order books for the near future. This does not mean that the complete value chain has recovered to pre-COVID volumes and margins but the outlook for continued fabrication work for the next year remains positive.

This is noticeable in the fact that the first five months of 2022 saw a 5% increase in local production compared to the same period in 2021. This period also saw growth of 13% in exports compared to the same period last year. The year leading up to May 2022 saw an increase in apparent local consumption of 3% if compared to the year leading up to May 2021.

ON THE WAY UP?

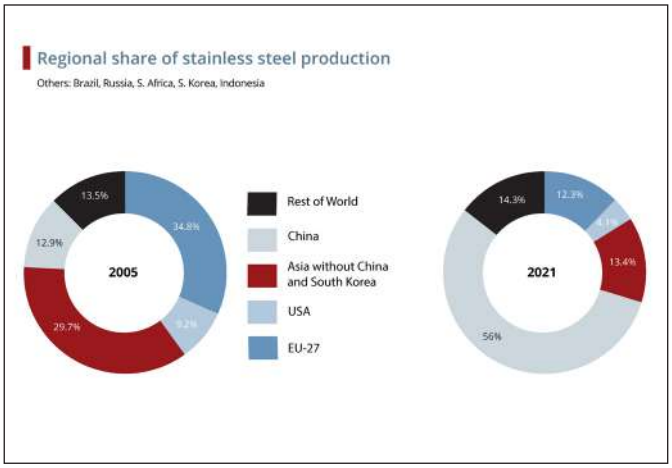
Once again, it looks as if we are ready to make that final manoeuvre towards prosperity and growth. With some interesting movements in the Steel Master Plan activities and the other positives mentioned earlier, we can remain optimistic.

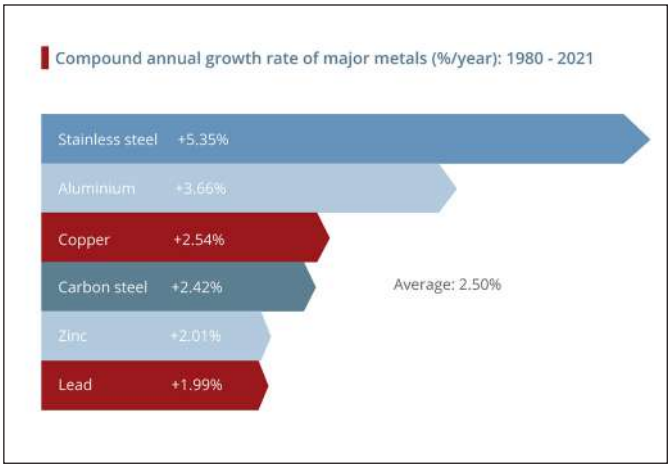
Besides a sobering dose of statistics, we also bring you an issue with some positives that we see on our continent and a snippet on local product development. We include interesting technical articles on potential stainless steel grade alternatives for the high nickel austenitics and we discuss the role that nickel plays in stainless steel.

Enjoy the read!
Michel
Sassda Executive Director

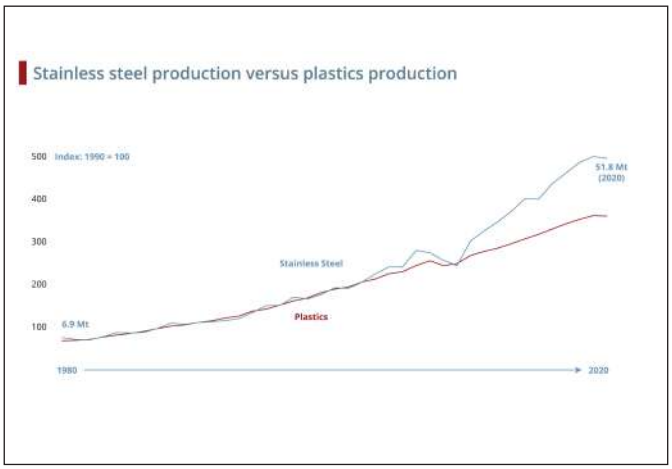
STATE OF THE STAINLESS STEEL NATION

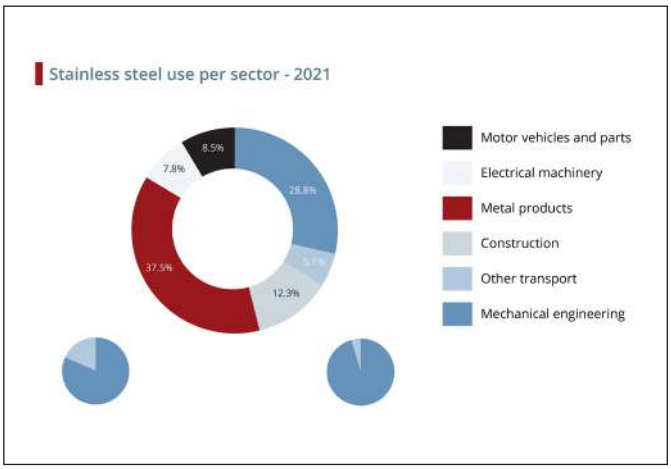
The South African stainless steel industry has felt the effects of the COVID-induced global turmoil over the past few years and while certain historic trends have changed, some remained the same. Worldstainless recently revealed interesting statistics in this regard.



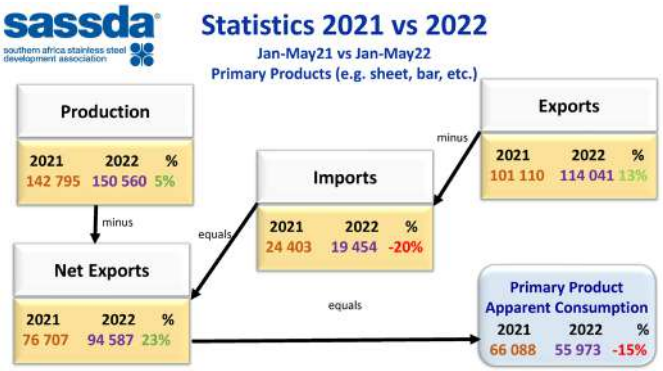


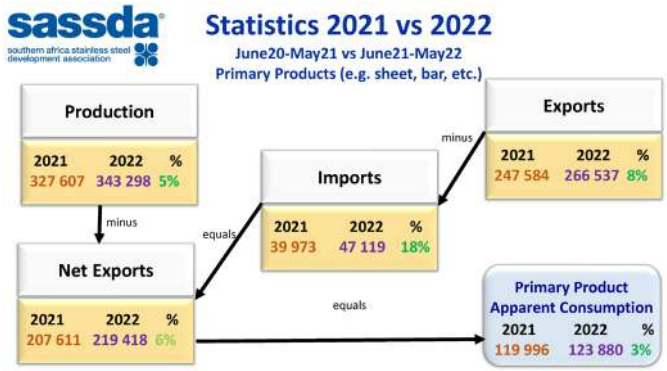
The share allocation of stainless steel production in the global regions has shown some movement away from Asiatic producers (not including China and South Korea) since 2005 and in 2021 China was the major global producer. This has not changed, and stainless steel remains the leader in terms of growth of major metals.





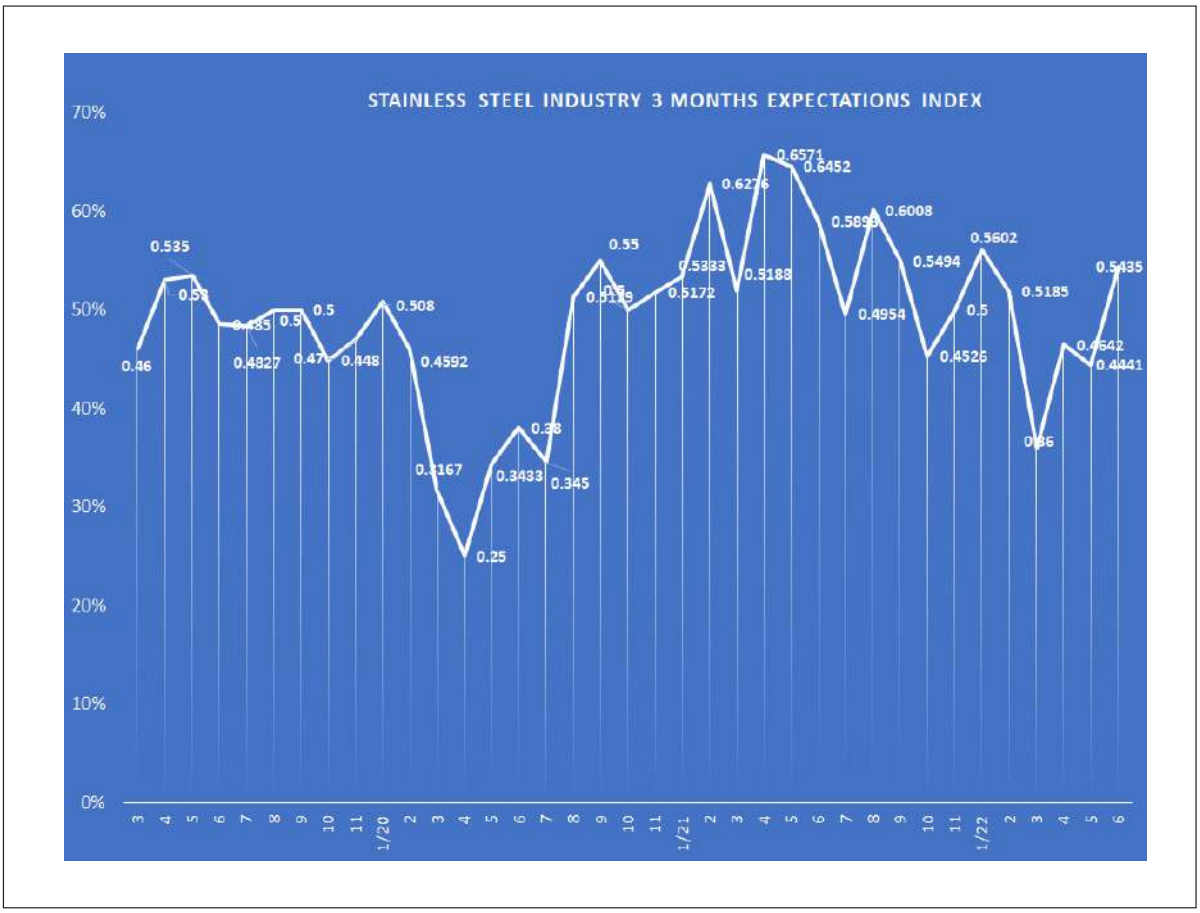
In the past, engineering plastics and other composite materials were regarded as a potential threat to the use of stainless steel with very similar growth curves since the 1980s. The latest information shows that the global production of stainless steel has made a positive break away from the plastic growth rate. This is good news for sustainability. Globally, stainless steel is used most for general metal products and as a preferred material by mechanical engineers. Stainless steel is widely used in the automotive industry and for other transport solutions.





