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ISSUE 2:2018

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So September is going to be a busy month!

The first Ethiopia Railway Summit will be held during the month of September, with a focus on railway transportation infrastructure development, operation and financing. This high-level event will provide a unique platform for international railway technology companies, investors and financial institutions to engage with Ethiopian decision-makers on short-term and long-term cooperation possibilities. First-hand information on Ethiopia's railway transportation and investment policies, priority projects, procurement opportunities, new public-private partnership framework and other potential project partnerships, will be made available at the summit.

The South African Heavy Haul Association (SAHHA) – will be hosting their Technical Workshop, during September, in Johannesburg. The theme, "*Embracing The 4th Industrial Revolution In Heavy Haul Railways – Paving The Way.*" This technical workshop serves as a build-up to the next International Heavy Haul Association (IHHA) Conference that will be held in June 2019, Narvik, Norway.

Then, InnoTrans, which is considered the world's leading trade fair for transport technology and takes place every two years in Berlin. At the last event - 2,955 exhibitors from 60 countries presented the global rail industry's innovations to 137,391 trade visitors from 119 countries. The five segments at InnoTrans are Railway Technology, Railway Infrastructure, Public Transport, Interiors and Tunnel Construction. InnoTrans is organised by Messe Berlin and this year will be held from 18-21 September, Berlin.

Looking locally at the relatively fresh news, it would appear that the Isaka-Kigali SGR, will not be making its construction debut this year, by all accounts, it appears that the respective ministries are still looking for funding. Therefore it might come as a welcome relief that Moody's has affirmed Rwanda's "B2 rating, maintains stable" outlook, this should assist in their funding quest. In an interesting move, Ethiopia is looking to partially and or fully privatise a number of government-owned entities including various railway projects further announcement are expected in the next few weeks, let's hope by September in time for their rail summit!

ILCAD, which is the International Level Crossing Awareness Day took place on the 7th of June. Whilst being a global initiative, each year a partner country of ILCAD hosts the International Level Crossing Awareness Day (ILCAD). The Croatian railway infrastructure manager (HZ Infrastruktura), together with the Faculty of Transport and Traffic Sciences in Zagreb and the International Union of Railways (UIC), hosted the 2018 ILCAD event. The theme for this year was, "don't beat the train". I hope to see this event taking place in South Africa sometime soon!

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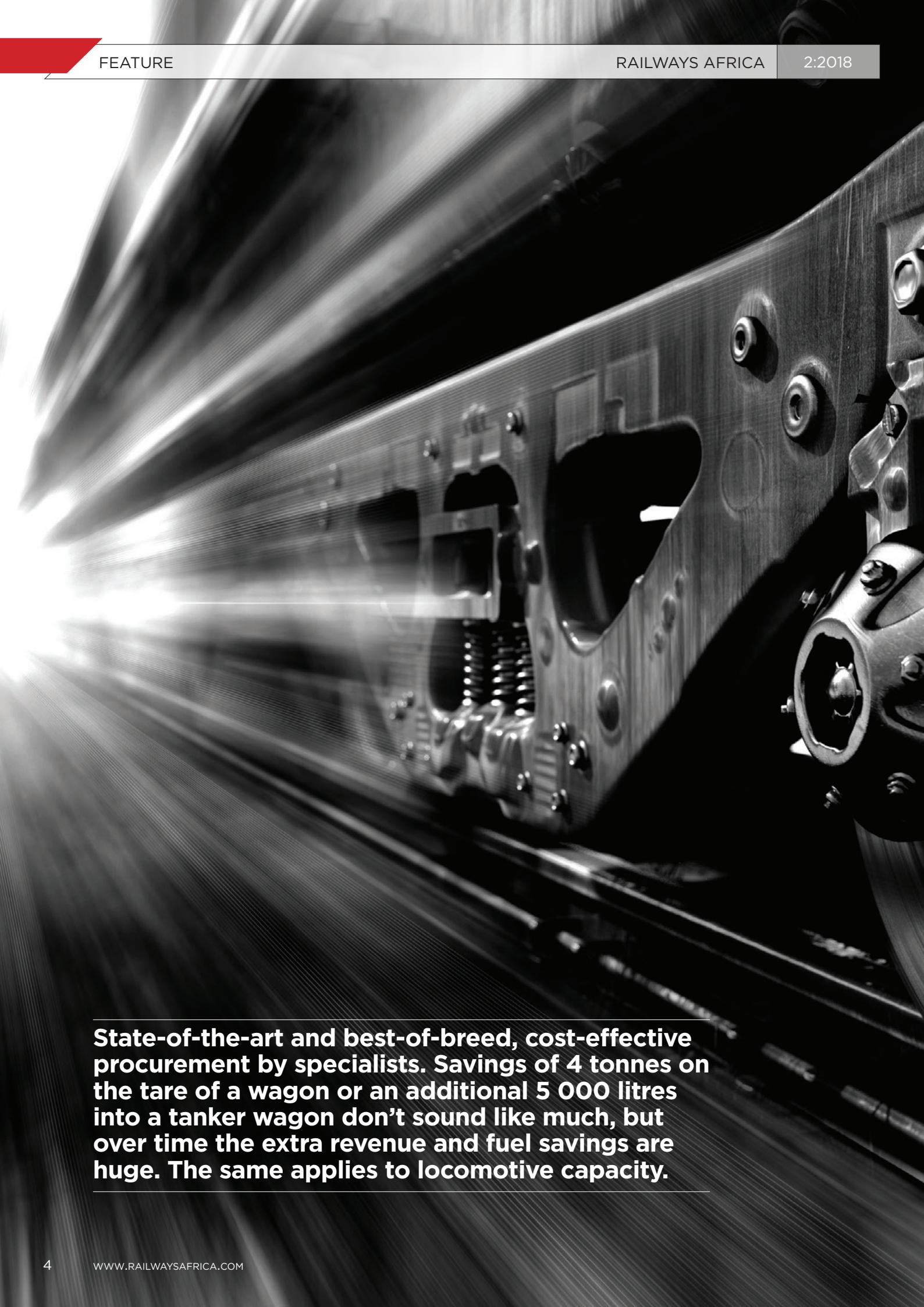
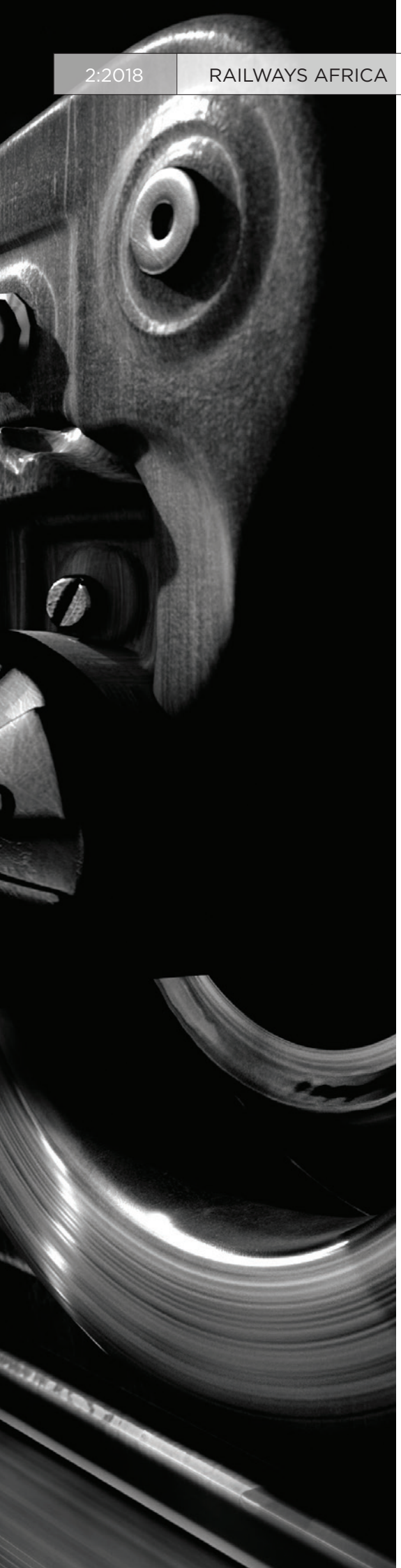


State-of-the-art and best-of-breed, cost-effective procurement by specialists. Savings of 4 tonnes on the tare of a wagon or an additional 5 000 litres into a tanker wagon don't sound like much, but over time the extra revenue and fuel savings are huge. The same applies to locomotive capacity.



Full Speed Ahead For Leasing

Sheltam, prior to its recent change in name to Traxtion, was and continues to be well known for the leasing of rolling stock, with a fleet of 45 locomotives, 100 wagons and 10 cabooses, ready to go. Last October, following the investment by Harith through the Pan African Infrastructure Development Fund 2 into the Traxtion Group, the leasing business - Traxtion Leasing – was launched with the full support of Traxtion's two major shareholders, Principle Capital and Harith.

Leasing of rolling stock offers an interesting business case both for the lessor and lessee. In an interview with Railways Africa, James Holley, CEO of Traxtion, goes into more detail on leasing and its benefits, why better rail infrastructure is the key to unlocking Africa's potential, and the role of the Traxtion Group.

Moving From What Was Traditionally Offered In Terms Of The Current Fleet, What Has Changed Under The New Brand And Investment:

What we have now is the ability to lease new rolling stock, and the ability to do much bigger deals, adding real capacity to Africa's railways and freight companies. The difference is that in the past we did not have the capacity to invest in, for example, ten new General Electric C30ACI locomotives. Now, we have access to significant funding, and with the support of our shareholders we are open to funding projects and have the capacity to meet the needs of our customers and their specific application requirements.

What Are The Benefits To Leasing?

First and foremost is the ability to create additional capacity. Leasing takes the requirement to invest in capital-intensive assets away from the mining company, freight owner or railway, and places that capital investment requirement with the leasing company, keeping capital available for alternative projects. In many instances, there are competing requirements for capital, so it makes sense to rather hand over capital-intensive investments such as rolling stock to a third party on a lease model. In some instances owning the rolling stock that has a life span of between 30-50 years is not core to their business: there may be a need to retain operating control but outsource the capital deployment.

Leasing companies are specialists in what they do which brings with it product innovation. The difference between an old-school flatbed wagon with a tare of 16 tonnes and a new lightweight skeletal design with a tare of 12 tonnes does not sound like much, but across a trainset the efficiency that this brings is material. This allows for more cargo to be moved at any given time. Leasing companies can bring great innovation to an operation by understanding the requirements of the customer and making the right procurement decision. That is a core aspect of the partnership between ourselves and the customer.

The next thing a leasing company, particularly in Africa, needs is the ability to keep that asset working. The customer needs to know those assets will work to the kind of availability thresholds that makes them efficient. Leasing companies embrace the concept of residual value risk, knowing that at the end of the lease period, you will get an asset back that is worth what it was when it was first leased out. That can only happen with best-of-breed maintenance.

Maintenance Is A Key Deliverable In The Leased Environment

Companies need to understand the complexities of operating and maintaining assets in remote areas. Maintenance is about parts, people and processes. On the parts side, you have to understand your lead times to get parts to remote areas. In terms of people, you have to have the right skills: at Traxtion, we have a Rail School where we put training artisans through a three-year, TETA-accredited training programme to ensure we have the right level of skills in place. In addition, the profile of the person is important. Not everyone is willing to go and work and live in some of the remote areas that we operate in, where one constantly has to be able to find workable solutions to a variety of problems. The right processes are equally important: many people are good at fixing a locomotive, but you need to make sure the locomotive does not break down. That is where the ISO9001 certification comes into play. This gives and the customer comfort that we have the right processes, the right people and the right parts and stock levels to meet the required service level agreements.

Our unit exchange programme is a core component of the leasing programme. For this to really work you need to have capacity across a fleet of locomotives obviously with similar specifications.

Our Rosslyn workshop allows us to provide a maintenance hub for our leased fleets in Africa. Typically, the maintenance cycle requires the heavy refurbishment of these assets every seven to ten years, depending on the usage. Bringing the assets back to a central place with core skills allows us to do these overhauls as well as offer third party locomotive refurbishments. We are looking at developing our Rosslyn facility as a rail services hub and invite other companies to be part of this.

The Leasing Model?

The leasing model is highly capital-intensive. You have a chunk of equity and a chunk of debt. The decision to raise debt and equity is similar, and in each instance the ultimate funder looks to the strength of the underlying cash flows. That rests on how strong the business case is and the balance sheet of the company that one is leasing to. Because of the nature of the heavy debt burden, the business case and the company wanting the lease need to be able to stand up to scrutiny and a due diligence. This is the first decision.

The next stage of discussion is around the right assets for the customer, the correct maintenance plan and whether there are adequate facilities to maintain those assets.

> Best-of-breed maintenance procedures. Leasing lives on the strength of the residual value of assets, so maintenance becomes critical. At Traxtion Leasing, we link leasing to Traxtion's ISO9001 certified maintenance offering, which means the assets do what they are supposed to: they work!

The most critical aspect is ensuring that the deal is bankable and that we can go to our investors on behalf of the client and procure the equipment that our customer needs.

The operator's state of infrastructure is also important, as this talks to the residual value of the asset. The locomotive or wagons need to come back in a condition that they can be redeployed at the end of the lease period - this is the whole point of a leasing company. Modern control systems on locomotives are there to protect the locomotive, so as a leasing company we are confident that the state-of-the-art on-board technology and telemetry will help to protect the locomotive.

We also have the ability to lease and train. Through our Rail School, we put in place a training programme that ensures that by the time the rolling stock arrives, the client's team is trained and certified to the right level to both operate and protect the asset.

On wagons, the specifications are based on what will be transported, where it will be operated and how it will be offloaded, as this informs both the specification of the steel used, the bogies used, and the design. Each specification has a significant impact on the wagon and the efficiencies thereof. There are a number of ways that we as a company can work out the challenges that are unique to Africa.