The first 5 months of 2022 saw a 5% increase in production compared to the same period in 2021. In the same period, exports also saw growth of 13% compared to last year. With the import levels down by 20% in the period, this resulted in a 15% shrinkage in apparent local consumption during the first five months of 2022 compared to the same period a year ago.

The year-on-year comparison shows that in the year leading up to May 2022, local production was 5% better than the preceding year. The same applies for Exports and Imports which showed a growth of 8% and 18% respectively. The year leading up to May 2022 saw an increase in apparent local consumption of 3% if compared to the year leading up to May 2021.



This is no indication of proverbial fireworks in our industry, but our members' confidence in the sector increased to just under 55%. There is a good demand for stainless steel products and specific stainless steel users have started to expand and refurbish plants. This all bodes well for the industry, but a major uncertainty and concern remains the availability and supply of electricity to the industry.

CELEBRATING 30 YEARS OF STOCK, SERVICE AND SOLUTIONS

EMVAfrica celebrates 30 years of service excellence, supplying the market with top-quality industrial stainless steel and valves since 1992. Having grown from only three employees to a staff of over 60 people, **EMV**Africa prides itself on helping customers solve business challenges using its **3-S factor of Stock, Service and Solutions.** Sourcing and supplying superior quality products from around the globe, providing support and industry experience, and implementing a 360° approach to problem-solving.

EMVAfrica's growth potential lies in growing its investment in stock and broadening its range of products. Having set a target three years ago to treble its turnover within five years, **EMV**Africa expects to exceed this goal over the next two years, despite Covid-related setbacks and global supply chain disruptions.

As an ISO 9001 certified, broad-based black economic empowerment Level 4 company, **EMV**Africa is proudly South African, with a mission to be the leading one-stop stainless steel and valve supplier in Africa.

1992

Founder Hugh Whitty established Energy Metals from humble beginnings, selling stainless steel products from his home.

1995

Energy Metals moved into its first building in Kyalami Business Park (the day of the 1995 Rugby world cup final).

1997

Multi Alloys was formed. Hugh was joined by Ken Perel and a powerful partnership was born.

MULTIAlloys

Visit **emvafrica.co.za** to see the full range from EMVAfrica

EMVAfrica

2002

E-metals Cape, the Western Cape branch opened in 2002. The team has now grown to 16 employees.

2016

The Gauteng business moved to bigger premises in Kyalami Business Park to keep up with a growing demand for product and services.

2018

Energy Engineered Products was rebranded to EMVAfrica under the leadership of Graham Whitty. Energy Valves and Energy Metals became divisions of EMVAfrica.

2018

Energy Valves is a stainless steel valve and actuation specialist. Energy Metals, is a stainless steel specialist.

2021

Multi Alloys became a division of EMVAfrica. Multi Alloys is a specialist in nickel alloy, duplex and high alloy stainless steel and titanium.

2022

V–Act Actuators and Accessories is launching, increasing our actuation and automation offerings.

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EMVAfrica

SASSDA MEMBERS HAVE ACCESS TO FREE INTERNATIONAL EXPERTS

A partnership designed to take South African stainless steel businesses to the next level

Sassda's Executive Director Michel Basson recently hosted a webinar with experts from PUM Netherlands, an organisation that offers voluntary assistance at no cost and is committed to the sustainable development of small and medium-sized enterprises in over 35 countries. With a team of active and retired experts in an array of sectors, PUM shares knowledge, empowers business owners, and impacts positively on the economy and society at large.

Speaking at the webinar, Kwa-Zulu Natal PUM representative Akash Singh gave insight into the services offered by the initiative. "PUM dispatches experienced entrepreneurs to SME's across the globe, to provide viable solutions to help businesses to grow sustainably. Through the PUM program, Sassda members will be offered the opportunity to work with experienced coaches or mentors that can assist in a specific area of development. These services are offered remotely and physically. Experts can help to assess problems and improve and fix them. Other areas of focus are production, management and special projects, and new business development."

27 YEARS OF FREE ASSISTANCE

He also explained that businesses globally have benefitted from the programme for 40 years and it has been active in South Africa for 27 years. With more than 1600 experts, mostly business owners, PUM offers its expertise and knowledge at no cost to a variety of sectors including Food, Security, Health and Environment, Services, and Industry and Trade.

The programme grants admission to between 80 and 100 applicants annually, with each business owner, allocated an expert based on the business need. Physical coaching is usually carried out over 10 to 12 days, and remote coaching is conducted over four to eight weeks. PUM experts help to identify business gaps, find ways to make businesses more resilient, brainstorm ideas on how to diversify their operations and offer training based on individual business needs. They also offer vital advice in developing strategies to make enterprises future-proof, especially post COVID-19.

Singh reported that he has brought over 700 experts to SA over the past 17 years. "The support offered is invaluable with immeasurable impact. Businesses that have engaged in the program have improved their turnover drastically and contributed to economic growth and job creation. All business owners need to do is to commit to being fully involved for the duration of the program."

He added that metal such as stainless steel is a PUM priority

sector in South Africa. "The technological and theoretical expertise offered by PUM is compelling and bound to make a difference to any business. SMEs in the steel sector are catalysts of innovation, job creation and growth. And with no cost to Sassda members, these invaluable coaching sessions can open doors to future growth.

WHO CAN APPLY?

Business growth takes continuous effort and the PUM program is designed to help owners succeed, with an uncomplicated process and simple entry criteria:

- Must have been in business for more than three years
- Must employ between 15 and 20 staff
- The business must be South African-owned
- Have an annual turnover of less than R180 000 000

Also speaking at the webinar, PUM Sector head Theo Roling said that he normally sees three common problems in the businesses that PUM works with. "The first is their strategic direction and marketing plan. Second is their production area that often requires a more logistical approach, and lastly, most businesses also see technical challenges as a major obstacle."

He stressed that although remote assistance has proven to be extremely effective, physical coaching has an incredible impact.

"PUM has experts who can help with welding techniques and machinery operation. "They're basically on the floor helping companies to better organise their production processes".

WHY SHOULD YOU CONSIDER PUM'S SERVICES?

- Do not have the resources to hire a consultant
- No available commercial consultant with the required level of expertise
- The business is making progress, but there is much more to learn and gain

THE APPLICATION PROCESS

Once businesses have met the required criteria, all that's left is a two-page application in which the company must outline what their key constraints are, what type of help is required and the type of expertise they expect. PUM then processes the application online and manually, matches an expert to the company and sends the relevant expert's CV for the company's acceptance. Soon after, the assignment is arranged based on a convenient time for all parties.

SASSDA MEMBER LAUNCHES EXCITING RANGE OF LOCALLY MADE SPECIALISED STAINLESS STEEL FASTENERS

It is always a pleasure to tell a story about South African innovation and the local development of specialised stainless steel products. This is especially so in the case of stainless steel fasteners as South Africa currently lacks the ability to manufacture high volumes of these fasteners and most fasteners used in the stainless steel industry are imported from abroad.

It is therefore exciting to announce that a long-standing Sassda member, Nikkei Bolt and Engineering Supplies in KwaZulu Natal, can now manufacture and supply bolts and nuts made from the duplex grade 2205 stainless steel, as well as the super-austenitic grade 904L. These fasteners would typically be used for higher tensile applications and highly corrosive conditions. Applications would include anchor bolts and various marine applications.

Yogan Moodley from Nikkei Bolt and Engineering Supplies tells Sassda that their specialised fasteners are a truly 100% local product with the input material being procured from another Sassda member, Wire Products Stainless Steel. He states that the company is a leading supplier of isometric and unified threaded bolts, screws, nuts, and washers, in various materials, including stainless.

The good news is that there is great potential for the use of locally made stainless steel fasteners in a variety of industries. The high volumes of these items required in the manufacture and maintenance of equipment in the food and beverage industry alone, involves staggering numbers.

THE BEST OF THE GPS E-NEWSLETTER

Each month Sassda rounds up a selection of global and local market intelligence articles that are sent to our members in an easy to read package of content. They're designed to highlight pockets of potential growth in demand for stainless steel. Here are some of the best articles from the last few issues...

'BUY LOCAL' MESSAGE MORE IMPORTANT THAN EVER – RAMAPHOSA

Good news for stainless steel! President Cyril Ramaphosa has encouraged South African consumers and businesses to actively choose to 'buy local' to accelerate the country's economic revival and stimulate job creation.

"By buying local we are supporting livelihoods, small business development and job creation. We are supporting investment and research in new technology and innovation. As long as we are producing quality, locally made goods, we should also be buying them," he said during a pre-recorded address presented at Proudly SA's Buy Local Summit and Expo.

Proudly SA is a government initiative that seeks to influence local procurement in the public and private sectors, increase local production, and influence consumers to buy local goods and services to stimulate job creation. As the government's official localisation campaign, Proudly SA, annually hosts the Buy Local Summit, its flagship event, to amplify this mandate. READ MORE

SOUTH AFRICA'S ABILITY TO MANAGE WASTEWATER IS COLLAPSING: WHAT'S AT RISK

The first detailed report in nine years on the state of wastewater treatment in South Africa – a potential demand sector for stainless steel was released recently and it paints a dismal picture. The Green Drop programme is a comprehensive auditing and reporting system designed to improve the overall performance of wastewater treatment plants. It includes an account of factors such as the capacity of municipal wastewater managers and process controllers to operate and maintain the treatment of sewage. The programme was recently reinstated with the publication of the first Green Drop public report since 2013. READ MORE

INTEREST POURS IN FOR TRANSNET'S LIQUIFIED GAS PROJECT AT RICHARDS BAY

Transnet National Ports Authority (TNPA) says about 19 companies – including major developers and operators – from South Africa, Europe, Asia, America and the Middle East have expressed interest in the development of a liquified natural gas (LNG) terminal at the Port of Richards Bay.

According to the port's authority, the request for information it issued in February received a positive response from companies aligned to different industries such as design, development, construction, finance and operations.

It is hoped that the development, which is scheduled to be completed by 2026, will provide the country with a much-needed respite from its costly energy supply crisis. READ MORE

MOZAMBIQUE'S MINISTER OF MINERAL RESOURCES AND ENERGY TO TALK GAS, LOCAL CONTENT AND INVESTMENT

Mozambique represents one of Africa's most lucrative gas markets, and with over 100 trillion cubic feet of reserves, multiple large-scale project developments and a strategic location, the country is well positioned to meet domestic, regional and international gas demand while kickstarting long-term economic growth in Southern Africa. Stepping into this picture, the newly elected Mozambican Minister of Mineral Resources and Energy H.E. Carlos Zacarias has made clear his intentions to resume project developments, awaken new investment and improve local company participation in oil and gas boding well for the stimulation of stainless steel demand. READ MORE

EYE-WATERING R1 TRILLION NEEDED TO FIX SA'S WATER INFRASTRUCTURE

It will cost R1 trillion to repair, replace, and restore South Africa's broken water infrastructure which could do with a healthy infusion of stainless steel to ensure minimal leaks and maintenance and maximum lifespan. R1-Trillion is the eye-watering estimate from Akosua Boadu Anie, Senior Civil Engineer at Aseda Consulting Engineers, speaking at a recent webinar hosted by the South African Institution of Civil Engineering (SAICE).

"We are a water-stressed country, and while the state looks to improve existing infrastructure, we as civil engineers need to implement alternative approaches to conventional potable water and stormwater management," she said.

"To achieve this, we must consider the available water resources, the needs of different water users, sanitation, and stormwater issues." This approach is defined internationally as water-sensitive urban design (WSUD), which has seen great uptake in Australia, the UK and New Zealand.

READ MORE

NAMIBIA TO BEGIN MULTI-BILLION DOLLAR OIL PRODUCTION BY 2028

Namibia aims to reach production from its multi-billion dollar Venus and Graff oil discoveries by 2028 with associated projects set to generate significant additional demand for local stainless steel products. National Petroleum Corporation of Namibia MD Immanuel Mulunga has said; "The plan is now to appraise these discoveries and come up with options and hopefully begin producing oil by 2028."

Also speaking at the Namibian International Energy Conference (NIEC) in Windhoek, Mulunga noted that Shell and TotalEnergies had made the two finds in February this year. The latter's GM for Namibia Adewale Fayemi described the Venus find as a "huge gamechanger."READ MORE

THIS 24-YEAR-OLD OPENED A STEEL COMPANY DURING THE HARD LOCKDOWN - IT'S NOW VALUED AT R7.5 MILLION

Jeandre van Derhan is the 24-year-old CEO and founder of Steelkor Steel and Pipe, a steel and pipe provider that launched during the hard lockdown and made almost its first million in just the first five months. After completing high school, Van Derhan pursued a career in aviation but later abandoned that dream after realising that he was more interested in becoming a businessman as opposed to "sitting in a cockpit the whole day," he said. READ MORE

COULD RENEWABLE ENERGY PROJECTS OFFER THE BOOST SA'S CONSTRUCTION INDUSTRY NEEDS?

With South Africa's embattled construction industry desperately in need of a boost, Databuild CEO Morag Evans believes this could come from projects based on renewable energy generation. According to Evans, not only will renewable energy projects help to stimulate the recovery of our construction industry while adding much-needed power to our ailing energy grid, but they will also promote job creation and further economic development in the regions in which they are located. READ MORE

MAJOR GAS PROJECT A STEP CLOSER TO COMING ONLINE IN SOUTH AFRICA

Energy group Renergen says it is making 'strong progress' in commissioning phase 1 of its Virginia Gas Project. The Virginia Gas Project is the only onshore petroleum plant in South Africa, with the site covering an area that includes Welkom, Virginia, and Theunissen. It is owned and operated by Renergen through its subsidiary company Tetra4. Renergen has previously estimated its helium reserve could be as large as 9.74 billion cubic metres, more extensive than the known reserves of the entire US. READ MORE

sassda
southern africa stainless steel development association

BOLDLY going where no metal has gone before!

Join us for a workshop on the future of nickel alloys for industrial applications which require high performing solutions

This ONLINE workshop on the **7 September 2022** will inform specifiers, users, fabricators and educators about the features, benefits and limitations of nickel and its alloys which may be used for corrosion and high temperature applications.

The workshop has been validated by SAIMechE, and participants can claim zero point five (0.5) CPD credits in Category 1 for attending this activity.

REGISTER HERE!

EMVAfrica MULTIAlloys

THE ORIGINS OF EXCELLENCE

Working in the stainless steel industry is more than making a name for yourself - it's about the value that that can be added through hard work and passion. An excellent example of this type of dynamism is National Stainless Steel Centre Director Tholwana Mogowane…

What did you study, and what is it about the discipline that attracted you to this field of study?

I studied for a National Diploma in Logistics Management at the Nelson Mandela Metropolitan University from 2008 to 2011. I believe that continuous education is the key to success and I am also currently undertaking post graduate studies in Management Practices through Henley Business School because my current role is extremely diverse.

Even as a young child, I was always fascinated with understanding the process of movement of raw material from inception to the end-user. I recall once asking my parents where my birthday cake had come from. Perhaps they did not understand my question, but the bakery answer just wasn't good enough for my inquiring mind. My curiosity extended from where the flour came from to how the cake ended on my table. It is exactly this that attracted me to the stainless steel industry, albeit a passion that was ignited by both time and circumstance.

How did the first years of your career build on what you learnt at university but in a more practical setting? What were the key lessons you learned during this time?

As a traditional African woman, it was difficult to break the bounds of what a woman should be doing. After completing my diploma, I was unemployed as millions generally are after graduating. I eventually applied for a position as a receptionist at National Stainless Steel Centre (NSSC), and I was fortunate to have had an alternate position created for me where my skills, talent, and education were put to better use. It was this that inspired my passion for all things stainless steel, and the manufacturing process still intrigues me to this day.

NSSC is a stainless steel profiler. We get flat sheets from Columbus Stainless, cut bend and roll them, and transform them into beautiful stainless steel products. The process itself is intriguing and I quickly moved up the ranks thanks to hard work and a strong will to learn. My career allowed both movement and growth that gave me insight into the intricacies of the stainless steel industry. I have been exposed to a variety of fields in the industry, including sales, procurement, client relations and logistics.

How would you describe a typical day in your current position?

As a Director, the amount of admin is incredible! I generally spend my days planning, organising and ensuring the smooth running of my department. I also head up our retail division and spend much time visiting customers and focussing on relationship building. Transformation is an integral factor in our business, and I drive this through various projects. One of these projects is an educational trust fund for our employees' children. As a mom of two young girls and a female in a predominantly male industry, I am very passionate about gender diversity and continuously strive to expose our young girls to the opportunities available to them in the steel and fabrication industry.

Why do you feel that stainless steel has such an important role to play in getting South Africa's economy back on track following the COVID-19 pandemic?

Stainless steel is a very durable, diverse, and aesthetically pleasing material. Because of its malleable nature, it can be used in many different ways. Its economic importance is not stressed enough, and more needs to be done to show the value our industry adds to the economy. Job opportunities within the stainless industry abound in various fields, but more importance should be placed on attracting youth to the sector. South Africa is fortunate to have the Columbus Stainless Mill. Neighbouring countries such as Zambia and Namibia are interested in importing quality products from us, and we are able to position ourselves as exporters to the Southern African Development Community region and thus contribute to economic growth as well as employment opportunities. I also believe that there should be more focus placed on monitoring the performance of the stainless steel industry as a whole as this would keep the general public informed.

What do you consider as the most exciting innovation/product developments happening in stainless steel right now and what sectors hold the greatest potential for the use of stainless steel in the future?

Given that we have a proudly South African focus, I believe that we need to create more hype around promoting and stabilising the industry before focusing on future innovation and development in terms of products. The steel industry is a crucial economic contributor that requires the support of our government to strengthen and reconstruct it so that it becomes the formidable force that it can be. We have to make what we have, work, and an exciting development is currently in the pipeline in the form of the Steel Master Plan. This collaboration between the South African government and stakeholders in the industry aims to create more awareness for the industry by highlighting developments and giving more attention to both the internal and external factors that affect the industry.

INNOV-X AFRICA

Celebrating 15 Years in the business of ensuring our customers have the best XRF Analysers

OUR STORY

Innov-X Africa, are proud to announce that we have been in business for 15 years as the sole distributors for Olympus XRF and XRD equipment in Sub-Saharan Africa. We supply Handheld XRF Analysers of the highest quality and most robust into various industries, such as; Mining and Exploration, Alloy and Steel, Precious Metals, Recycling and many more.

ABOUT INNOV-X AFRICA

Stuart Bateman, as the Managing Member, with 35 years of experience in the XRF field, is the driving force behind the success of the company.

Today we have grown to be one of the leading XRF and XRD specialist companies in Africa. Situated in Bedfordview, Johannesburg, with a fully certified service centre, we pride ourselves on offering only the best sales, service, maintenance, calibration and repair. There is no need to send your equipment out of the country for repairs, saving both time and money. Backed by dedicated and highly skilled staff who are passionate about customer service and ensuring the customer receives the most suitable solution for their specific needs.