Cost Packaging Around Leasing

The cost packaging associated with leasing depends on what the customer's ultimate requirement - a full maintenance lease, or a dry lease. In either case, the company leasing the product needs to be geared towards that. For a leasing company to succeed in Africa, you need a strong maintenance capacity, so we would typically offer a full maintenance lease. Typically, in a lease, the capital portion of the lease - considered the dry portion, before you get to maintenance - is the majority of the total lease charge. Availability penalties typically only apply to the maintenance portion of the rate however where we maintain we can take some risk over the dry lease portion which really differentiates our offering.

Interoperability And The Challenges Of Africa

At the moment we have two primary gauges in Africa - Cape and Metre. With the addition of standard gauge, you get the problem of going down from a wide gauge to a narrow gauge. There is a lot more space to fit a traction motor to a standard gauge bogie than a Cape gauge bogie, so typically the traction motor under a standard gauge bogie is bigger. So moving a locomotive from standard gauge to a common gauge in Africa is a lot more challenging. The move from metre gauge to 1067 is not a problem: the interoperability of locomotives across the region is good and this happens frequently. As a leasing company, we can manage this and it is not a big cost to make the change and redeploy the asset elsewhere.

The vast majority of track in Africa is non-electrified, and I foresee this being the case for a number of years. We will maintain a diesel-based traction environment for some time.

A Leasing Pool

Take an example where there has been a derailment, and the operator needs an interim power solution quickly. We would then use our existing fleet, if the specifications fit, to meet those requirements. For a lease pool in the traditional sense to succeed, though, one needs a certain amount of activity and demand from the region, and whilst there is a market for this, it is not quite buoyant enough. Currently there is an over-supply of interim power.

Sale And Lease Back Projects

Provided it is well maintained, rolling stock has a long life cycle. A typical fleet will have an average age of 15-20 years, although it is not uncommon to see rolling stock in service that's more than 50 years old. The intrinsic value of that rolling stock is significant, so where companies need to raise capital, one of the "low-hanging fruits" available to them is to enter into a sale and lease back agreement. The leasing company procures those assets, releasing cash back into that company for investment elsewhere, and then leases the assets back to the customer. This can include a few enhancements as part of the leasing programme, including the modernisation of that fleet, gradual upgrades and even a replacement programme over the fleet of rolling stock, be it wagons or locomotives. To upscale those assets to improves the efficiencies of those assets. Purchase options can be included as part of these programmes should the railway wish to bring these assets back on balance sheet.

There are also interesting things one can do around rail cargo management and extracting additional efficiencies from freight flows, ensuring better use of the assets. This is an area that we have not even begun to scratch the surface of in Africa, and we believe there is huge potential in this model.

Optimal Length Of Lease

The lease tenure really depends on the requirements of the customer first and foremost, and as a leasing company, one tries to be as flexible as possible. If a customer requires a short term - for example, the life of a mine or rights of an asset are only for a defined period - the leasing company will look at the redeployment possibilities of the assets at the end of the period. It also depends on finding the right sweet spot: in raising cost-effective finance, there is a period where the residual value of the assets and residual value of the debt is so high that it makes leasing for a short period very expensive. So the first thing is to try and develop a solution around what the customer needs and the cost-effective point of the underlying funding. By the same token, long-term leases are also not ideal, as the leasing company is then not embracing the residual value risk. Each situation needs to be looked at individually.

Developing The Business Case For The Mining Sector In Africa

The business case for the mining sector is becoming less about the type of commodity being bulk or refined and more about the economic fundamentals that underpin that commodity. Some commodities like copper and coal look good, but iron ore is looking tough. Bulk commodities are historically well-suited to rail: the heavier, the longer, the better for rail. However, the actual commodity is less important than the fundamentals of the business case. The rolling stock investment decision for a leasing company is always going to be based on the capacity of what the customer needs – so whether it is bulk coal or refined copper we can find a solution.

For railways to really succeed in Africa, you need the financial capacity to invest in what is below and above rail. One of the key challenges for the mining sector is access to rail-related infrastructure.

The strategic decision behind our recent investment and the launch of the Traxtion Group into separate business units allows us to service our customers based on what their need is: for leasing, there is Traxtion Leasing; for the development of infrastructure such as an investment into a spur or track refurbishment, we have Traxtion Projects; for rolling stock maintenance and rail operations, we offer this through Traxtion Sheltam. We develop skills for train drivers and formal operations through our Rail School. What this means is that we as the Traxtion Group are able to meet the specific needs of our customers by positioning ourselves as specialists in each service that we offer.

In The Leasing Environment How Does Insurance Work?

Typical asset insurance is relatively straightforward: we engage with insurers who have a presence on the continent. It gets interesting where we can access ECA funding, as this funding comes with commercial risk and political risk insurances. In the days when ECIC still had an interest rate subsidy, South African manufacturers were really efficient, as the funding lines we could get from South African banks were on a par with anything we could get in the rest of the world. This meant South African rolling stock manufacturers had a good leasing offering that they could put into the market with effective funding lines.

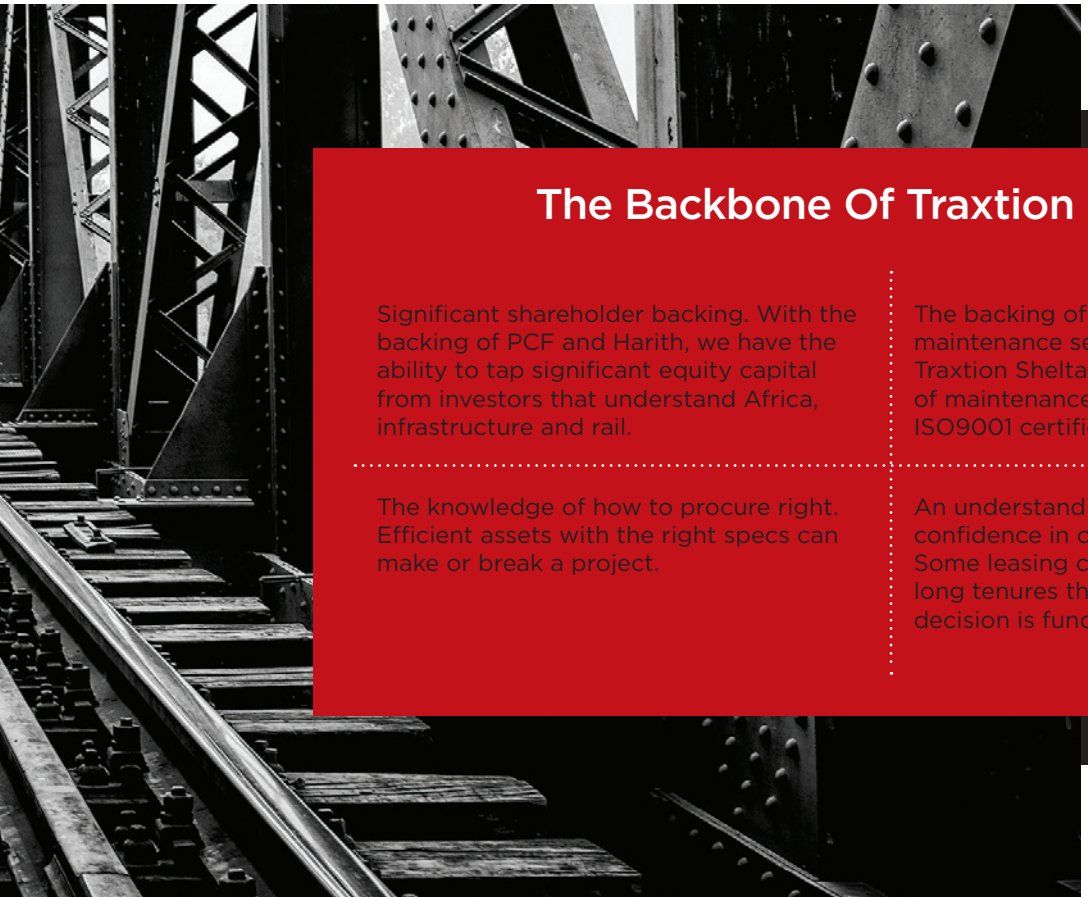
When leasing products into Africa there are commercial insurance products that one can buy when products are manufactured in South Africa, that cover both commercial and political risk, but they are expensive. If you are procuring from other countries with really cost effective commercial and political risk enhancements, this can be the difference between leasing or not leasing.

The Luxembourg Rail Protocol

The Luxembourg Rail Protocol brings to the rail sector the same benefits that the Cape Town Convention brought to the aviation industry: a central registry of ownership and title of railway assets. This brings certainty of ownership, which in turn brings a reduction in financing charges – which ultimately translates into a reduction of freight charges. This means that we can become more competitive against road, and we would be able to create more freight for our railways. It really is one of those steps that will allow Africa to advance and there is no downside to it.

The Luxembourg Rail Protocol should be embraced by every country in Africa with rail operations. What will really drive the success of the protocol is if that central registry is also recognised in local legislation. The Rail Working Group is making good progress in this.

For more on the Luxembourg Rail Protocol refer to www.railworkinggroup.org



The Backbone Of Traxtion Leasing

Significant shareholder backing. With the backing of PCF and Harith, we have the ability to tap significant equity capital from investors that understand Africa, infrastructure and rail.

The backing of quality in your maintenance service provider. With Traxtion Sheltam, we have 30 years of maintenance history in Africa and ISO9001 certification to back it up.

The knowledge of how to procure right. Efficient assets with the right specs can make or break a project.

An understanding of the market and a confidence in our ability to redeploy. Some leasing companies demand such long tenures that the lease versus buy decision is fundamentally undermined.

Official Handover Of Remanufactured Locomotives for Zambia Railways

The official handover and commissioning of the recently remanufactured locomotives for Zambia Railways (ZRL), by SMH Rail SDN. BHD. Malaysia (SMH Rail), took place in March this year. The Zambian Government's commitment to revitalise the rail industry and contribute to the modernisation of rail infrastructure will have a direct impact on the economic returns for the country. In addition, the remanufactured locomotives will add much need capacity to Zambia Railways Rolling stock fleet and demonstrate the company's resolve to succeed in the implementation of the SI.

Whilst new locomotives are almost always an operator's preference, one must not forget that to keep the engines running, that returning old rolling stock to an as-new-state, will bode well for the balance sheet, whilst enabling the operator to meet demand and build CAPEX for future rolling stock procurement. Taking into consideration that an asset which is already paid for can with a complete renovation be reinstated to the fleet as an almost new solution and when embarking on a remanufacturing process, the operator can potentially save up to 30 to 40% of the proposed budget, whilst achieving the same performance and warranties of a new locomotive.

SMH Rail has successfully delivered the first two locomotives within the prescribed timeline as per the contracted awarded in 2015 for the remanufacture of 10, U20C class locomotives. The 3rd locomotive has been completed and has successfully completed the trial runs. The 4th locomotive is in its final stages of completion and the balance of the locomotives will be delivered per the directive.

These remanufactured locomotives are sophisticated, equipped with digital-microprocessors, remote GPS monitoring control system that allows the monitoring of the locomotive performance through GPS on from a multitude of devices including smartphones. In addition, the system allows for troubleshooting from any remote location enabling the Control Centre or Train crew to accurately identify and resolve problems. This is sure to provide an increased level of comfort to Zambia Railways customers, who will now have the ability to monitor their goods in transit.

SMH Rail has ensured that the original bogie frames, chassis and fuel tanks used in the remanufacturing have been pre-qualified through non-destructive testing and finite element analysis. The capacity of the remanufactured locomotive is 2,150 horsepower, enabling 1,200 tonnes of cargo

(equivalent to 20 full loaded wagons). The impeccable performance is a proof that remanufacturing technology is a workable and cost-effective solution to revive ageing locomotives.

Remanufacturing works have been carried out at ZRL's own premise in Kabwe under the direct supervision of key engineering personnel from SMH Rail, promoting localisation through local employment opportunities. Currently, the division of workforce stands at 75% local workforce and 25% foreign expatriates. Human capital development has been effectively administered wherein ZRL's personnel are being given the requisite training and knowledge transfer on the remanufacturing works. The experience and exposure gained from this venture will equip ZRL's personnel to handle future maintenance works.

SMH RAIL, is a leading manufacturer of new and remanufactured Rolling Stock such as; locomotives, metro train, electrical multiple units (EMU), diesel electrical multiple units (EMU), wagons and axles while performing maintenance for locomotives, wagons, wheelsets and bearing reconditioning. SMH Rail, the largest rolling stock company, has carved its name in the African rail market with its proven track record in the successful remanufacturing of Tanzania Railways Limited's old and ageing locomotives.

SMH Rail is also the assembler of Malaysia's first driverless metro train (232 rail cars) apart from having other notable rolling stock projects, which include wheel shop operations, locomotive, metro train maintenance, and track works in various parts of Asia and Africa.

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Protecting Railway Networks From Cyber Threats

Rail networks, as integral parts of critical infrastructure, continue to come under cyber attack

Supplied By Morand Fachot, | IEC e-tech

Technological And Cultural Change

Railway systems form an integral part of the transport system and as such are seen as part of the critical infrastructure in many countries. Cyber threats to railway networks are assuming increased importance as the digitisation of railway control systems grows.

Signalling and train control systems have relied on various types of switches for a long time. These are essentially closed proprietary systems protected by so-called air gaps.

The traditional air-gap protected systems are not immune to attacks. In 2008, a 14-year old Polish teenager used a modified TV remote control to interfere with the tram track and point system in the city of Lodz. Four vehicles were derailed and 12 people injured in the process.

The railway sector is now introducing open systems that are based on technologies such as general packet radio service (GPRS) and long-term evolution (LTE) for mobile communications, and IP. These systems, being open, represent a technological and a cultural shift.

However, computer-based systems have introduced the additional dimension of cyber threats. This means that cyber security becomes a concern and must be integrated from the beginning.

In November 2016, the San Francisco Municipal Transportation Authority (SFMTA) was the target of a ransomware attack. Its information systems were encrypted and the operator was forced to disconnect its fare gates and ticket vending machines, resulting in financial losses.

In May 2017, German rail operator Deutsche Bahn was affected by the WannaCry ransomware attack. While this resulted in its electronic boards being switched off in some stations, its train services were not disrupted.