MEET THE SALES TEAM

Stuart Bateman's main focus is on the Mining and Exploration Industry. With 35 years' experience in the industry, he is well connected with specialists in this field such as Geologists and surveyors. Having travelled extensively within Africa Stuart is well aware of what is required in this market and can therefore offer the best suited XRF solution for your mining application.

Pieter du Preez's main focus is on the Alloy, Recycling and Precious Metals Industry. With 13 years' experience and coupled with the best quality XRF analyser, you can be rest assured that he will offer the best suited XRF analyser for your application.

MEET THE SERVICE TEAM

Cyril Mustard and Ingrid Lembke, together have a wealth of experience in the XRF field. Having received training from the Olympus factory in Waltham and access to a well-stocked service department, the team is able to perform not only routine maintenance, but also services repairs and calibrations at our offices in Bedfordview, Johannesburg. This equates to speedy turnaround time for customers as there is no longer a wait for the analyser to travel back and forth to Europe or America.

CONCLUSION

As Olympus has been around for over 100 Years, Innov-X Africa as the sole distributor in Sub-Saharan Africa, a member of the South African Stainless Steel Development Association, we continue to strive for a strong presence and to maintain excellent business relationships.

INNOV-X AFRICA

For more information please visit our website at www.innovxafrica.com

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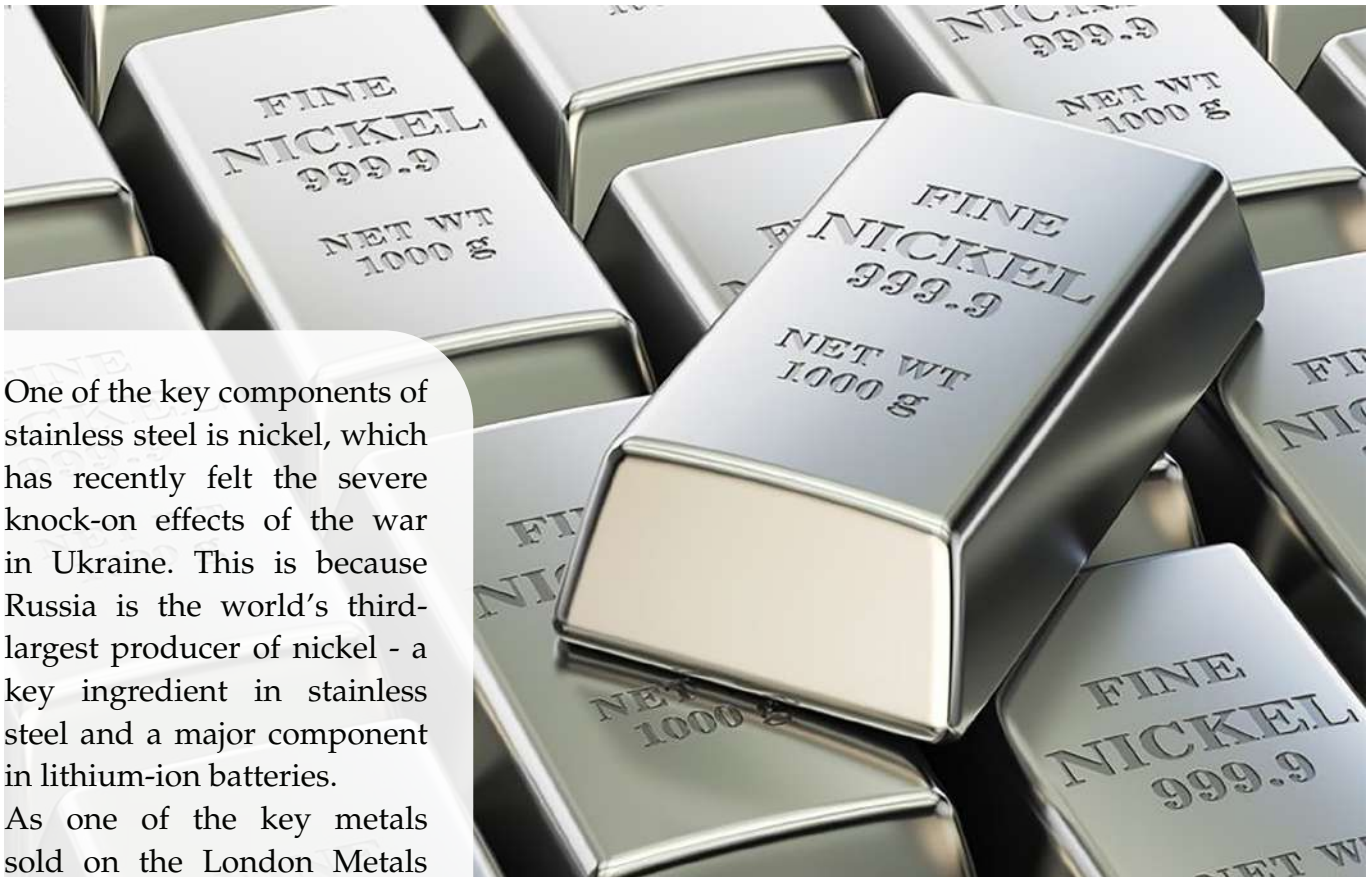
COULD NICKEL PRICE VOLATILITY HERALD A NEW ERA IN STAINLESS STEEL INNOVATION?



One of the key components of stainless steel is nickel, which has recently felt the severe knock-on effects of the war in Ukraine. This is because Russia is the world's third-largest producer of nickel - a key ingredient in stainless steel and a major component in lithium-ion batteries.

As one of the key metals sold on the London Metals Exchange (LME) nickel was also one of the cost casualties as the reality of the situation became apparent.

This led to the price of nickel experiencing massive volatility issues on the LME, especially after China's Tsingshan Holding Group bought large amounts to reduce its short bets on nickel. This saw the price of the metal increasing within hours from $20 000/ton to $100 000. The severity of the price run meant the LME had to stop trading for the first time in its history and it was subsequently shut down for three days.

It has subsequently brought in new measures to control price fluctuations and reduce price volatility on metals such as nickel and titanium.

AN EXPECTED PROBLEM

From a local perspective Sassda Executive Director **Michel Basson** comments; "To a certain extent our members have been expecting an increase in the price of nickel in light of global events. At first glance, it is not positive when input costs into fabrication explode like this, but historically we also know that workload looks good when prices rise for some reason.

"From the Sassda side, we are looking to create awareness around grades with lower nickel content that can act as alternatives to the nickel-containing grades that have seen the brunt of the increase."

EXPANDING THE GRADE HORIZON

Basson explains that the austenitic grades of stainless steel, also known as the 300 series, all contain nickel as an alloying element and it is nickel that makes these grades weldable, formable, usable in very high and very low temperatures, as well as non-magnetic.

Around 75% of stainless steel used around the globe is austenitic with the popular grades being 304 and 316 (molybdenum containing). With the high volatility of nickel prices, these grades have seen large price increases and some customers are looking at alternative grades that can be regarded as lower cost alternatives.

These include alternatives within the austenitic cluster of stainless steel grades such as the 200 series containing less nickel; the ferritic grouping that contains no nickel; as well as the lean duplex grades also with lower nickel content. Austenitic replacements such as the Series 200 grades, as well as the lean duplex alternatives have some of its nickel content replaced with manganese. **Basson** explains; "Metallurgy demands that every 1% of nickel removed should be replaced by 2% of manganese leads to a lower chrome content rendering these grades slightly less resistant to general corrosion.

"The ferritic grouping (430, 441 and 444) offers some good alternatives, but with less chrome than the 300 series. They do not contain nickel and are therefore not weldable in thicker sections. There are, however, magnetic with a unique property of not work hardening during cold working. "Grades 430, 441 and the molybdenum containing grades such as 444 can also be considered.

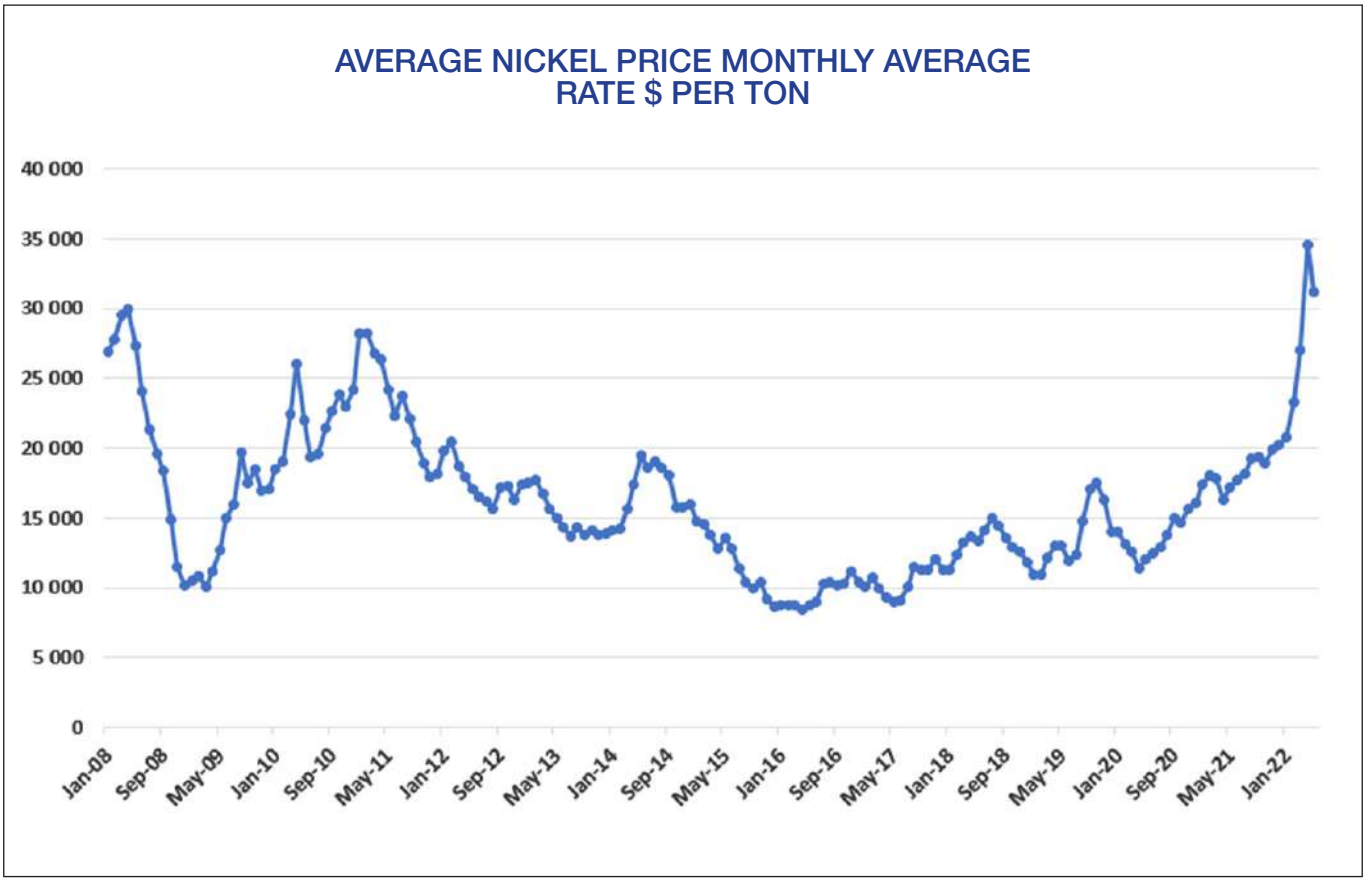
"444 is a cost-effective ferritic stainless steel and very safe and well suited for use in water geysers and especially solar applications. In fact, much better in some cases than using material containing 314 and 316."