Growing awareness of cyber threats within the railway sector has been highlighted by a range of international initiatives and conferences. A special session on Cyber Security in Rail within the framework of the Intelligent Rail Summit 2017 organised in Vienna in November 2017 by RailTech, a global platform for rail professionals, looked at a range of aspects. This session, attended by e-tech, listed issues in the cyber threat sphere and measures to address them, among them the use of IEC Standards.

Wide Range Of Potential Attackers

The main threat to railway (and other transport) systems does not come from the so-called script-kiddies, like the Polish teenager who hacked the Łodz tram system, but from four different groups of perpetrators in two categories:

1. Criminals who try to extort money, with ransomware being the main tool. This has become a business model with different types of malware being developed and either sold or rented.
2. Others who are determined to disrupt or damage operations. They include:

- Disgruntled or sacked employees with access (including physical) to computer systems
- Terrorists and politically-motivated groups
- Possible state actors

Physical attacks should not be discounted. In September 2016, the Chicago air traffic control centre was closed by a massive fire set by a disgruntled contractor. Thousands of flights were disrupted across the US. Attacks can take a hybrid form that combines physical and cyber-attacks.

Prevention of physical attacks, which are often carried out through unauthorised access, can be ensured by applying International Standards developed by IEC Technical Committee (TC) 79: Alarm and electronic security systems, and by ISO/IEC Joint Technical Committee (JTC) 1/Subcommittee (SC) 17: Cards and personal identification.

Enclosures containing electronic and control equipment installed in remote places along tracks present physical and cyber vulnerabilities.

Protecting Railway Infrastructure From Cyber Threats

The digitisation of the railway sector and the move from electromechanical to digital IP-enabled technology is being encouraged by the European Union in the form of the European Rail Traffic Management System (ERTMS).

ERTMS is a system of standards for the management and interoperation of signalling for railways, which is being adopted not just in Europe, but beyond: in several African countries, in Brazil, Mexico, many Middle Eastern and Asian countries including China and India, and Australia.

Industrial automated control systems (IACS), are no longer isolated from the outside, and railway systems are increasingly interconnected thanks to automatic train operation (ATO) and as part of intelligent transport systems, François Hausman, Alstom Main Line cyber defence manager and Shift2Rail cyber security WP leader told the conference. Cyber-attacks on industrial control systems increased by more than 600% between 2012 and 2014, he said, bringing with them severe financial and safety concerns.

Inside the drive cabin of a Japanese Shinkansen "bullet train"

Mechanical levers are still used in many countries to control railway signals and the movement of trains over the points (Eastgates signal box, Colchester, UK, Photo: Sir Ross BA)

Railway specifics, such as electronic components scattered along tracks or trains, a very long life cycle (in excess of 25 years), diversity both of supply chain and technology and other characteristics make this a complex domain.

Automated, Wireless Signals More Efficient, But Open To New Threats

"The automotive sector has woken up to the critical need for cyber protection. It's time the railway industry got on board as well," says Amir Levintal, CEO of Israel-based specialised rail cyber security company Cylus. "The current approaches to cybersecurity do not fit the architecture of railway networks today," Levintal told the Global Railway Review.

Levintal sees new signalling systems as especially vulnerable to hackers. These systems "are the heart of safety-critical train operations. They have also become more and more automated over the past few years – and are now operated wirelessly," he explains.

"In the worst-case scenario, hackers could send commands to the train causing them to slow down, stop completely, or even accelerate on curves so that the train would be unable to align itself with the switches on the track. All of these scenarios could lead to disaster," Levintal warns.

IEC Standards For IACS Central To Railways

Shift2Rail, an initiative that brings together key European railway stakeholders to achieve a single European railway area, is looking at defining how different aspects of cyber security should be applied to the railway sector. It has assessed applicable standards and selected the IEC 62443 series for the following reasons (and others):

- it is a set of Standards dedicated to IACS
- it addresses product and system life cycles
- it covers security risk assessment processes
- it defines security levels based on functional security requirements
- it is used by other critical infrastructures.

The choice of IEC 62443 was also highlighted by ERTMS Cyber Security Lead Engineer Sharvind Appiah at a workshop organized by the Railway Gazette. "There's no reason to develop new standards for railways. There are already many standards for cyber security, whether they are NIST [the US National Institute of Standards and Technology] or ISO/IEC standards (...). The challenge is to see which of these fit in the railway context. That's what we're doing in Shift2Rail; we're looking at industry standards, which means IEC 62443, a complete set of

Standards designed for IACS, but we apply them in the railway context."

"For me this is a smart way to bridge the gap. It avoids forcing us to go through the R&D phase, where we have to rewrite the standards. We have standards there; it's a matter of adopting them and learning how to use them."

The fact that IEC 62443 is emerging as a core set of Standards for the railway sector was highlighted by other speakers at the Vienna conference, in particular by David Rogers of Siemens in his presentation: "IEC 62443: A cyber security Standard approaching the Rail IoT."

The set of Standards involves the three major stakeholders in the protection of plants against cyber-attacks: asset owners, system integrators and product suppliers, Rogers said. A key concept of IEC 62443 is that security requires a set of coordinated measures to be taken, an approach generally described as defence-in-depth.

The fact that IEC 62443 is being widely adopted is illustrated by the German standard DIN VDE V 0831-104; VDE V 0831-104:2015-10: *Electric signalling systems for railways – Part 104: IT Security Guideline based on IEC 62443 (62443-3-3:2013).*

All Countries Are Introducing Cyber Security Measures In The Rail Sector

The UK Department for Transport has issued a guidance document which is designed to support the rail industry in reducing its vulnerability to cyber attack. It is designed to be high-level and sets out the principles and general approach to cyber security as good practice. It does not provide detailed instructions.

Standards mentioned in a recent public consultation document by the Australian Standard Rail Industry Safety and Standards Board (RISSB) include, in addition to IEC 62443, the ISO/IEC 27000 family of Standards on IT Security Techniques, as well as ISO/IEC Technical Reference (TR) 15443-1:2012 and ISO/IEC TR 15443-2:2012, Information technology – Security techniques – Security assurance framework.

In the US, NIST has published a paper on the performance evaluation of secure industrial control system design for a railway control system.

As railway systems will rely increasingly on mobile communication, connected devices and IP networks, the incidence of cyber attacks from a variety of actors is likely to increase.

International standards, in particular IEC Standards such as the IEC 62443 series, will provide an all-inclusive approach to information technology (IT) and operational technology (OT) security and will be central to protecting IACS from cyber threats.

About The IEC

Founded in 1906, the International Electrotechnical Commission (IEC) is the world's leading organisation that prepares and publishes International Standards for all electrical, electronic and related technologies. The IEC also administers four Conformity Assessment (CA) Systems certifying that components, equipment and systems conform to standards of quality, including such aspects as safety, efficiency, effectiveness and durability.

Close to 20 000 experts from industry, commerce, government, test and research labs, academia and consumer groups participate in IEC standards development and CA activities.

The IEC is one of three global sister organisations (IEC, ISO, ITU) that develop International Standards for the world. When appropriate, IEC cooperates with ISO (International Organization for Standardization) or ITU (International Telecommunication Union) to ensure that International Standards fit together seamlessly and complement each other. Joint committees ensure that International Standards combine all relevant knowledge of experts working in related areas.

IEC Reaches Out To Developing Countries

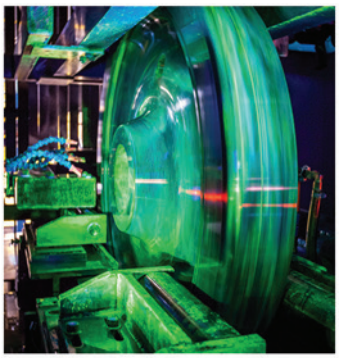
The IEC Affiliate Country Programme reaches out to developing countries, giving them the opportunity to get involved with the IEC without needing to become members. The Programme encourages greater awareness and use of IEC International Standards and CA Systems in developing countries; helps those countries understand and participate in the work of the IEC and facilitates the adoption of IEC International Standards as national standards.

IEC In Africa

The IEC has regional offices on five continents. The Africa Regional Centre (IEC-AFRC), in Nairobi, Kenya, is the focal point for the IEC in Africa, helping to promote awareness of the IEC in the region, increase the use of IEC International Standards and IEC CA Systems, and enhance participation and membership of countries in the region. It cooperates closely with the African Electrotechnical Standardization Commission (AFSEC), the African Union and all the other regional bodies that are important for African development. The Centre also helps enhance the governmental level of involvement in African countries participating in IEC work.

In May 2017, the IEC and the Kenya Bureau of Standards (KEBS) hosted the first ever low voltage direct current (LVDC) *Conference for Sustainable Electricity Access*, in Nairobi. The conference focused on how LVDC could be leveraged to help bring about clean and affordable electricity to the estimated 1,2 billion people, of which 640 million are in Africa, without access to electricity.

IEC	www.iec.ch
IEC Affiliate Country Programme	http://www.iec.ch/affiliates/
IEC-AFRC	www.iec.ch/about/locations/iec-afrc/iec-afrc.htm
AFSEC	www.afsec-africa.org/
KEBS	https://www.kebs.org/



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Lucchini South Africa is committed to transformation and the principles of Broad-Based Black Economic Empowerment.

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LOOK BEYOND

Madaraka Express Passenger Service Marks One Year Of Successful Operations!

Kenya Railways (KR) has celebrated the first year of operations of the Madaraka Express Passenger Service launched on May 31 last year.

According the operators press statement "The public's uptake of the service has been nothing less than astounding. So far, more than 1,328,000 passengers have used the Madaraka Express passenger train with the demand increasing every day."

The uptake is largely attributed to the numerous benefits it holds over alternative modes such as unparalleled comfort of the coaches and the reduced travel time between the Port City and Nairobi which averages at 5.5 hours.

At the celebratory ceremony held at the Nairobi Terminus, the Cabinet Secretary for the Ministry of Transport, Infrastructure, Housing & Urban Development (MoTIH&UD), Mr. James Macharia, hailed the one year of operations as having surpassed expectations to perform exceptionally well with the future looking even brighter. "The service has presented new opportunities for Kenyans through job creation and technology transfer while helping in navigating transport challenges which had partly hindered Kenya from fully realising its domestic potential. The service has had a positive impact on the tourism sector by encouraging the growth of domestic tourism. According to the Kenya Tourism Board, bed occupancy has increased to more than 90% up from 50% in previous years, a factor largely attributable to the Madaraka Express," he said.

Since the launch, KR has actively sought to improve the Madaraka Express experience for customers by strategically introducing new developments from time to time. In August 2017, the intercounty train service was introduced with the inaugural stops being at Voi and Mtito Andei. This was swiftly followed by the launch of the full intercounty train service in November. The intercounty train makes stop a at all seven intermediate stations. This has greatly widened the customer base while increasing the service's efficiency. The intercounty train leaves Mombasa at 07:15 and Nairobi at 08:00 while the express train leaves Mombasa at 15:15 and Nairobi at 14:30.

In September 2017, KR launched the USSD ticket booking platform which requires customers to dial the short code *639# from a Safaricom line to book their tickets and pay for them via Mpesa. In January 2018, in an effort to make the ticket booking even more efficient, KR introduced the online booking option which requires customers to visit the website metickets.krc.co.ke from where they can select their preferred date of travel, point of boarding and destination, the travel class as well as other details such as number of passengers travelling. The introduction of the online booking platform also increased the booking window to 30 days (individual) and 32 days (group booking) up from 14 days and 16 days respectively.

Kenya Railways is working together with the Madaraka Express Operator, China Road and Bridge Corporation to fast track even more developments of the service in order to ensure it remains the top choice for travellers plying the Mombasa - Nairobi route.

Currently the construction of SGR Phase 2A is ongoing, with works having reached Duka Moja. Just like Phase One (MSA – NRB), many Kenyans are already enjoying the benefits of Phase 2A through the numerous employment opportunities at the various sites across the project. It is anticipated that this phase and the Madaraka Express passenger train for that section will be operational and servicing the country's development agenda by June 2019.


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34

Developing Professionals In Non-Destructive Testing (NDT) And Why Their Technical Expertise Will Soon Be In High Demand In Africa

The following paper has been submitted by: Eng. Kunetsa K. Kufakowadya[1,2,3,4,5] (MBA; MScMEng; MZweIE; MECZ).

About the Author: Eng. Kunetsa K. Kufakowadya, has enrolled at the Dresden International University (DIU) in Germany to study the Master's Degree Programme in Non-destructive Testing. He is keen to acquire this engineering skill and see it being developed in his own home country of Zimbabwe and the rest of Africa. He can be reached on: Email: kkunetsa@yahoo.com

Abstract

There is no doubt that Africa is now slowly becoming an awakening giant in terms of industrialisation. By 2050, it is predicted that Africa is going to be the manufacturing factory of the World, replacing China. Africa is going to follow in the footsteps of countries like Japan, South Korea, Taiwan and China. With this anticipated industrial and socio-economic growth, Africa needs to prepare its people to acquire appropriate technical skills that will be required in handling this phenomenal technology growth. One of the key professional and technical skills that is still very scarce in Africa is that of Non-destructive Testing (NDT); an important field of materials science and engineering that is a must in any industrialised nation. The professionals that are needed to support NDT industry practices can be technicians, engineers and academics. These professionals should be certified in NDT techniques in accordance with the International Standards ISO 9712:2012 or BINDT's PCN scheme or ASNT's SNT-TC-1A standards for personnel certification. These standards outline the personnel certification methodologies that need to be followed in order to adequately train and certify NDT practitioners to internationally recognised levels. NDT is a "hands-on" technology that must be thoroughly mastered in order to be recognised at three (3) different levels of qualifications: Level I, II and III. These levels of personnel certification are for particular NDT methodologies such as Ultrasonic Testing (UT), Visual Testing (VT), Radiographic Testing (RT), Infra-red Thermography (IRT), Magnetic Particle Testing (MT), Liquid-dye Penetrant Testing (PT), Eddy-current Testing (ET), Acoustic Emission Testing (AET), Computed Tomography (CT-Scan) and many more other modern NDT methods that are being developed.

- Motivation
- The regulation and development of the NDT Industry
- What is NDT and what is its role in industry?
- Africa is Rising and will Replace China as the Next Factory of the World by 2050.
- Developing NDT Professionals – the ISO 9712: 2012 Standards
- Conclusions

Motivation

After reading the 2017 book by Irene Yuan Sun, 'The Next Factory of the World: How Chinese Investment is Reshaping Africa', the author of this paper was deeply motivated to think of how Africans can prepare themselves for this giant developmental phenomenon. As an engineer the author thought of how engineering, particularly in manufacturing can contribute effectively to the rise of Africa as a future manufacturing hub of the World. If Africa is to manufacture goods for the world, it must therefore master issues of Quality Control and Quality Assurance (QC/QA) in its manufacturing processes and infrastructural development. And at the centre of any successful manufacturing process/infrastructural development is the ability by engineers to master the engineering behind Materials Science. QC/QA in materials science is guaranteed mainly by a thorough knowledge of Non-destructive testing (NDT) methods that are used by engineers to control the quality of engineering materials for manufacturing, in-process materials and finished products that would undoubtedly satisfy customer needs at an affordable price. This paper therefore seeks to highlight to the many Africans out there that the time is now to start preparing our own citizens to have the right technical skills that will propel the industrial growth of Africa within the next 40 years. One such important area, is for Africa to start training as many NDT professionals as possible because the production of quality goods in African factories and construction of reliable infrastructure, will depend largely on the availability of competent NDT practitioners.

In order to support and boost its industrialisation process, Africa will need to develop its energy sector (i.e. build more power stations to provide enough electrical energy to the rising number of factories), the transport sector (i.e. have more railway networks, more trains, more airports and aeroplanes, more roads, more seaports), natural resources-processing plants (i.e. develop minerals-processing plants, steel plants, petrochemical plants, agro-foods processing plants), education & skills development sector (build technical colleges, universities, research centres), medical & health sector (i.e. build modern hospitals, laboratories), the defence industry and many other sectors that are supportive of the growth of an industrialised nation or continent.

The regulation and development of the NDT Industry

Most advanced and industrialised countries have established either societies, organisations, associations

or institutes that are geared to regulate and develop the engineering activities around the NDT industry. Most of these well-established NDT organisations are found in Europe, the Americas, Australia and Asia, whilst the continent of Africa seems to be still far from catching up with the rest of the world. South Africa is the only leading country in Africa that is taking NDT development seriously, possibly followed by other African countries like Egypt, Kenya and Algeria.

Notable organisations are:

- EFNDT is a federation of national NDT societies of European countries, including Israel and Australia, that have signed the EFNDT Agreement on the Multilateral Recognition of NDT Personnel Certifications issued by member countries.
- AFNDT is a federation of NDT in Africa and it so far comprises of 8 Member countries, South Africa, Sudan, Tunisia, Algeria, Kenya, Angola, Ghana, Cameroon; with a likelihood of including the following countries in the near future: Uganda, Egypt, Mauritius and Nigeria.
- APFNDT is a federation of NDT for Asian countries and those in the Pacific region.
- PACNDT is an organisation for NDT grouping countries in the American Continent and the Caribbean region.
- ICNDT is a non-profit organisation based in Vienna, Austria and it is devoted to the international development of science and practice of NDT in conjunction with individual NDT societies and other groupings of the NDT communities.
- IAEA is an international organisation which regulates atomic energy and is very much involved in the development of NDT technology in order to manage nuclear power generation facilities in the world.

To access the full list please refer to: http://www.railwaysafrica.com/uploads/ndt.pdf

What is NDT and what is its role in industry?

Non-destructive Testing is a branch of materials science and engineering which is concerned with the scientific methods that are used to inspect, detect and evaluate flaws or defects in materials without causing any harm or damage to the material being inspected. NDT is used for the in-service inspection and also for condition monitoring of operating plants and for the quality control of engineering products and materials. The terminologies of non-destructive testing (NDT), non-destructive inspection (NDI) and non-destructive evaluation (NDE) mean the same and are therefore used interchangeably. The field of NDT has no clear boundaries and it is a scientific and technological field that is still growing, although it is said to have since gone past its infancy stage. There are well-documented methods that are used to carry out NDT in industry. These methods range from the simplest techniques such as Visual Inspection (VT) to the more complex ones such as Optical Techniques (OT), Liquid Penetrant Testing (LPT), Magnetic Particle Testing (MPT), Electromagnetic Testing (ET) or Eddy-current Testing (ET), Radiographic

Testing (RT), Ultrasonic Testing (UT), Infra-red Thermography (IT), Leak Testing (LT), Hydrostatic Testing (HT), Acoustic Emission Testing (AET), Alternating Current Field Measurement (ACFM), Computed Tomography (CT-Scanning), Strain Measurement (SM), Fatigue & Fracture Testing (FFT). It is however, not the objective of this paper to explain in detail the methodology behind each of these mentioned NDT techniques.

From mere laboratory experiments, NDT techniques have been developed all these years to become indispensable decision-making tools in production, security, safety, structural integrity, maintenance and lifespan predictions. The role that is played by NDT techniques in industry is quite immense; especially when it comes to the quality control of materials and components during the manufacturing process, plant operations and maintenance and above all its endeavour to guarantee general security by detection of dangerous items and operational safety through the identification of material flaws before a catastrophe happens.

Industry Application of NDT Techniques

Purpose and Benefits from Application of NDT Techniques in Industry

NDT techniques are mostly applied in the following areas:

- Civil Infrastructure such as dams, bridges, buildings, railway line, tunnels, etc; in order to determine their structural integrity without any damage done on them.
- Power Generation Plants such as nuclear power stations, coal power stations, hydro-power stations, gas power stations and general steam generating plants for manufacturing industries.
- Aeronautics and Space Industry: organisations such as Boeing, Airbus, Bombardier, NASA, etc; make use of NDT techniques extensively in order to guarantee maximum safety on their manufactured aircrafts. Aircraft maintenance relies heavily on non-destructive inspection and testing (NDI/NDT) to ensure aviation safety.
- Marine Industry: manufacture and maintenance of naval equipment, cargo vessels, luxury yachts/cruisers and submarines.
- Automotive Industry: during the manufacturing and maintenance of automobiles and their assembly plants.
- Railway Industry: during the manufacturing of locomotives, rail cars, rail plant machinery and their assembly plants.
- Petrochemical Industry i.e. the Oil and gas industry to guarantee structural integrity of all fuel storage facilities and related piping structures.
- Mining Industry: structural integrity of heavy machinery used in minerals processing.
- R & D Laboratories and Universities to carry out research and train NDT Professionals
- Manufacturing Plants to determine the structural integrity of all the operating components of the plant i.e. in-service inspection and condition monitoring.
- The Metallurgical Industry i.e. the development of engineering materials (metals, polymers, ceramics, composites and advanced materials) and the design of engineering components.
- Security Industry e.g. public places, at airports, railway stations, seaports, etc.
- Medical & Health Industry.

The use of NDT techniques in industry provides inspections with better productivity and with greater integrity, which in turn improves the reliability of performance in manufacturing, infrastructure, transportation, power and utilities, natural resources and all other related industries. It is without any doubt that industrial developments are closely related to the application of quality and safety controls. The development of accepted quality and safety standards in manufacturing and engineering is a long-term process requiring well-qualified manpower, especially in the field of NDT. One of the most important conditions of successful industrial development is the proper practice of NDT because a good practice of NDT results in the promotion of economic growth. Below is a brief explanation of the purpose and benefits that are accrued from a consistent application of NDT techniques in industry:

- Quality Control and Quality Assurance (QC/QA)
- Improved Design of Engineering Components
- Development of Engineering Materials
- Condition Monitoring and Predictive Maintenance
- Protection of the Environment and People's lives – Operational Safety
- Homeland Security
- Contribution to the Engineering Value Chain and to the Bottom line – Profitability
- Control Manufacturing processes and ensure product integrity and reliability
- Ensure Customer satisfaction and maintain manufacturer's reputation.

NDT technology is now considered a key engineering tool in QC/QA since its correct application guarantees safety and luxury to the public. Safety and quality go hand in hand; without quality products, there is no safety. In terms of NDT technology, quality is defined as "the freedom from defects that may compromise safety."

When designing engineering components, a "safety factor" is taken into consideration by the design engineer. This has been the practice all along. But nowadays, with the developments in NDT techniques, certainty in material flaws can be determined to a 100% level and this can help the design engineer to lower the "safety factor"; and this in turn helps the design engineer to lower the weight of the material. By lowering the weight of the design material, the manufacturing costs of the engineering component are also lowered and hence its operational costs. This means that the power-to-weight ratio in the design of machines is lowered significantly with the correct application of NDT techniques. NDT Engineers now play a greater role in the design process of machines. They are now part and parcel of the design process.

During the processing of engineering materials such as metals, ceramics, polymers, composites and advanced materials, NDT techniques are consistently applied in order to detect any defects or flaws. Materials Scientists and Materials Engineers must be competent in NDT technology because it helps

them to determine the quality of the materials that they are processing in order to give them the appropriate crystalline structures, which will enhance the material's physical and chemical properties for better engineering performance.

When machines are in use their lifespan is extended through the application effective maintenance programmes. One of the key practices in predictive maintenance programme is the condition monitoring of the machine components. Condition monitoring of machines can be successfully executed through the use of NDT technology without or with very minimal disruptions to machine operation. NDT methods like electromagnetic testing (ET), magnetic particle testing (MT), liquid-dye penetrant testing (LPT), strain measurement (SM), fatigue & fracture mechanics (FFM), and many other methods are used to detect cracks that have the potential to cause disastrous failures in machines. For example, in the petrochemical industry, the application of leak testing (LT) can help avoid potential explosions from highly explosive gases coming out through leaks. Appropriate repairs can be conducted after NDT technology has detected these potential leaks from cracks. The potential collapse of a dam wall from developing cracks can be avoided if NDT techniques are used to monitor the structural integrity of the dam wall. Maintenance costs of machines or infrastructure can thus be controlled effectively with the use of NDT technology.

Extensive NDT is usually carried out in order to mitigate the risks associated with operational safety caused by premature component failures. The consequences of failure can result in loss of life, an adverse environmental impact and commercial penalties. In many countries nowadays, there are laws and regulations that have been enacted to protect the environment and people's lives. Failure to comply with these laws can result in rising costs emanating from awards given to injured people by the courts of law or lawsuits after damaging the environment. This means that responsible companies that wish to protect the environment and the lives of people, must ensure maximum safety around their business operations. One way to achieve this is to make use of NDT technology to avoid catastrophic premature failures of components. For example, the consistent application of, say, radiographic testing (RT) techniques in a nuclear plant is one of the responsible ways of using NDT technology to avert nuclear disasters.

The public's expectations for greater safety is now everywhere. We are also now living in a dangerous world and necessary precautions must be taken at all times. Every country needs to secure its public places like airports, railway stations, sensitive facilities, by ensuring that adequate security systems are installed. At such important facilities, CT-scanners are installed in order to detect (without harming anything) dangerous items or substances that have the potential to damage aircrafts, people, infrastructure, etc. This is what is known as homeland security. The application of NDT techniques in this area guarantees public security.

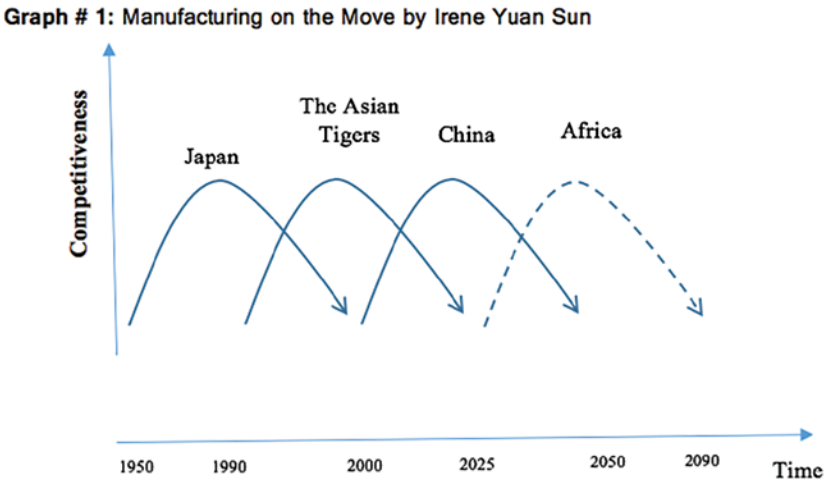
At every given opportunity an NDT professional ought to tell plant owners, other engineering groups, insurance companies, financiers, government officials and regulators how important NDT technology is to

the business value chain and what value it adds to the engineering life cycle of plant and components. For example, the adequate application of NDT technology in complex and expensive manufacturing plants or power stations, can give insurance companies a piece of mind. It can help them lower insurance premiums and this can eventually contribute to better profitability of the company. One cannot take chances with an aeroplane full of passengers. Safety is number one in this industry and the extensive application of NDT technology in aircraft maintenance guarantees maximum flight safety. Zero accidents to an airline results in better image and reputation of the company. With good image and reputation, comes increased revenue from increased happy customers, which in turn contributes to better profitability of the airline business.

Many assembly plants for the manufacturing of consumer goods now employ NDT technology in order to ensure product integrity and reliability. For example, in vehicle assembly plants, there is extensive use of ultrasonic testing procedures on vehicle components so that defects can be detected. In the electronics industry, the use of infra-red thermography (IRT) helps manufactures to detect any defects (dangerous hotspots) that may be in integrated circuits boards. With this practice, the reliability of gadgets such as computers, smartphones, etc is ascertained with the use of NDT technology. During the production of materials such as metals, NDT technology is extensive used in order to detect any flaws in the metal's crystalline structure before they are used in the design of engineering components.