In general, the lean duplex materials or LDX grades are lean in nickel. In general, duplex material contains about half the nickel content of the austenitic grades.

In the case of LDX material, some of this reduced amount of nickel is replaced by manganese making it a cost-effective alternative to the austenitic grades. The LDX ranges contain higher levels of chromium than other alternatives and are also significantly stronger. This means that thinner gauges of material can be used making the product lighter and reducing material costs.

Looking to the future **Basson** says; "It is now the role of Sassda and its partners to protect the status of stainless steel as a preferred material by ensuring proper training, awareness, and technical support to find alternative grades to the austenitics in other parts of the stainless steel family tree.

"These include ferritics (grades 3CR12, 430, 441 and 444) and the low nickel lean duplex grades. There are more than 200 different stainless steel alloys with a wide range of properties to act as potential alternatives for the historically used 300 series materials. This family of superior steels is Simply Brilliant!"



NICKEL-CONTAINING STAINLESS STEELS AND POTENTIAL ALTERNATIVE GRADES

Stainless steel isn't a single material, but a family consisting of five 'clans', each of which is home to many grades. These five types of stainless steel - ferritic, austenitic, martensitic, duplex and precipitation hardening - are defined by their individual grain crystal structure.

Nickel is an important alloying addition in more than two-thirds of the stainless steel produced today. This includes the austenitic, precipitation hardening and duplex grades that are dependent on nickel for its properties. Lesser amounts of nickel are also found in some of the ferritic and martensitic grades.

Another important element is chrome which is the key alloy that makes stainless steels 'stainless'. When more than 10.5 % is added to steel, a protective passive oxide film forms on the surface to make the material corrosion resistant with a bright appearance. In general, the more chrome added, the higher the corrosion resistance.

Some of the early stainless steels also contained nickel, resulting in improved properties, and nickel-containing grades have been in use ever since. However, nickel may be seen as a relatively high-cost alloying addition, due to the volatility in its price. It would therefore be useful to revisit the reasons why nickel is added to stainless steel and to what extent the influence of nickel is needed in specific applications.

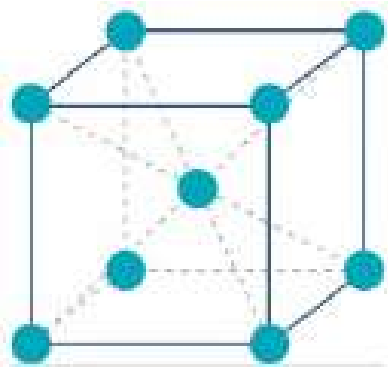
The primary function of nickel is to stabilise the austenitic crystal structure. Nickel changes the ferritic crystal structure of stainless steel to an austenitic structure (face-centred cubic). This structure is particularly tough and ductile. This property, and others, are responsible for the versatility of the various grades of nickel-containing stainless steel.

The major chemical elements making up stainless steel can be divided into two groups. The first is a group of ferrite formers including iron and chrome. The other is austenite formers such as nickel and nitrogen.

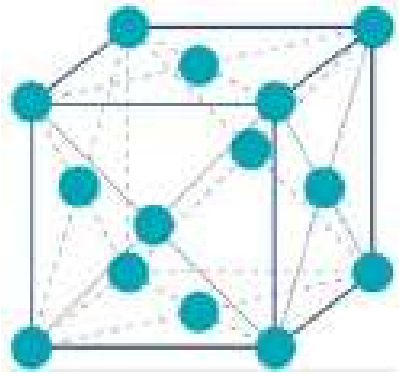
To stabilise the austenitic crystal structure, there must be a strong enough presence of austenite-forming elements in the alloying mix. The minimum amount of nickel that can stabilise the austenitic structure at room temperature is around 8%. This is the reason for the 8% nickel present in grade 304 which is the most widely used grade of stainless steel.

Grade 304 contains 18% chrome and 8% nickel and is often referred to as 18-8 stainless steel. This chemical composition was developed in Germany in the early 20th century. It was used for chemical plants and to clad the roof of the Chrysler Building in New York as one of the earliest architectural applications in the 1930s.

Manganese was first used as an addition to stainless steel in the 1930s.



Ferritic structure



Austenitic structure

The 200-series of low-nickel, austenitic grades was developed further during the 1950s when nickel supply was scarce during the Korean war. These grades have an austenitic structure with a portion of their nickel content replaced by manganese.

A NICKEL IMPERATIVE

However, not all nickel can be replaced whilst the structure remains fully austenitic. All the high-manganese austenitic stainless steel has additions of nickel to ensure enough austenite forming content. To reduce the nickel content, even more, the chemical balance is adjusted by reducing the chrome (ferrite former) content. However, this reduction of chrome negatively impacts the corrosion resistance of manganese-containing alloys compared to the standard 300-series nickel grades.

More recent improvements in melting technology at stainless steel mills have allowed the controlled addition of increased amounts of nitrogen. Nitrogen is also a potent austenite former like nickel.

As the austenite forming content in the alloy is reduced in the ways described above, the structure of the stainless steel changes from 100% austenite to a mixture of austenite and ferrite crystal structures. Grades with this deliberate reduction of austenite formers are referred to as the duplex stainless steel grades. The nickel continues to stabilise the structure of the austenite phase which would be between 50% and 60% of the total material. Commercial duplex grades, even the 'lean duplexes', contain at least 1% nickel. Most duplex stainless steels have a higher chrome content than the standard austenitic grades for higher corrosion protection. Chrome is a ferrite former, and, with increased chrome levels, increased levels of nickel are required to maintain the metallurgical balance. This principle also applies to manganese-containing austenitic, such as the 200 series.

DUPLEX STRENGTH

This dualistic or two-phase structure of the duplex grades makes it, in general, inherently stronger than the standard austenitic grades. The slightly higher chrome content also makes duplex grades more corrosion resistant than standard grades.

Reducing the nickel content further creates grades with no austenite at all. These grades have a completely ferritic structure like iron and carbon steel at ambient temperatures. It is important to note that not even ferritic stainless steel grades are completely nickel-free.

Nickel is added to lower the Ductile-To-Brittle Transition Temperature (DBTT) i.e. the temperature below which the alloy becomes brittle. Some of the highly-alloyed super-ferritic grades contain an intentional addition of nickel to improve the DBTT, especially of welds. It must be stated that the nickel levels in austenitic stainless makes it tough at cryogenic temperatures with no DBTT, i.e., it will not exhibit brittle behaviour at even the lowest temperatures.

Unlike the austenitic grades, the martensitic grades can be hardened by heat treatment. Certain martensitic grades contain nickel that improves the toughness but it also enables the steel to have a higher chromium content. This is once again to maintain a stable ferritic structure. This also increases the corrosion resistance of the grade.