Africa is Rising and will Replace China as the Next Factory of the World by 2050

It sounds unreal, but it is coming! Many doubt it, but it is going to happen! African governments need to wake up and prepare the continent for the envisaged industrial boom by 2040-2050. The majority of industrial companies are going to shift their manufacturing plants to Africa as the living standards in China continue to rise and make the labour costs very high. As argued by a sceptical development pundit, Rick Rowden, in the Economist magazine of February 2014, he says, "Apart from a few tax havens, there is no country that has attained a high standard of living on the basis of services alone. A country that does not focus on establishing factories for manufacturing goods will not eradicate poverty. Real economic growth comes from manufacturing."



4.1 Manufacturing on the Move – Irene Yuan Sun Model

Mr Wolfgang Fengler, a World Bank economist, argues that, "Africa is now in a good position to industrialise with the right mix of ingredients." This includes favourable demography, urbanisation, an emerging middle class and strong services. "For this to happen," he adds, "the continent will need to scale up its infrastructure investments and improve the business environment and many [African] countries have started to tackle these challenges in recent years.

Graph #1 above explains how "Manufacturing" is on the move as per the model proposed by Irene Yuan Sun of McKinsey Corporation in Washington DC. She argues that soon after the 2nd World War in the early 1950s, the Japanese manufacturing sector was not very competitive, but as they embraced technologies from the USA and Europe, their manufacturing sector gradually increased in competitiveness until its peak in the early 90s. As the standard of living improved in Japan, the labour costs and energy costs went up and the manufacturing competitiveness of Japanese factories started to decline. The experienced Japanese manufacturers became entrepreneurs who began looking for better investment opportunities elsewhere, such as in South Korea, Hong Kong, Taiwan, Singapore, Malaysia and Indonesia; thereby giving rise to what was termed the "Asian Tiger countries". These Asian tiger countries started to establish competitive manufacturing factories that flourished until their peak in the late 90s. The competitiveness of their factories started to decline in the early 2000s, and again the Japanese manufacturers together with the new entrepreneurs from the Asian tiger countries, started to move their factories to favourable China. As the manufacturing sector in China developed, China slowly became the manufacturing hub of the world and it has now reached its peak. The standard of living in China has greatly improved and again the movement of factories from there is inevitable. But the question is where to now?

According to Irene Yuan Sun, in her book, "The Next Factory of the World: How Chinese Investment is Reshaping Africa" she states that more and more Chinese entrepreneurs are investing in Africa because of what she termed as the push and pull factors. In her book, she explains these factors as follows:

- Push Factors
- Pull factors

These are the factors that are pushing the Chinese entrepreneurs and investors out of China; which are caused by:

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- **Labour Costs:** From 2004 – 2014, the labour costs in China have risen by 12% as the standard of living in China improved. Also the one-child policy of China has left the country with a small labour pool that is now affecting the Chinese manufacturing sector.
- **Energy Costs:** these have gone up by 60% from the time China started its industrialisation drive. The costs are now slowly making the manufacturing of goods in China uncompetitive in the global market.
- **Supply of Entrepreneurs with Capital to invest in Africa:** many Chinese have the money and the technical know-how of establishing factories and they are willing to bring this to Africa.

These are the factors that are pulling the Chinese investors into Africa:

- **The Demographics of Africa:** currently Africa has a population of 1 billion people, the majority of whom are young people who can be absorbed into factories. By 2050, the population of Africa is going to grow to 2 billion, thereby offering a large labour pool to investors in the manufacturing sector.
- **Markets in Africa:** these are huge and attractive, especially in populous countries such as Nigeria and with the growing population of Africa, the market potential is going to be huge as the standard of living in Africa improves with industrialisation.
- **Profit Margins:** considering the fact that logistical costs to import goods into Africa are quite high due to poor infrastructure and bureaucratic trade procedures, it makes great sense to establish factories in Africa and enjoy the healthy profit margins that can be as high as 10-12%. Also evident is the fact that most African governments tend to support locally-produced goods because the country saves on forex.

To date, an estimated 10,000 Chinese companies have invested in Africa and of this number about a third are in the manufacturing sector. And more Chinese investors are still coming. It is therefore envisaged that by 2050, Africa will have replaced China and become the factory of the World. From this enlightening literature by Irene Yuan Sun, the author of this paper sees an inevitable great future demand of technical skills, especially in engineering in order to run the many factories that will be established in Africa. As factories are established in Africa, one very important engineering skill that shall be in great demand is that of Non-destructive Testing (NDT). In preparation of such an anticipated demand in NDT technology in Africa during the few years to come, the author has personally and boldly taken the necessary steps of learning NDT now; with the view of developing other NDT professionals in the future. It is definitely going to be an exciting and great journey towards the industrialisation of Africa.

Developing NDT Professionals – the ISO 9712: 2012 Standards

In South Africa's Engineering News magazine of 15 July 2016, Mr. Harold Jansen, Systems & Quality manager of South Africa Institute of Welding (SAIW), said that "South Africa is leading the way for NDT in Africa, but, [as we are] able to provide certification in only one sector, namely pre-and-in-service testing, we lack skills relating to the rail and nuclear sectors, two significant national development projects, for which 'localisation' of scarce skills, such as NDT, is critical." He also notes that technicians who are certified by an employer often lose their company certification when they eventually leave the company, having to re-apply, be mentored and reassessed for company certification on starting at a different company, with no 'basic qualification' that can be carried over – hence, the need for basic personnel certification. Whilst there is an already established standard that is used in the development and certification of NDT professionals, i.e. ISO 9712: 2012, there is however a lot to learn from the British's PCN scheme. PCN is (Personnel Certification in NDT) and in the UK, the scheme got off to a slow start but very quickly became the primary certification scheme in the UK, and is now widely regarded by many countries as high quality in terms of the NDT training and certification. The popularity of this type of NDT training and certification is based on consistency of delivery and the high standards that PCN is set at. The development of PCN standards were done by the British Institute for Non-destructive Testing (BINDT) and many countries have now adopted the PCN scheme. For more information on PCN scheme in the UK, please log on to the BINDT website: www.bindt.co.uk Through its South Africa Institute of Welding (SAIW), South Africa Institute of Non-destructive Testing (SAINT) and Vaal University of Technology (VUT), South Africa is seriously developing its own NDT professionals. SAIW has become the secretariat of the African Federation of Non-destructive Testing (AFNDT) and it is vigorously seeking to promote the growth of NDT in other African countries. Their efforts are highly commendable and should be fully supported by other African countries before it is too late to do so. VUT is working very hard with the South African Qualifications & Certification Committee (SAQCC) to establish a framework that will fully develop NDT professionals from the current National Diploma Level in NDT to that of a Master's degree and Doctorate level. The University is also working hard to ensure that qualifications in NDT are recognised as a Profession by engineering bodies such as the Engineering Council of South Africa (ECSA) and SAINT. Graduates in the field should be able to be registered as professionals by these professional bodies. According to Mr. Ike Sikakana of VUT, the envisaged NDT development and registration with ECSA is as shown in the table 2 below. This development is good and it will be similar to the highly-rated training approach being followed by the NDT community in the UK.

VOCATIONAL	Level I	Level II	Level III				
ACADEMIC			National Diploma (3 years)	Post graduate level	BSc Degree (4 years	MSc Degree level	Doctoral Level
REGISTRATION	Certified Engineer	Technician	Technologist	Engineer			

Conclusion

Africans must adequately prepare themselves for the rise of "Factory Africa." A lot of people might be still doubting it, but it is going to happen. There are already some signs of the accelerated growth in the manufacturing sector in Africa. Countries like Ethiopia, Uganda, Rwanda, Ghana, South Africa and Nigeria are clear testimonies.

As Africa becomes industrialised, all NDT personnel in Africa shall have the great responsibility of promoting NDT technology as a key Engineering tool which shall help African factories to accelerate its industrialisation through the production of high quality goods, the construction of reliable infrastructure, the reduction in business risks, promotion of operational safety to save lives and avoid damage to the environment.

The NDT Apprenticeship programme being followed in the UK under the PCN programme, should be copied by many African countries as they endeavour to develop their own NDT professionals. Through the PCN scheme, the training and certification of NDT professionals has proven effective beyond any doubt. The VUT of South Africa is in the right direction in its endeavours to develop NDT professionals. SAIW's voluntary acceptance to be the secretariat of AFNDT, should be fully supported by industries and governments in Africa. Many universities in African countries must start formulating training programmes for NDT professionals. There is need to closely collaborate with industries and provide the NDT skills development programme as it is done in the UK by BINDT and Northampton University. Engineering bodies in Africa should play their part and contribute to the establishment of a legal framework that must consider NDT as a profession with the ultimate recognition of its practitioners through official registration.

The postulation by Irene Yuan Sun makes great sense to like-minded Africans. Her insights in the future rise of Africa as a World Factory by 2050, must be taken very seriously. The author of this paper has seen it fit to highlight the urgent need to develop one of the scarce and critical skills, NDT technology, that Africa will soon require during its journey to becoming the next Factory of the World. The rise of Africa as an industrialised continent is around the corner and the sooner such a call is given adequate attention by African governments, industries, universities, the NDT community and other business players, the better it will be for Africa!

REFERENCES

- Hellier CJ: Handbook of Non-destructive Evaluation; McGraw Hill Edition, 2003.
- Lüthi T.: Non-destructive Evaluation Methods, Version 2014.
- Callister Jnr. WD: Materials Science and Engineering: An Introduction; 7th Edition.
- Pyzdek T, Keller P: The Handbook for Quality Management: A Complete Guide to Operational Excellence, 2nd Edition.
- Krishnanoorthy K, P. Eng.; Atomic Energy of Canada Ltd: A Paper on "Quality Assurance in NDT"
- The Economist Magazine, 8th Feb 2014: Manufacturing in Africa-An Awakening Giant.
- Yuan Sun Irene: The Harvard Business Review, May – June 2017 Issue (pp 122-129): The World's Next Great Manufacturing Centre.
- Yuan Sun Irene, 'The Next Factory of the World: How Chinese Investment is Reshaping Africa.'
- Sikakana I, "A Diagnosis of the South African Non-Destructive Testing Community".
- The Engineering News Magazine of South Africa.

Rehabilitation, Maintenance and Emergencies

Rehabilitation, Maintenance and Emergencies (RME) is the Specialist Construction Unit of Transnet. RME is responsible for the maintenance, rehabilitation and construction of port and rail infrastructure. RME executes, maintains and constructs projects for the external market. External customers are TFR customers with private sidings, Eskom, Municipalities, SADC countries, Gautrain and Prasa.

RME has a staff complement of 4,000 employees and an annual turnover is R1.5bn.

RME offers experienced professionals in Civil Engineering, Electrical Engineering, Mechanical Engineering, Project Management, Costing and Construction.

RME have completed over 100 projects in South Africa and the SADC region.






CIVIL ENGINEERING WORKS

Concrete Structures:
Refurbishment or construction of bridges, culverts, inspection pits, track slabs, crane beams, paving slabs, floors and foundations. Resealing of tunnels and concrete drains.

Steel Structures:
Refurbishment or construction of bridges, sheds, warehouses and microwave masts.

Services:
Refurbishment or construction of storm water reticulation, sewer reticulation, fire hydrant installations, pipe and chamber systems and sub-surface drainage.

Buildings:
Refurbishment or construction of offices, residential houses, relay rooms, sub-stations, mess and ablution facilities.

Earthworks:
Construction of formation layers, drainage, roads and level crossings, as well as construction of gabion structures.

ELECTRICAL ENGINEERING WORKS

Construction And Upgrading Of Overhead Traction Equipment (OHTE) And Related Electrical Infrastructure:
25KV AC electrification system, 3KV DC electrification system, 50KV AC electrification system, extension of loops, installation of Motor Operated Switches, 11KV AC transmission.

Refurbishment and Maintenance Of:
OHTE Wiring, OHTE Protection systems, Neutral Sections, Track Switches, H-Frames, Earthing and Bonding, etc.

Emergencies:
Replacement of overhead cables, repairs of damaged cables, major breakdowns (hook-ups and derailments).

Electrical Lighting and Power (EL&P):
Construction, refurbishment and maintenance of substations, power distribution and high masts lighting for different yards.

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TRACK ENGINEERING WORKS

Construction of new Track Infrastructure, including upgrades and rehabilitation.

- Track evaluations
- Set and crossing replacement
- Re-railing (36m – 240m lengths) and destressing
- Re-sleepering
- Screening and profiling of ballast
- Major emergency repairs (wash-aways / derailments)
- Track welding:
  - Exothermic welding
  - Removal of wheel spin burns (skid-marks)
  - Repairing of crossings (preventative grinding)
  - Removal of ultrasonic detected defects
  - Cropping and creeping of rails
- Loading, off-loading of bulk material, rails, sleepers and ballast including classifying and sorting of second hand track material.

FLEET

RME manages a fleet of some 642 vehicles across the country ranging from standard cars and bakkies to specialised heavy commercial vehicles such as dual purpose welding trucks and troop carriers that have been custom designed and built to ensure that we have fit for purpose vehicles.

SIGNALLING ENGINEERING WORKS

Installation Of New Systems:

Fail Safe Data Transfer (FSDT) control over fibre optic cable, radio controlled crossing places, protected level crossings, anti-vandal equipment, new CS90 remote control and CTC centres, cable replacement programs, new signals and points and electrical interlocking units.

Workshop Wiring and Assembly:

Pre-assembly and wiring of equipment. Clean and refurbish existing interlocking units, site workshops when required.

Debugging, Pre-Testing:

Testing and commissioning of signalling works. All signalling works installed are pre-tested, debugged and commissioned by a registered Signalling Test Engineer. Pre-wire and assembly of various signalling equipment can be wired and tested in workshop conditions.

Construction Works For Asset Rationalisation:

Re-positioning of points and signals, rationalisation of station layouts by removal of equipment from layout and interlocking, interlocking clean-up to incorporate alterations, installation of temporary interlocking crossover facilities to enable formation rehabilitation of track structure.

Rehabilitation and Re-instatement Of:

Existing signalling structure, train detection equipment, axle counters, points machines, existing interlocking and remote control.

RME

MAERSK DELIVERS NEW BLOCK TRAIN SOLUTIONS FOR SGR

A Standard Gauge Railway (SGR) train fully laden with 108 twenty-foot equivalent units (TEU) of Maersk Line Through Bill of Lading (TBL) containers arrived in Nairobi from Mombasa on the 13th of April. Compared to the Meter Gauge Railway, the 472km journey through the SGR is expected to reduce the cargo transport time from an average of 48 hours to 8 hours.

Mombasa is one of the main gateways to the landlocked countries in Eastern Africa. The Kenya Ports Authority reported approximately 676,921 TEU full containers came through the port of Mombasa in 2017. Of this, about 80 percent are imports and 20 percent exports.

According to Mads Skov-Hansen, Maersk Line Eastern Africa Managing Director, the direct link between the port in Mombasa and the Inland Container Depot (ICD) in Nairobi offers alternative solutions to transport cargo from Kenya's international trade partners to key inland markets.

"Moving goods shipped by Maersk Line, to Mombasa, onward through inland corridors in a timely and efficient manner is crucial to our customers. Solutions to transport massive cargo volumes quickly, safely, and efficiently to delivery destinations from outside Kenya give our customers the ability to better control their supply chain," says Skov-Hansen.

He added that this is a crucial process to Kenya as a trading nation and investment destination. Introducing efficiencies into the import and export processes, by putting in place infrastructure and clearer processes to support this results in reduced costs, faster delivery to market, and ultimately gives local businesses a boost.

"We work with our key stakeholders in the industry to enable trade in Kenya by engaging in discussions to find solutions to further improve transport efficiencies," says Skov-Hansen.

He added that the upcoming conference announced by Kenya Railways to gather recommendations and discuss service standards and operational concerns with industry stakeholders and experts is a significant boost for the import and export markets that directly impact the Kenyan economy.

CCECC $6.68 BILLION CONTRACT FOR THE IBADAN – KADUNA RAILWAY SEGMENT

The Federal Government on 15 May 2018 signed a Contract Agreement of $6.68 for the Ibadan – Kaduna railway segment of the Lagos-Kano Railway Line with the China Civil Engineering Construction Corporation (CCECC).

Addressing Journalists shortly after signing the contract agreement, the honourable minister of transportation, Rt. Hon. Chibuike Rotimi Amaechi said that the contract agreement is for the implementation of addendum no. 4 Ibadan- Kaduna segment of the Lagos-Kano Rail Line at the cost of $6.68 billion. "This one is Ibadan- Kaduna Rail Line which is part of the Lagos-Kano Rail line" he said. The Hon. Minister added that the completion time of the contract is between 2-3 years depending on the availability of funds.

Rt. Hon. Chibuike Rotimi Amaechi promised that the Ministry should be able to provide its counterpart funding between this year and next years budget provision. According to the Minister, the Ibadan-Kaduna Standard Gauge Rail line will pass through Oshogbo-Ilorin-Minna to Kaduna, with a single track branch line from Oshogbo to Ado- Ekiti.

Director Legal Ministry of Transportation, Uche Okoro, Honourable Minister of Transportation, Chibuike Rotimi Amaechi and Managing Director China Civil Engineering Construction Corporation, Jak Li,during the Signing of 6.68 Billon dollar Contract of Ibadan to Kano Railway Line Memorandum of Understanding with China Civil Engineering Construction Corporation (CCECC) at Federal Ministry of Transportation Office Abuja.

This contract is in fulfilment of the federal government's plan to complete the Lagos-Kano rail modernisation project which was started in 2006 and broken into Segments for implementation in 2008. The segmentation phase commenced with Abuja-Kaduna rail line in 2011 which was completed and commissioned into commercial operation by president Muhammadu Buhari in July, 2016.

The federal government in March 2017 commenced implementation of the second leg of the Lagos-Kano line which is the Lagos-Ibadan rail line currently on-going and is planned to be completed by the end of 2018. The Signing of the Ibadan–Kaduna segment contract agreement concludes all outstanding segment of Lagos–Kano rail line, he said.

SOUTH AFRICA - BUDGET VOTE ADDRESS BY THE MINISTER OF TRANSPORT, DR BLADE NZIMANDE

The recent budget vote address by the minister of transport, South Africa, highlighted the following aspect in relation to the rail sector;

"Honourable members, we have intensified our effort of stabilising the Passenger Rail Agency of South Africa (PRASA), by dealing with their capacity challenges, appointing a new board that will lead the turnaround strategy, and to attend to the senior management vacancies in the organisation.

Among the areas we have given our urgent attention, are challenges facing PRASA in the Western Cape, Cape Town in particular. We have begun tackling the safety and reliability of Metrorail in this corridor. Our priority is to provide safe rail travel, especially for the working class. I will convene a series of stakeholder meetings in the coming months, which will include PRASA, the City of Cape Town, trade unions and their shop stewards, municipal councillors, and political formations.

PRASA is currently implementing a signalling programme to replace the old signalling system, and the project is near completion. Furthermore, we are at an advanced stage with the construction of the Central Operation Centre for the control of rail operation in the entire Western Cape. Construction is expected to be completed by the end of June 2018.

Through the centre we will be able to better manage our service, and improve our management and safety of our operations. To address the inadequacy of the rolling stock, we will continue to refurbish our current rolling stock to meet the immediate demand of this corridor.

The Cape Town corridor requires about hundred and ten train sets. In the next twenty four months, we will operate eighty-eight fully configured train sets.

However, we are also working on our plans to roll-out the new rolling stock, including putting in place enabling infrastructure such as the depot programme, perway and electrical works, to support the deployment of the new rolling stock fleet, although I am concerned at the slow pace in these projects. I have therefore directed the new board to pay urgent attention in dealing with these challenges and I expect a plan within the next two months.

Honourable Members, part of our focus is to ensure that we provide a predictable Metrorail service within current capacity constraints over the twelve months period. I am happy to report that the construction of our train manufacturing factory at Dunnotar in Ekurhuleni is now complete and it is anticipated that two new locally produced trains will be delivered in December 2018.

As of December 2017, we have created a total of one thousand three hundred and ninety-six jobs. We are also contracted to up-skilling 19,527 individuals during the implementation of the Programme.

Through the Railway Safety Regulator Amendment Act and the Rail Safety Strategy, we will be able to mitigate the risks associated with Level Crossing occurrences, people struck by train, mainline derailments and platform-train interchange occurrence. We have set aside about R3 billion to upgrade the Limpopo and Mpumalanga sections of the Moloto Road. An estimated twelve thousand five hundred jobs will be created over the five-year period of the project.

Within the next twelve months, government will take the final decision regarding the planned rail component of this corridor.

The issue of public transport subsidy regime remains a challenge. To this end, we have reached an agreement with the MECs that we need to review the entire regime, including the amounts for the bus industry, commuter rail, Gautrain and the BRT systems. We also need to determine whether this money is being allocated equitably, especially in support of the workers and the poor, and whether adjustments are required."

In Terms of the budget:

- Roads Transport: R27 Billion
- Rail Transport: R18 Billion
- Public Transport: R13 Billion
- Civil Aviation: R182 Million
- Maritime Transport: R120 Million
- Integrated Transport Planning: R90 Million
- Administration: R430 Million.

LOBITO CORRIDOR TRADE FACILITATION PROJECT

The Government of the Republic of Zambia has received a grant from the African Development Fund to finance the Lobito Corridor Trade Facilitation Project. The principal objectives of this project are to, promote value chain development as well as participation of Small and Medium Enterprises (SMEs), particularly from the agriculture and construction sectors.

Accelerate growth in domestic and cross-border trade along the Lobito Corridor through:

- Implementation of harmonised trade facilitation instruments
- Strengthening coordination of joint corridor development activities; and
- Fostering effective participation of small and medium enterprises (SMEs) in value chains.

The project includes the following components:

Component I: Capacity Building for Trade Facilitation and Corridor Coordination. This component will facilitate the development of trade facilitation instruments along the Lobito Corridor, build institutional capacity among Corridor States for coordinated planning of corridor development and convene key stakeholders. Activities will include:

- Construction of solar powered trade information desks (TIDs)
- Construction of Pilot Border Market
- Office Refurbishment for One Stop Shop (OSS)
- Lab Equipment and Accessories,
- IT Hardware and software for TIDs,
- Design and Printing of Information Pamphlets
- Media Campaign materials
- ICT Equipment.

Component II: Technical Assistance for Value Chains and Economic Clusters Development. This component will focus on supporting local SMEs to participate in the value chains and economic clusters along the corridor. Activities will include design and implementation of an incubation programme to provide mentoring to SMEs located in CEEC industrial yards. Development and implementation of a business platform to facilitate information flow on regulations and tenders and business opportunities including hosting of transboundary Forums for Trade Facilitation (FTF) among corridor states to facilitate business linkages, networking, cross-border trade and create awareness of private sector investment opportunities in value chains and corridor infrastructure. Design and implementation of a business linkages programme to link SMEs to large firms in the value chain.

CDN EXCEEDS FREIGHT TRANSPORT TARGET BY 41%

Nearly 100,000 tonnes of miscellaneous cargo was transported by the Northern Development Corridor (CDN) in the first three months of 2018 on the line connecting the strategic city of Nacala to the countries of the hinterland, namely Malawi and Zambia.

The figure represents a 41% increase over the budget for the reference period, where the railroad concessionaire in the northern region and the port of Nacala had scheduled to transport 79,955 tonnes of miscellaneous cargo.

This positive performance is due to the quality of the services provided by CDN and the good condition of the railroad, combined with the increase in freight transport to Niassa as a result of the reduction of the tariff on the Nacala-Lichinga line, from 2,900 meticals to 2,150 meticais, effected in February this year.

"During the first three months we shipped a lot of Clinker and Fertilizers to Zambia and we recorded a large flow of cargo to Lichinga, these factors also contributed to exceeding our targets" - Said Dário Viegas, head of the Commercial area at CDN.

For the current 2nd quarter, the CDN's challenge is to seek improvements needed to meet existing demand, and as a consequence, improve its performance.

Regarding the passenger service, a total of 119,470 persons were transported during the reference period, compared to 84,544 people transported in the same period last year.

It should be noted that from January to March, 294 trains were carried out on the sections, Nampula-Cuamba, Cuamba-Lichinga and Cuamba- Entre Lagos.

WORLD BANK GROUP ANNOUNCES SETTLEMENT WITH AFRICA RAILWAYS LOGISTICS LIMITED (ARLL) AND TWO OTHER COMPANIES IN KENYA

World Bank Group has announced the debarment of Africa Railways Logistics Limited (ARLL) for two years, in connection with an employee's attempt to improperly influence the customs and port clearance process for locomotives that were part of two investment projects by the International Finance Corporation (IFC), the private-sector arm of the World Bank Group. This is the World Bank Group's first debarment related to an IFC investment.

The debarment makes ARLL ineligible to participate in World Bank Group-financed projects. It is part of a settlement agreement, under which the company acknowledges responsibility for the underlying sanctionable practices and agrees to meet specified corporate compliance conditions as a condition for release from debarment.

Two related companies – Africa Railways Limited (ARL) and Rift Valley Railways Kenya Limited (RVRK) – were sanctioned with conditional non-debarment, which means that they remain eligible to participate in World Bank Group-financed projects as long as they comply with their obligations under the settlement agreement. Otherwise, the conditional non-debarment will convert to a sanction of debarment with conditional release, and the companies then will become ineligible to participate in World Bank-financed projects until the conditions for release set out in the settlement agreement are met.

The IFC investments (Project No. 31102 and Project No. 24766) included a loan to purchase locomotives, wagons, infrastructure, and cover other costs associated with railway concessions in Kenya and Uganda. According to the facts described in the settlement agreement, an employee of RVRK, who also owned a subcontracted company, both failed to disclose his ownership interest in the company and attempted to improperly influence the customs and port clearance process for the locomotives, which is a corrupt practice. The employee was disciplined and subsequently terminated.

The settlement agreement provides for a reduced period of debarment in light of the companies' cooperation and voluntary remedial actions. As a condition for release from sanction under the terms of the settlement agreement, all three companies commit to develop an integrity compliance program consistent with the principles set out in the World Bank Group Integrity Compliance Guidelines. They also commit to continue to fully cooperate with the World Bank Group Integrity Vice Presidency.

The debarment of ARLL qualifies for cross-debarment by other multilateral development banks (MDBs) under the Agreement for Mutual Enforcement of Debarment Decisions that was signed on April 9, 2010.

WALVIS BAY SHIPYARD SHAREHOLDING RESTRUCTURED

The management of Elgin Brown & Hamer Namibia (EBHN), together with new minority shareholder the Elgin Brown & Hamer Consortium (EBHC) have confirmed that a share transfer agreement has been concluded.

In terms thereof, 100% of the shares held in EBHN by former shareholder the DCD Group were transferred to EBHC, a group comprised of prominent Namibian business leaders.

As a result, the 47,5% shareholding held by EBHC is now effectively in the hands of Namibian-owned companies. As of Monday 2 April 2018, the DCD Group relinquished all shareholding in EBHN. The National Ports Authority of Namibia (NAMPORT) remains the majority shareholder (52.5%) and EBHN's joint management agreement remains unchanged.

Over many years, EBHN has acquired a wealth of experience in the marine engineering and maintenance industry, servicing the local and international maritime and offshore oil and gas sectors. The share transfer to the EBHC makes good strategic sense, as synergies generated by a combination of the expertise of the new shareholder with the existing core strengths of EBHN, will unlock further advances in effective and efficient service delivery going forward. This will ensure EBHN's strong competitive advantage, resulting in sustainable growth and greater value for the company and its shareholders.

Since its founding in 2006, EBHN has made a very significant contribution to the Namibian economy, with a downstream impact in the region of more than N$8 billion. EBHN will therefore continue to empower and develop its employees and – through this highly motivated and skilled workforce – will deliver unmatched service to clients at all times, while remaining globally competitive, and retaining its position as the preferred shipyard on the west coast of Africa.

EBHN proudly welcomes its new shareholder the EBHC, and looks forward to working synergistically with the consortium, and to benefiting from its extensive experience and expertise, for the greater long-term benefit of all the company's valued internal and external stakeholders moving forward.