SELECTING A POTENTIAL REPLACEMENT GRADE FOR NICKEL-CONTAINING STAINLESS STEEL

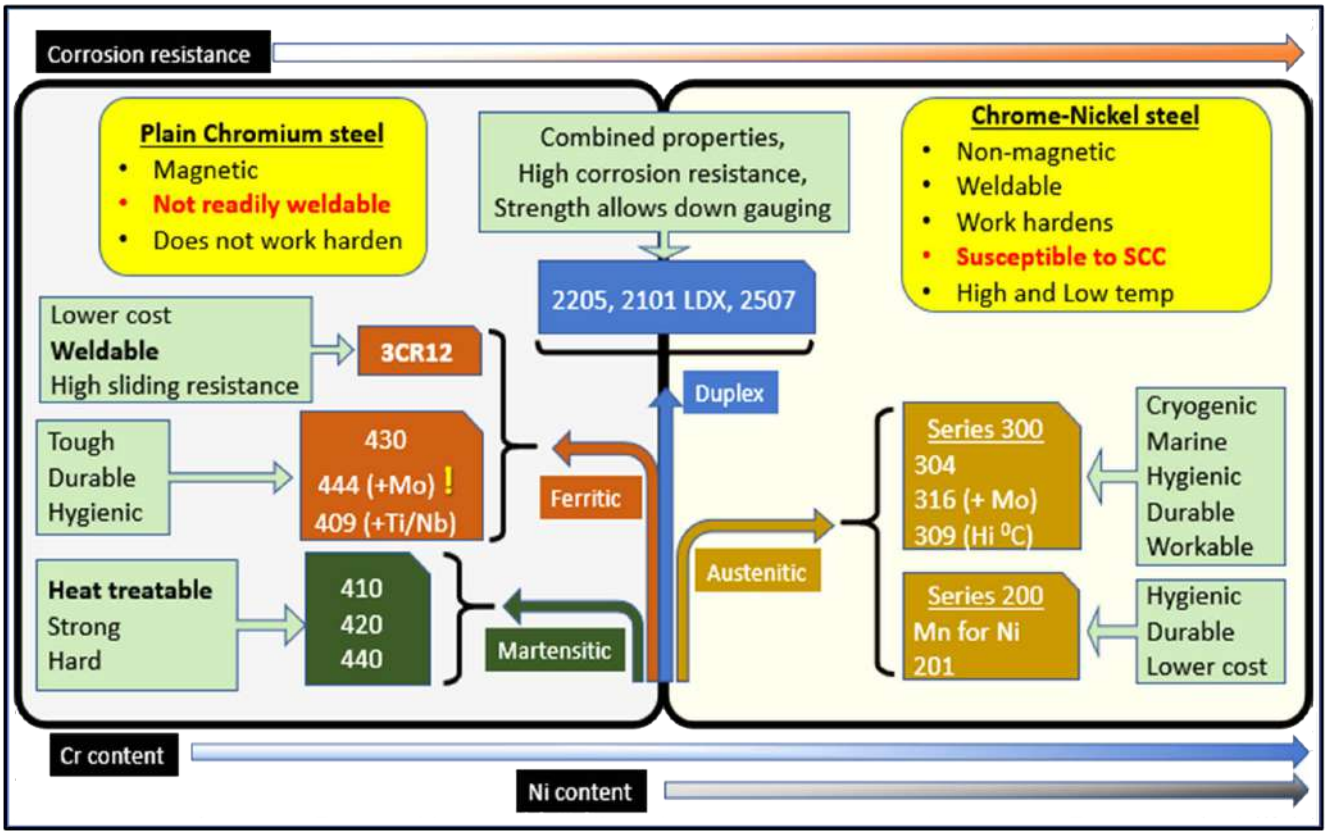
The selection of an alloy should be guided by careful examination of the application. Before making a change in an alloy, it is important to fully understand the current and potential alternatives in terms of the alloy's strengths, weaknesses, and applicability to the application.

To counter poor choices, due to underestimating the required performance criteria, a solid understanding of both material and application is important. When considering grade selection, it's important to remember that quality is in most cases more important than cost. Correct specification is key to delivering on the required levels of performance. Due to its longevity, it is always a good idea to calculate the cost over the complete life cycle costing (LCC). Stainless steel is surprisingly cost effective when not only the initial material cost is evaluated.

USING 200 SERIES STAINLESS STEEL

The 200 series of austenitic stainless steels have some nickel replaced by manganese. These stainless steels are regarded as an alternative to the 300 series. Both have an austenitic structure, with the 200 series containing manganese and nitrogen instead of some of the nickel. In practice, these materials work, look, and feel like 300 series materials.

The original 200 series alloys were first produced in the US during the 1950s. The grades contained 16% chrome compared to the 18% in 304 and about 4% (half) the nickel content. Around 2005, a whole new range of 200 series alloys increased in popularity in Asia. To reduce the nickel content even



further, producers had to reduce the chrome content even further - in some cases as low as 12%. As a result, the 200 series materials in general have a much lower corrosion resistance than their Series 300 counterparts. This does not reduce the applicability of the material where a slightly lower level of corrosion resistance is acceptable. In other cases, a higher rate of cold working is a benefit in applications such as hose clamps, some structural applications and reinforcing bar with a low magnetic response and a higher nickel content will be preferred.

Some 200 series alloys are also susceptible to delayed cold cracking after forming. This delayed cracking can in many cases only manifest months after the mechanical action. Welding of these grades can be more challenging than with the standard austenitic materials, especially in thicker sections. Keep in mind that the manganese addition might also influence the appearance of polished surfaces.

There are many legitimate applications for low chromium 200 series alloys, especially where there are lower demands on corrosion resistance. The selection of an alloy should be guided by a careful examination of all the requirements for the application.

FERRITIC STAINLESS STEELS WITH NO NICKEL

In some applications, it might be possible to substitute an austenitic grade with a ferritic grade such as 430, 441 or 444. Grades 430 and 441 are nickel-free, 17% chromium grades with good corrosion resistance, and high-temperature strength. It has good formability and weldability making it a suitable replacement for 304 in indoor cladding, restaurant equipment and appliances, tubes, and heat exchangers.

Similarly, 316 can be substituted by 444. This is a nickel-free molybdenum-alloyed ferritic stainless steel with very good corrosion resistance, good cold formability, and high strength. It allows for thinner walls in tanks and is not prone to stress corrosion cracking. It is ideal for hot water tanks and drinking water pipes. Grade 444 shows a higher pitting resistance compared to 316.

Ferritic grades have good ductility and are therefore generally not suitable for load-bearing applications. They are also magnetic, unlike austenitic grades. In some uses, the difference in surface finish may be a significant factor as cold-rolled ferritic stainless steel has a slight shiny blue colouration, while austenitic grades appear grey. Ferritics do not harden or strengthen through cold work and would not be readily weldable above a 3mm gauge thickness.

Another characteristic of ferritic stainless steel is the high resistance to stress corrosion cracking, and they are usable in very aggressive conditions. The most common use of ferritic stainless steel is in the automotive industry for catalytic converters and exhaust systems. Ferritics display some mechanical properties, such as low-temperature toughness, generally poorer than austenitic grades.

LEAN DUPLEXES LOOKS LIKE A LONG-TERM SOLUTION

Lean duplex grades are members of the duplex family. These alloys typically have a PRE number below 30, with a reduced content of expensive elements such as nickel and molybdenum. The grades aim to substitute 304 and 316 in more niche applications.

To maintain the desirable corrosion properties and phase balance between the ferritic and austenitic structures, other alloying elements are increased in the chemical composition, such as

chromium, manganese, and nitrogen. Lean duplex is already quite popular for structural applications such as tanks, buildings, and bridges and the future will see increased usage in both the upstream and downstream oil and gas sectors, as well as in chemical, petrochemical, and food industries.

ADVANTAGES OF USING LEAN DUPLEX

- The main reason for using lean duplex grades is its significant resistance to chloride stress corrosion cracking (SCC) because of its dual phases. As a rule of thumb, the corrosion resistance of lean duplex is likely to be similar to, or better than 304L and 316L with competitive PRE numbers.
- Unlike ferritic grades, the lean duplex grades are much more weldable in thicker sections.
- Lean duplex grades are not leaner on alloying nobility when compared to generally used austenitic grades such as 304 and 316.
- The yield strength of lean duplex grades is more than twice that of 304 and 316. This means that the wall thickness of equipment or piping can be reduced. Less thickness also means lower weight which can significantly lower initial material costs, transportation, and installation costs.
- Lean duplex benefits from an improved Life Cycle Costing (LCC), reducing the total cost and increasing the sustainability of the project.

LIMITATIONS OF DUPLEXES

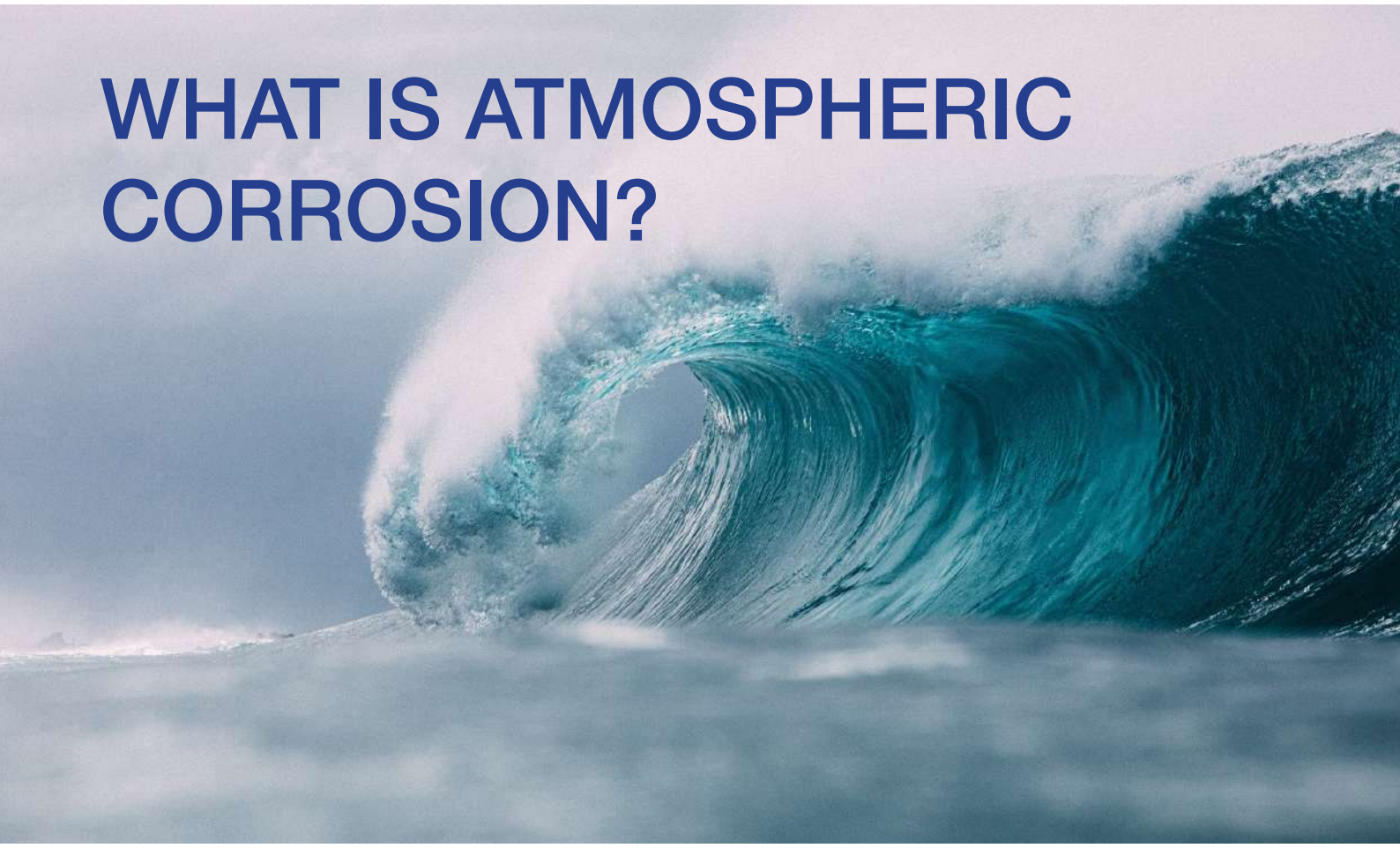
However, there's no such thing as a perfect material and hence some imitations when considering lean duplex:

- The duplex family achieves their phase balance and pitting corrosion resistance from nitrogen amongst others. During welding, some nitrogen is released from the metal, so the use of nitrogen-containing gas is recommended.
- The material, being less ductile and stronger than austenitics, requires more energy during forming and mechanical manipulation.
- The corrosion and mechanical properties of duplex grades are achieved with a ferrite/austenite phase balance of 40 – 60%. This is important to remember when selecting welding consumables, especially filler materials and weld input temperatures.
- Although the yield strength of lean duplex is more than double compared with austenitic, the allowable stress for design calculation is not.
- As in the case of 200 series austenitics, the manganese addition might also influence the appearance of polished surfaces.

CONCLUSION

Stainless steel is not one material, but a range of over 200 alloys, each with its unique properties and suitable for an endless variety of applications. Users and specifiers have for decades become accustomed to the versatility of the popular grades such as the nickel-containing 304s and 316s. They also have been spoilt by this and, in some ways, remained ignorant about the true range of stainless steel available. The correct material choice can have a significant impact on life cycle costs, profitability, and a sustainable future.

WHAT IS ATMOSPHERIC CORROSION?



Atmospheric corrosion is the deterioration and destruction of a material and its vital properties due to electrochemical reactions of its surface with the constituents of the atmosphere surrounding the material. Atmospheric corrosion does not discriminate, and it leads to the deterioration (corrosion) of metals and non-metallic materials. Environmental oxygen and condensed water vapour can cause gradual corrosion of iron and steel surfaces, producing iron oxide or rust. Corrosion drastically reduces the mechanical strength and useful life of the metals.

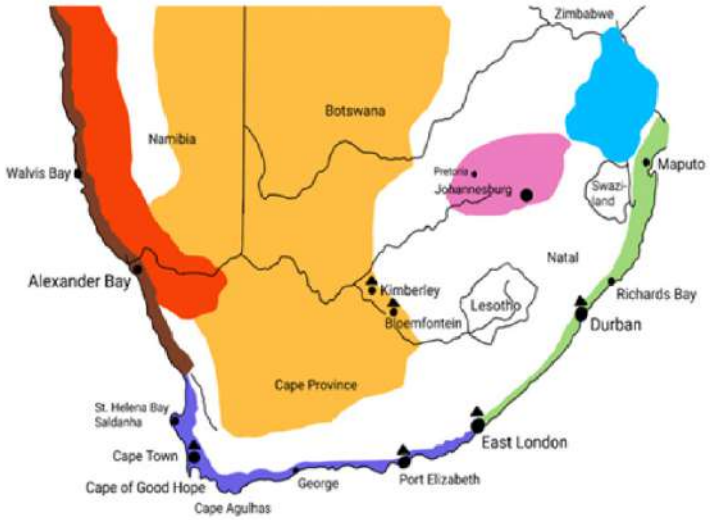
The vital factor in atmospheric corrosion is the presence of moisture due to fog, dew, precipitation, and relative humidity. This provides the electrolyte for the ensuing electrochemical reaction. Salts of sulphur and chlorine can aggravate corrosion by increasing the conductivity of the water in industrial atmospheres. Ambient temperature and air pressure also affect corrosion. At higher temperatures, some electrolytes become highly reactive. The critical humidity which enables corrosion is a factor which is specific to each metal.

The study of atmospheric corrosion is essential because this type of damage is the most prevalent among the different types of corrosion damage. This type of deterioration is widespread, as it affects outdoor as well as indoor installations such as utilities, industries, vehicles, and residential structures.

FACTORS THAT AFFECT ATMOSPHERIC CORROSION

Different factors are essential to atmospheric corrosion. Once these are identified within a specific environment they can contribute to the control of potential atmospheric corrosion.

FIGURE 1 SA CORROSION MAP AS ADAPTED BY SASSDA



Key	Description	Corrosion type
	Inland arid	Semi-desert
	Inland	Rural
	Inland dry	Desert
	Inland urban	Inland industrial
▲	Inland	Industrial
	Sub-tropical marine	Medium to severe marine
	Desert marine	Severe marine
	Temperate marine	Marine
	Possible SO_2 exposure	Medium
	Inter-tidal to 5 km inland	Severe marine

This map and legend was adapted from the work of D.T. van Rensburg, L. Cornish, J. van der Merwe; Corrosion map of South Africa'a macro atmosphere; SAIS, July 2019

1.The environment:

The environment plays a critical role insofar as the risk for atmospheric corrosion is concerned. In complete rural environments, there will be little chemical pollution that is airborne to settle on material surfaces. In more urban areas the airborne pollution will increase due to emissions from the denser population, vehicles, and the like. This will increase as the environment changes from urban to industrial. It would therefore be important to identify the geographic location of the installation and potential sources of specific pollution in the area.

The South African corrosion map is used to determine corrosive conditions for the region. The map above was derived by Sassda from work done by the School of Chemical and Metallurgical Engineering, University of the Witwatersrand, South Africa. In essence, the effect of exposure to SO2 was added.

2. Proximity to the ocean and other sources of salt:

Halide ions such as chlorides are responsible for highly localised forms of corrosion such as pitting and crevice corrosion. In South African conditions, the proximity to the ocean plays a bigger role than in other parts of the world such as Europe. Heavy wave action and prevailing winds drive chloride-rich air deep inland. Other sources of salts will be mostly industrial or, as in the case in Europe, the use of de-icing salts on roads.

3. Climate:

Moisture, whether in the form of dew, rain or condensation, is a significant factor when it comes to atmospheric corrosion.

FIGURE 2 SELECTION OF F1, F2, AND F3

STEP 1: Calculating F1: Risk of exposure to chlorides

Risk:	Description:	F1
Controlled	Internally controlled Environment	1
Low	M > 10km or S > 0,1 km	0
Medium	5 km < M ≤ 10 km or 0.01 km < S ≤ 0.1 km	-3
High	0.5 km < M ≤ 5 km or S ≤ 0.01 km	-7
Very High	M ≤ 0.5 km	-10
Severe	M ≤ 0.25 km	-15

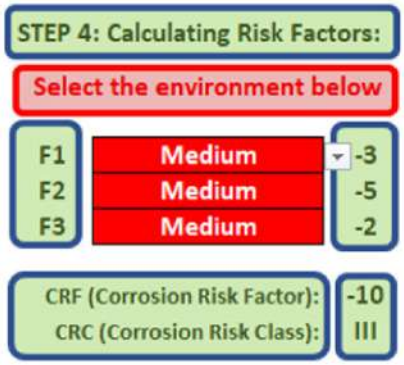
STEP 2: Calculating F2: Risk of exposure to sulpher dioxide

Risk:	Description:	F2
Low	10 µg /m³ average deposition	0
Medium	10 to 90 µg /m³ average deposition	-5
High	90 to 250 µg /m³ average deposition)	-10

STEP 3: Calculating F3: Risk in cleaning regime

Risk:	Description:	F3
Low	Fully exposed to washing by rain	0
Medium	Specified cleaning regime	-2
High	No washing by rain /No specified cleaning	-7

FIGURE 3 FINDING RISK FACTOR, CLASS, AND MATERIAL SELECTION



STEP 5: Select a suitable material

I	II	III	IV	V
3CR12	304	316	317LMN	254SMO
430	304L	316L	904L	S34565
409	304LN	316L2.5Mo	2205	NO8926
	321	316Ti		2507
	301LN	316LN		S32760
	304 DDQ	316LCu		UNS32520
	304Cu	2404		
	2001	2304		
		2202		
		2101		

Although rain can wash away hazardous air pollutants in the atmosphere that have been deposited in exposed areas, such as in a marine environment, rain also collects in crevices and pockets. On such surfaces, moisture can become stagnant, which turns into an alkaline reaction with metal or absorbs carbon dioxide to create a dilute acid. Dew films that have become saturated with acid sulphates, sea salt and other acids can produce an aggressive electrolyte environment that promotes the occurrence of corrosion.

Temperature also affects atmospheric corrosion. As a rule of thumb, every 10°C increase in the temperature can double the corrosion rate.

The relative humidity is another important component in atmospheric corrosion. Among the requirements in the process of atmospheric corrosion is the existence of an electrolyte in the form of a thin film on metal surfaces that are exposed to critical humidity levels. Although the film is invisible, it can contain corrosive contaminants at high concentrations, particularly in situations where there is alternate drying and wetting.

4. Design factors:

While rain can wash down surfaces and, in effect, clean surfaces of contaminants that can lead to corrosion, flat or concave surfaces can lead to the collection of moisture to form puddles. This water can turn stagnant with a detrimental effect on the corrosion rate. This also applies to sheltered surfaces where no washing can take place. Examples of this would be overlapping surfaces, the undersides of horizontal sections, and applications where metal strapping is used. The surface finish of the material would also play a role. Rougher surfaces can trap contaminants while smooth surfaces will rid themselves of a potential build-up of pollutants.

5. Maintained schedule:

All surfaces need to be cleaned from time to time to rid the surfaces of contaminants that facilitate the creation of galvanic cells as part of atmospheric corrosion. High alloyed stainless steel might be corrosion resistant enough to withstand the corrosive attack, but maintenance and washing continue an important role in curbing atmospheric corrosion.