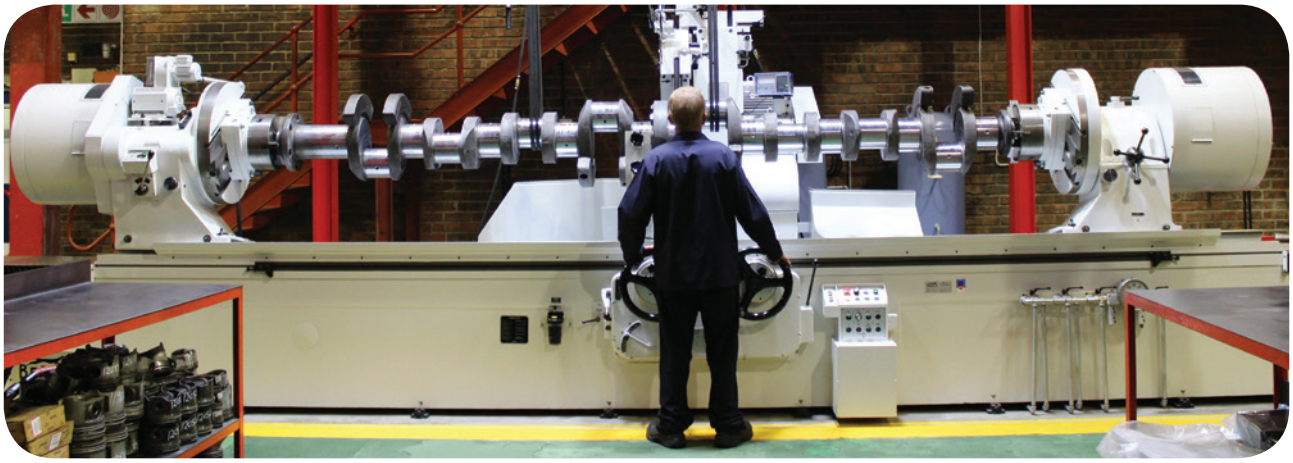
TRAIN DERAILS OUTSIDE OTJIWARONGO IN CENTRAL NORTH NAMIBIA

At approximately 10:45, on Saturday, 26 May 2018, freight Train 2200 from Walvis Bay en route to Otjiwarongo derailed 7km before Otjiwarongo on the Kranzberg - Otjiwarongo section. No injuries were recorded.

- The train had two locomotives, three container wagons and fourteen loaded fuel tankers. Eleven tankers derailed, four capsized and two had spillage
- TransNamib Civil maintenance team, Otjiwarongo Municipality and NAMPOL staff were deployed to the scene on the same day after the accident
- A portion of 180 metres of track was damaged
- The investigation for the cause of the accident is underway.

The cost of the accident is yet to be determined.

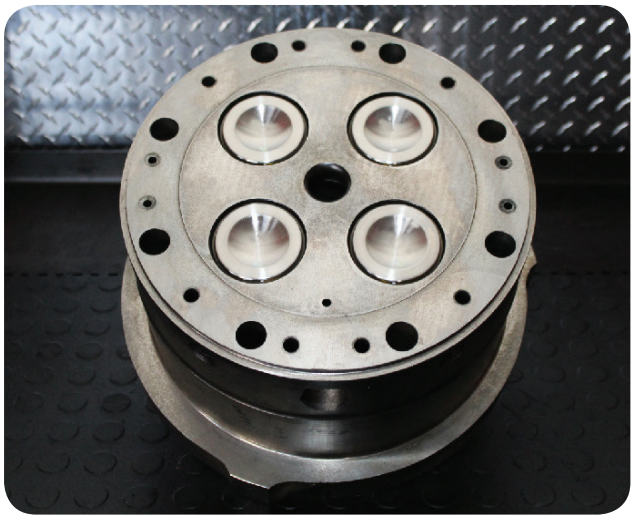
The train driver at the time of the accident has over 15-years train driving experience. At the time of the derailment, both train driver and assistant were appropriately qualified, assessed as competent and medically fit for duty.

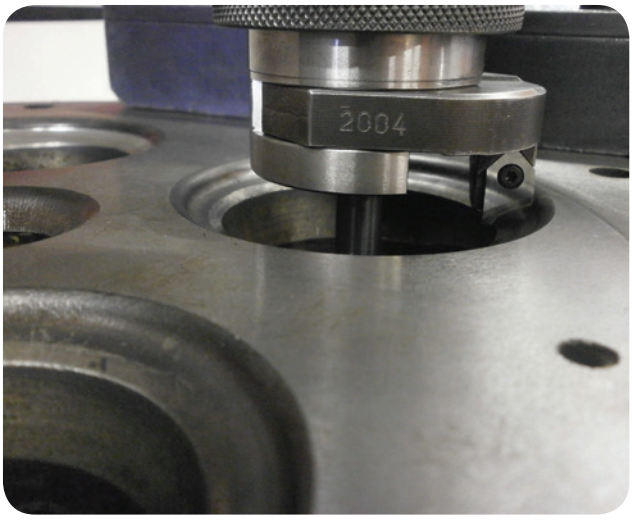


Grinding of crankshafts with lengths of up to 4.7 metres and weights of up to 5 ton

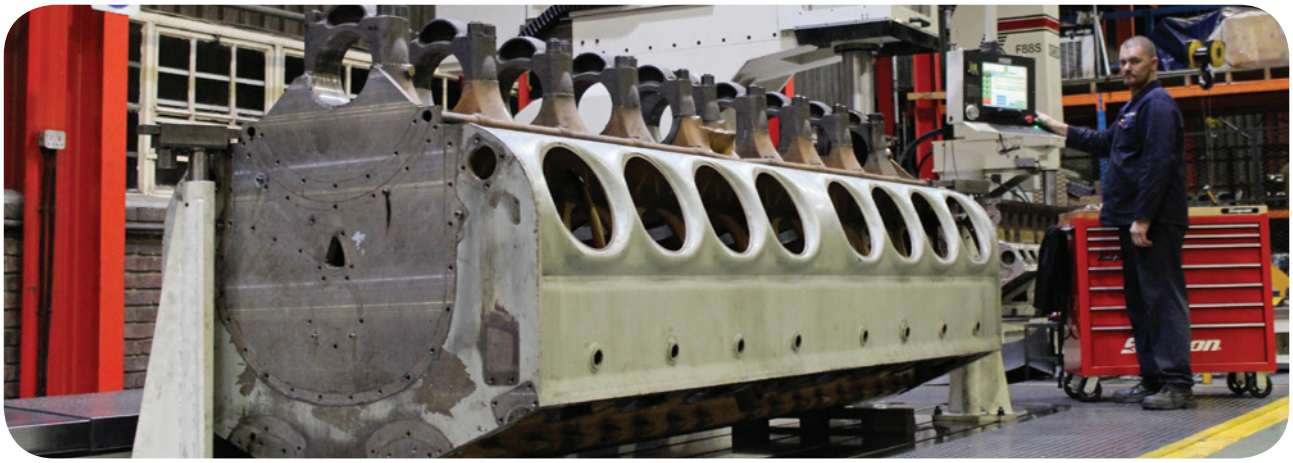
METRIC

AUTOMOTIVE ENGINEERING





Zero hour cylinder head remanufacturing



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PRASA APPOINTS NEW GROUP CEO

The Passenger Rail Agency of South Africa (PRASA) has appointed Sibusiso Sithole as its new Group CEO for a period of 12 months effective from 1 June 2018. Sithole is the former City Manager of EThekwini Municipality.

Addressing senior executives at the welcome meeting recently, Sithole emphasised the need for PRASA and employees to be cognisant of the role the organisation is playing, which is focusing on delivering on the needs of the poorest of the poor who rely on rail as the backbone of public transport.

"A turnaround strategist and policy specialist, Sithole has held key positions, including General Manager at Umgeni Water Board, Xhuma Development Solutions, just to mention a few," PRASA said.

Chairperson of the Board of Control, Khanyisile Kweyama, said the appointment of Sithole comes at an opportune moment and hopes that he can hit the ground running.

"Sithole is quite aware of the immense challenges facing the organisation. PRASA is at its worst performance levels and there is an expectation from the public that we serve for the organisation to turn itself around.

"We cannot overemphasise what our expectation as a Board is from the CEO. Fortunately with the kind of experience he has, we should not expect any difficulty in him executing the task at hand," PRASA said.

Sithole holds a B. Proc (Law) Degree from University of Natal, Masters in Education from Manchester University (UK), MBA in Corporate Strategy (UNISA), and is currently pursuing a Doctor of Business Administration with Walden University (USA).

The Board has urged all staff and management to give Sithole all the support he will need during this challenging period.

MOZAMBIQUE PORT AND RAILWAYS IN CONJUNCTION WITH CORNELDER AND MUTARE DRY PORT SCOOPS TOP HONOURS AT ZITF 2018

Mozambique Port and Railways in conjunction with Cornelder and Mutare Dry Port scooped the converted overall President's trophy together with a Gold Medal and Certificate at the Zimbabwe International Trade Fair (ZITF) 2018.

The company's stand – a star attraction at the country's premier trade and business exhibition because of its captivating and interactive features – exhibited under the theme, Moving people and goods, thus highlighting the key role played by the three organisations in the transportation of goods and people, both locally and in the region.

A major highlight that had a positive impact was the running of "O" scale model trains and a huge ¾ size locomotive model, fitted with an alarm system, voice-fused welcome sound and a digital moving sign. The pavilion was divided into three sections for each of organisations. Displays of a coal liner train, container wagon train, rail-road level crossing, the scaled model of Beira Port together with digital messages played a major role in communicating the intended message with maximum emphasis.

Mozambique - CFM, which has consistently participated at the ZITF over the years, was represented by its senior management team together with that of Cornelder and Mutare Dry Port, led by the commercial representative to Zimbabwe Mr Amir Amade who received the converted trophy from the President of Zimbabwe at the awards ceremony during the official opening of the Trade Fair.

Designer, Mr Martin Banda of Sport-Talk Investments was also awarded a Gold Medal and certificate for being the overall Best Designer of the Mozambique Ports and Railways – (Developing and Developed Nations), throughout the entire ZITF.

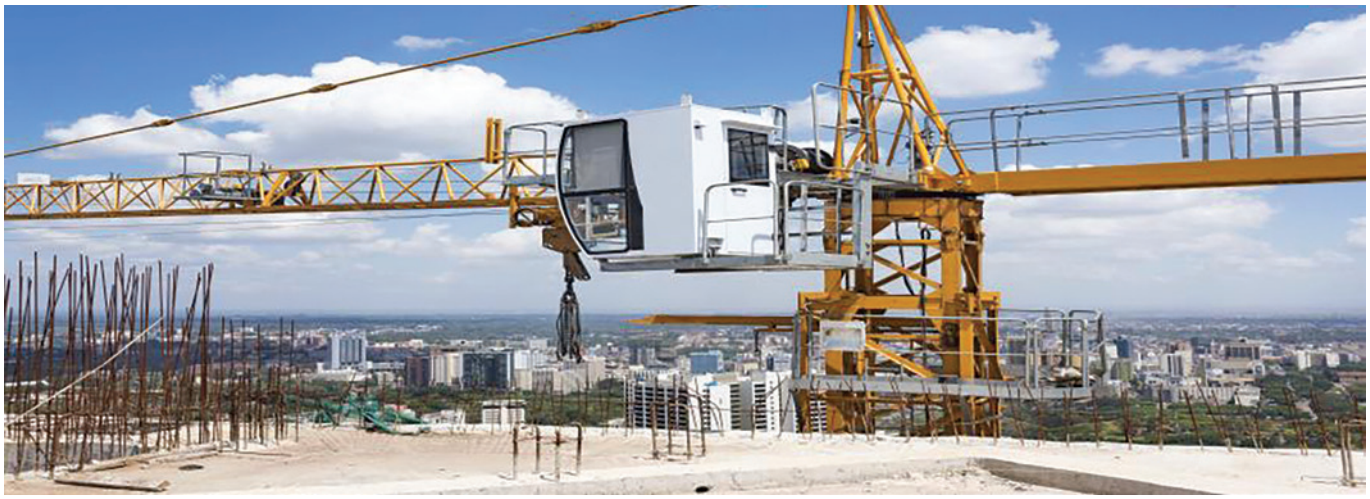
ENFORCEMENT UNIT TO PROTECT METRORAIL COMMUTERS AND INFRASTRUCTURE

The City of Cape Town, the Passenger Rail Agency of South Africa (PRASA), and the Western Cape Government signed a memorandum of agreement which will see the formation of a dedicated enforcement unit to focus on the safety and security of Metrorail commuters and infrastructure.

The details about how the dedicated enforcement unit will be funded, established and managed are addressed in a memorandum of agreement (MOA) between PRASA, the City of Cape Town and the Western Cape Department of Transport and Public Works.

The MOA follows on from the commitment that was made during the rail summit convened and attended by the City's Transport and Urban Development Authority (TDA), the Western Cape Department of Transport and Public Works, PRASA, rail experts and business leaders in Woodstock in February.

The cost to establish and operate the unit for a period of 12 months is approximately R47,9 million and will be jointly funded by the TDA, the Western Cape Government and PRASA. It is foreseen that the unit will be operational within the next two to three months.



ACCELERATING INFRASTRUCTURE DEVELOPMENT IN AFRICA

Dignitaries from Africa, under the auspices of the African Union's NEPAD Agency, in collaboration with the NEPAD/APRM Kenya Secretariat, converged in Nairobi from 23-24 May 2018 for the Presidential Infrastructure Champion Initiative (PICI) Technical Task Team workshop. To deliberate on the way forward for the initiative and to present the progress status of each of the PICI projects. PICI is a continental initiative created to accelerate regional infrastructure development across Africa through political championing of projects.

The workshop, which was opened by Hon. Peter Munya, cabinet secretary, East African Community and Northern Corridor Development, brought together relevant stakeholders and the PICI country focal points to provide input for the preparation of the Comprehensive PICI Project Status Report. The report will be submitted to the NEPAD heads of state and government orientation committee for onward transmission to the African Union Assembly, in July.