HOW TO EVALUATE THESE FACTORS IN A STANDARDISED WAY?

The European standard EN 1993-1-4 describes a simple, yet effective methodology for doing this. The standard proposes that three risk factors be calculated; F1 the risk of exposure to chlorides; F2 the risk of exposure to sulphur dioxide; and F3 the risk in the cleaning regime. (Fig.2)

The total of the risk factors will then equal the Corrosion Risk Factor (CRF). The CRF is then used to determine a Corrosion Risk Class (CRC), and this is then used to determine the various grades that can be used in the specific application. (Fig.3)

It was also mentioned earlier that European conditions differ somewhat from that in Southern Africa. Especially in coastal areas, the African sub-continent sees much deeper penetration of chloride-rich air from the heavy wave action and strong prevailing winds. Fig.2 shows some adaptation to the values cited by the EN standard to compensate for the higher risk of chlorides in coastal areas.

For each risk class in fig.3, there is a variety of potential grades. It is advised to select one or two of these materials, and make use of sample plates, and to do a physical test in the real environment before the final decision on material grade is made.

CONCLUSION

Atmospheric corrosion is an underestimated form of corrosion and good initial material selection is often neglected. This leads to unnecessary damage, maintenance, and replacement costs. To play our part in a sustainable future, this unrelenting form of corrosion must be part of material selection and future sustainability. Atmospheric corrosion can be controlled and, in many cases, eradicated for all practical considerations.

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MOZAMBIQUE OIL AND GAS LOOKING FORWARD

Mozambique is the site of one of the largest oil & gas discoveries of the 21st Century. With stability now returning to the region in which these resources will be extracted, processed and distributed, Sassda Market Intelligence Specialist **Lesley Squires** provides an update on this vital market for Southern African stainless steel demand…

THE ECONOMY

Mozambique experienced modest GDP growth in 2021 of 2.2%, followed by a contraction of 1.2% in 2020, owing to COVID-19 restrictions, temporary operational issues at major mines, the destruction of infrastructure and property due to floods, and the displacement of communities because of ongoing insurgency in Cabo Delgardo.

Standard Bank Mozambique forecasts economic growth of 3.5% in 2022 fuelled by the external sector. Increased coal production at Moatize Mine and exports of other commodities, such as aluminium, should benefit from the short-term commodity shortages created by the Ukraine-Russia conflict and some price upsides.

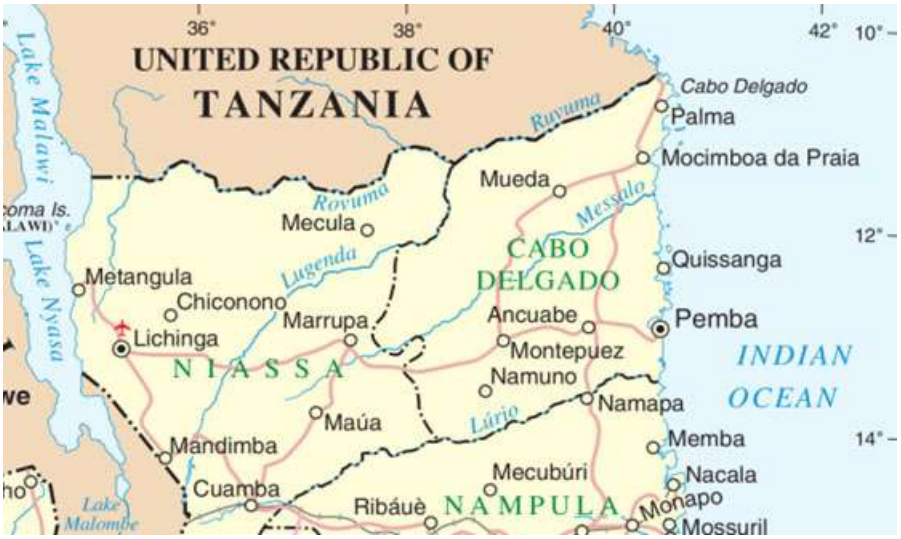
Mozambique's fiscal performance was better than expected in 2021 as revenue increased by almost 2%, while expenditure growth was contained to less than 1%. Inflation is expected to close at around 9% in 2022 due to higher fuel and food prices, exacerbated by the Russia-Ukraine conflict.

POLITICAL MOVEMENTS

President Nyusi replaced the prime minister, finance minister, and head

of the country's natural resources and energy portfolio in March, just weeks before the IMF announcement of a staff-level agreement for a $470-million Extended Credit Facility over three years.

The IMF's support should boost the government's ability to implement reforms amid elevated political risk stemming from the ongoing insurgency and repercussions of the 2016-17 debt crisis. The agreement with the IMF aims to promote inclusive economic growth but is also linked to the restoration of public finances, strengthening of governance, and improving transparency, particularly the management of the wealth derived from developing the LNG sector.



CARBO DELGARDO SECURITY UPDATE

The presence of Rwandan and SANDF military forces on the ground state that they intend to create a safe perimeter for work to resume. The safe perimeter would be a 50-kilometer exclusion zone away from

- Afungi
- Palma
- Mocimboa de praia
- Mueda
- Pundahar
- Macomia
- Chai.

Military actions have been carried out recently in Chai, Quitarejo and Mucojo by the Rwandan forces. A month-long, joint operation by Rwandan security forces and the SADC Mission in Mozambique in the Macomia district of Carbo Delgardo has restored life to normal.

The South African military announced that the SANDF deployments in Mozambique will be extended by a full year. The EU will send 200 to 300 military training officers to Mozambique in 2022 to train their forces. Portugal is to supply half the personnel and the commander for the two-year-long mission.

OIL AND GAS UPDATE NORTHERN MOZAMBIQUE

Mozambique is expected to become a major LNG exporter due to the discovery of over 180 TCF (Trillion cubic feet) of natural gas reserves in the Rovuma basin in the north of the country.

Mozambique holds the third largest proven natural gas reserves in Africa (after Nigeria and Algeria) and could be among the world's largest 10 exporters of LNG within a decade.

- **Area 1**

Area 1 covers approximately 2.6 million acres. Offshore Area 1 is located within the Rovuma Basin, approximately 40 km offshore of Northern Mozambique. This area is led by TotalEnergies with plans to build 6 LNG plants.

The first two plants are about 13mtpa ($23b) and reached FID in 2019. TotalEnergies onshore project (MLNG) is under Force Majeure and resumption is dependent on an improvement of the security situation.

• **Area 4**

Area 4 is led by ENI (all upstream operations) and ExxonMobil (construction and operations of LNG facilities onshore located in the Afungi LNG Park).

ExxonMobil said that it would conduct an independent assessment of the security situation before taking the FID decision, which is not expected before the second half of 2023.

An $8 billion FID for the construction of six subsea wells connected to an FLNG has been decided. The vessel is already in Mozambique with production planned for the second half of 2022.

OIL AND GAS UPDATE SOUTHERN MOZAMBIQUE

Sasol PSA/PPA Temane/Pande

Sasol Petroleum Mozambique Limitada (SPM) is the Operator of the Production Sharing Agreement (PSA), which is a license holding in the Province of Inhambane, Mozambique. SPM has been actively executing the Field Development Plan (FDP) which describes SPM's intent to optimally develop the light oil and gas resources contained in the Inhassoro, Temane and Pande fields.

To enable the objectives contained in the revised FDP (now submitted for government approval), SPM requires the drilling of new PSA development wells and the construction of a new light oil, gas and LPG processing facility and associated surface facilities infrastructure in Temane, Inhambane (the PSA Project).

In support of the engineering, procurement and construction of the PSA Project, SPM will be required to procure from the market, various goods and services. All procurement processes to be followed by SPM will be required to follow PSA licence requirements, i.e., competitive tender through the Expression of Interest (EOI) process.

The EOI process entails advertising the contract requirements on public media namely Mozambican local newspaper The Noticias and the Sasol website, to solicit potential bidders. Upon receipt of response submissions to the EOI advertisement placed, a shortlist of qualified bidders is required to be prepared by SPM and submitted to the Instituto Nacional de Petroleo (INP) for approval before SPM issues Requests for Quotation to the market to select potential bidders with which to contract.

SPM will publish all requests for EOIs regarding the PSA Project that will also be published in the Noticias newspaper. The detail of what will be requested from interested parties will be contained in full within the actual request for the EOI document.

BELULUANE GAS COMPANY PROJECT

Beluluane Gas Company SA (BGC) is a Mozambique registered company, which owns a concession for the import of LNG into the Matola harbour.

The concession also gives BGC the right to construct all the required infrastructure in the Matola harbour to permanently moor an FSRU, receive LNG carriers for refilling the FSRU and the right to construct pipeline infrastructure to connect the FSRU with the Beluluane Industrial Park.

In the Beluluane Industrial Park, the BGC pipeline will connect with a new 2 000MW gas-fired power station being developed by Central Térmica de Beluluane (CTB). BGC is also developing a Truck Loading Facility (TLF) near the FSRU berthing location, to fill trucks with LNG to transport to markets in Southern Africa, which are not connected to the pipeline network.

Critical project milestones achieved:

- Concept studies completed in 2012
- Government engagement regarding Concession negotiations initiated in 2016
- EIA Fatal Flaw analysis completed in 2016
- Pre-FEED studies completed in 2018
- Concession awarded in 2019
- Onshore and Offshore FEED completed mid-2021

AGAINST THE ODDS SASSDA KZN GOLF DAY REFLECTS REGIONAL RESILIENCE

The Sassda & SAIW KZN Golf Day recently took place at the Royal Durban Golf Club, the first in KZN since 2019. Despite the ravages of the recent devastating floods in the province the venue was immaculate and a pleasure to play, on a warm 'east coast' style winter's day.

All participants had a wonderful and well deserved round of golf with 84 golfers taking part and 120 guests joining the prize-giving dinner.
We'd also like to take this opportunity to thank all our sponsors without whom this wonderful event would not have shone as brightly.

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We look forward to hosting the Gauteng Sports Day at Bryanston Country Club on Wednesday, 17 August 2022!