NEPAD Agency's PICI coordinator, Dr John Tambi set the scene by contextualising the PICI projects within the framework of PIDA, as a precursor to this continental strategic framework for infrastructure, before presenting to the audience the different achievements and milestones for each of the PICI projects. Dr Tambi gave the opening speech on behalf of Dr Ibrahim Mayaki, CEO of the NEPAD Agency, who stated amongst others, that the role of the Country Focal Points and members of the PICI Technical Task Team is of tremendous importance to provide leadership and direction for infrastructure development in Africa.

In attendance were development partners, from the United Nations Economic Commission for Africa (UNECA), the African Development Bank (AfDB) and representatives from the Economic Community for West African States (ECOWAS), Southern Africa Development Community (SADC), and Inter-Governmental Authority on Development (IGAD), CCTFA, and UMA. Participants were drawn from Kenya, Algeria, Egypt, Nigeria, Niger, Rwanda, South Africa and Namibia.

Progress achieved in the development of various projects under PICI across the continent was highlighted. These projects include:

- The Missing Links of the Trans-Sahara Highway and Optic Fibre Link between Algeria and Nigeria via Niger championed by President Abdelaziz Bouteflika of Algeria
- The Nigeria-Algeria Gas Pipeline Project (Trans-Sahara Gas Pipeline) championed by President Muhammadu Buhari of Nigeria
- The Dakar-Ndjamena-Djbouti Road/Rail Project championed by President Macky Sall
- The North-South Corridor Road/Rail Project championed by President Cyril Rhamaphosa of South Africa
- The Kinshasa-Brazzaville Bridge Road/Rail Project championed by President Denis Sassou Nguesso of the Congo Republic
- The Unblocking Political Bottlenecks for ICT Broadband and Optic Fibre Projects Linking Neighbouring States and the SMART Africa Project championed by President Paul Kagame of Rwanda
- Construction of the Navigational Line between Lake Victoria and the Mediterranean Sea championed by President Abdel Fattah el-Sisi of Egypt
- The Lamu Port Southern Sudan and Ethiopian Transport Project (LAPSSET) championed by President Uhuru Kenyatta of Kenya
- The International Logistics Hub Project Championed by President Hage Geingob of Namibia.

Hon. Munya informed the participants that the Lamu Port South Sudan and Ethiopian Transport (LAPSSET) project was on course and that major milestones had been achieved. The three berths being constructed by the Government of Kenya at the Lamu Port were now 48% complete. LAPSSET is not just for the three countries (Kenya, Ethiopia and South Sudan) but it is a continental project by all standards, as it feeds into existing transport and trade corridors such as the great North Corridor from Cape Town to Cairo (Trans-Africa Highway No:4).

In his remarks made on his behalf by NEPAD Kenya acting CEO Mr Daniel Osiemo, Dr Julius Muia, PS state department of planning, reiterated the importance of cross-border infrastructure for unlocking development potential. The PS further said that PICI is playing an important role of accelerating regional infrastructure development and commended NEPAD for its great work and commitment towards Africa's integration.

Seb's Railway - Sandstone

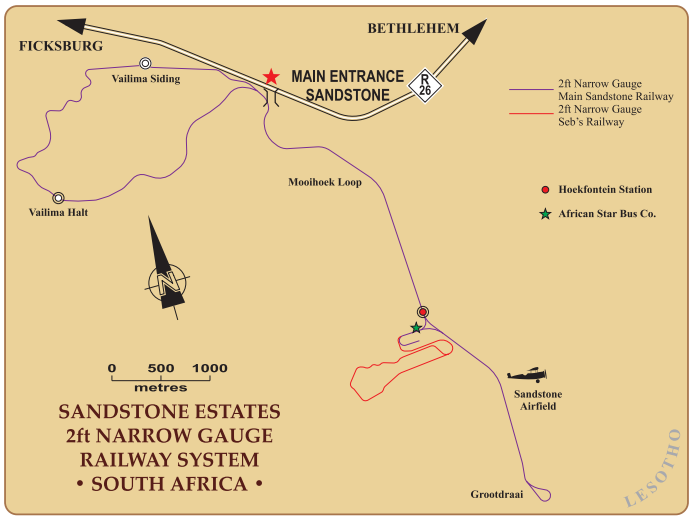
Sandstone's interest in Heritage was originally inspired by a large vintage tractor collection that was on site and included with the purchase of the original farm, Hoekfontein, which formed the basis of Sandstone Estates. The Sandstone Steam Railroad, as it was originally known, only came into existence in 1999 by chance and not by design. The original rail plans by the owners of the agricultural enterprise, Sandstone Estates, in the Eastern Free State, did not include a line but they had planned to concession the Bloemfontein to Bethlehem line from the then Spoornet which ran past the farms. This did not come to fruition for many reasons but mainly due to the fact that, at that time, South Africa was not ready for public/private initiatives.
The 2ft narrow gauge railway, which now compares to anything in the world and has the world's largest private collection of locomotives and rolling stock, was triggered by the demise of the 2ft gauge railway at Midmar Dam. The National Parks Board gave the Railway Society of Southern Africa, who ran the railway as an attraction at Midmar, three weeks to clear the site or the assets would be scrapped as the railway did not fit into their future plans.

Sandstone had been in communication with Spoornet extensively over the proposed concession and it's heritage interest had been noted. This resulted in the late Allan Clarke, then curator of the Spoornet museum, contacting Sandstone to assist. Sandstone Estates agreed to assist in the interest of preserving the assets and a massive road haulage operation was launched to clear Midmar of locomotives, rolling stock and track which was taken to Sandstone in the Eastern Free State.

Having already bought three 3'6" gauge Garratt locomotives for the proposed line concession, Sandstone was already involved with restoring locomotives and one of the narrow gauge Garratts, NGG16 number 153 from Midmar, was restored and put into working order. A request by the fitters to have some track to test it led to the first 200 metres of rail being laid. Over time the track grew to its now 28km route measuring 16km from end-to-end.

The locomotive collection grew with many small industrial locomotives being acquired, not only South Africa but also Angola and Mozambique alongside ex South African Railways' workhorses. Most were in derelict condition but all were restored by Lukas Nel and his team at the Sandstone steam workshop facility in Bloemfontein established in 2001.

Twenty four locomotives have been restored. Fourteen of these were small industrials which created a problem with all of them operating on what had become the "main line". Many were without vacuum brakes and could only pull very small loads for short distances which they were originally designed for. There was a need for another railway that would cater for these locomotives and shorter trips that would be suitable for younger visitors who are the future of preservation in South Africa. Hence the original project name was The Kiddies Line.



The Birth Of A New Line
Since completing the main railway, The Railway Safety Regulator (RSR) had come into existence by an Act of Parliament in 2002. This was to change the way railways in South Africa would operate.

A raft of regulations came into effect, initially to ensure safety and good governance in railway operational matters. Eventually any new project was included in the remit of the RSR and any new line had to meet detailed specifications required by law. The major one being, qualified civil engineering involvement. The days of just laying a siding for a kilometre "in that direction" were over.

Phase One was to identify a site for the new line and a portion of the farm that was not utilised for agriculture was identified south of the locomotive depot (*see map*). The proposed length of the railway was +/- 2,5km which needed to be connected to the main line network and if possible be close to the loco depot and have access to coal and water supplies. It was decided not to link the line to the main running line directly as this would involve more complex operating procedures but, to start the line at a point on the access line to the loco depot branching off south before the depot and completing a 2,5km loop back to the departure point. At the departure point a loop would be installed to act as a halt and avoid trains operating on the line blocking the entrance and exit to the loco depot and storage sheds, while they awaited passengers prior to departure.

After submitting a letter of intent to build the line to the RSR in early 2017, this initial submission, required as part of the approval process to construct the line, was approved. A civil engineering consultancy was appointed and full construction specifications were then submitted to the RSR. Sandstone submitted that they would construct the line themselves using its their earthmoving division in line with the approved specifications under the guidance of the civil engineers. Following the final RSR approval the project started.

Heading off in a south westerly direction the line crosses over the loco depot line to position itself on the western side of that line before making a horseshoe turn and running along the rear of the engine shed, in a north easterly direction and then making another horseshoe turn to the south west. A junction at this point would take the line left or right to complete a loop back to the junction.

Taking the right fork took the line through a small forested area before making a left turn to loop around an existing dam by crossing the dam wall and then across open land to join the entrance line at the junction.

Initial surveys showed that there were some large changes in elevation which had to be contended with. To loop around the rear of the engine shed presented a gradient of 1:11 which was eased by a deep cutting to a much safer and manageable operating gradient. The original line through the forest was also modified to avoid steep gradients and the cutting of trees. Arriving at the dam wall after exiting the forest also presented a 1:11 gradient onto the dam wall from the forest. The dam wall was then raised by two metres to ease this to 1:27. Exiting the dam wall on the level, also required earthworks by means of an embankment to lighten the gradient as the line turned north east across the open veld. This was established as a comfortable 1:40.

As the line was constructed on sloping ground in a south western direction drainage was identified as a challenge. This slope was perfect for the existing dam but the presence of a railway line, cuttings and embankments would severely impact the historical water runoff, either by blocking it or diverting it with subsequent damage to the track. A comprehensive study was made of the drainage characteristics and a number of culverts inserted under the line as well on the embankments plus a new spillway for the dam with its now two metre higher retaining wall. Being on a working farm a large number of level crossings were required. The resultant formation is extremely scenic.

A further complication encountered at the birth of the line was the lack of rail materials. Over the years Sandstone has acquired and stockpiled rails and points but suitable sleepers were becoming increasingly difficult to come by. With the assistance of Railcor, 2ft gauge sleepers designed for underground mine railways were obtained which met the required specifications. After comprehensive testing only one locomotive earmarked for the line was found to be unsuitable due to its wheelbase dimensions being too long for the curves on the line but the balance of 13 locomotives and two railcars passed the tests and will see service on the line.

Rolling stock comprises four wheel open passenger coaches and a small collection of coco pans which will be used for freight demonstration and photographic sessions.

The project name "*The Kiddies Line*" was by now fading as many adult visitors to Sandstone were indicating that they would like to ride and photograph the new line when it was opened so something special was required. One of the Sandstone Directors' grandchildren, Sebastian at the ripe old age of 5, is an avid rail enthusiast and the new line was officially named, Seb's Railway.

Further testing has been conducted with the easing of one curve close to the departure point and the line is now ready for its final sign off by the civil engineering contractors and the Railway Safety Regulator.

Seb's Railway adds a new dimension to the Sandstone experience both with a scenic short trip for younger visitors plus new photographic opportunities. Sandstone's next major event is Stars of Sandstone in April 2019 where a ground breaking visit by the iconic Blue Train will offer a four day trip for just 52 people to the event, adding to an even greater rail experience at Sandstone. Seb's Railway, being a unique new line built in 2018 purely as a tourist attraction, will be in great company.

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CAF WINS THREE NEW TRAM CONTRACTS WITH A TOTAL JUST SHY OF €100M

On Monday 4 June, the Minister for Transport of Luxembourg, François Bausch, and the Major of Luxembourg City, Lydie Polfer, held a press conference to present the second phase of the city tram line which is currently under construction. The primary feature of this new phase is catenary-free running. The units are power supplied at tram stops by means of a ground-level charging system.

The operator, Luxtram, has selected CAF as the supplier of 12 trams for the commissioning of this new phase with an aggregate in excess of 40 million euro. Remarkably, CAF signed a contract in 2015 with the same operator for the supply of 21 units which are currently running in revenue service.

The new trams belong to the Urbos 3 family, and are similar to those in operation on the current line. They are fitted with supercapacitor accumulator technology and ground-level rapid charging at stations. Consequently, Luxembourg will be the second city in the world boasting this innovative technology by CAF. This technology reduces the architectural impact of tram overhead catenaries in city centres, saves energy by preventing rheostatic losses on the line, and optimises brake energy regeneration.

CAF Group's affiliate, CAF Power & Automation, will be entrusted with the supply of facilities and charging equipment for each tram stop.

CAF awarded with two contracts for the cities of Freiburg (Germany) and Lund (Sweden)

The City of Freiburg in Germany renews its trust in CAF with the new contract award for the supply of an additional 5 trams. This order is an extension of the Urbos fleet of 12 trams recently supplied by the Company and which are currently providing revenue service in the city. Furthermore, the contract contemplates the eventual extension of the procurement with yet another seven unit order.

Seated on the edge of the Black Forest, Freiburg has 220,000 inhabitants and sports a distinct inclination towards sustainability and proactive protection and preservation of the environment. In this context, the new trams will become a hallmark of the city where car traffic ranks lower in transport preferences.

Besides, Skånetrafiken, the transport operator of the Skåne region in the south of Sweden, has selected CAF for the supply of 7 trams for the city of Lund. These units will run along the 5.5km line with 9 stops which is currently being built in the city.

In this particular case, CAF's scope includes the maintenance of the units for 10 years in addition to the supply of the vehicles. Again, provisions have been made for the extension of the number of units.

The Units to be supplied to this Scandinavian country are also part of the Urbos Tram platform. Vehicles will comprise 5 modules each for a total length of 32 meters. They will feature state-of-the-art technology helping minimise both operating and maintenance costs.

The aggregate of the aforementioned two contracts is close to 60 million euro, but this figure could fall short in case any of the extension options are exercised.

Yet again, CAF upholds its commitment to supplying high quality transit vehicles which are comfortable and accessible and promote sustainable transport in urban areas. After all, we mustn't forget that CAF's trams are already running on a long list of European cities such as, Budapest, St. Etienne, Nantes, Belgrade, Utrecht, Birmingham, Edinburgh and Stockholm.

CONSTRUCTION OF A $300M DRY PORT COMMISSIONED ON THE DRC- ZAMBIA BORDER

Initial steps towards the construction of a $300 million dry port at Kasumbalesa border post, for DR Congo and Zambia, has begun following the commissioning of the project, Friday, June 1, 2018.

According to the press statement, President Joseph Kabila of DR Congo commissioned the Multi-Modal Logistic Trade facilitation dry port project by the DRC government and the African Roads Rail Ltd, a South African company, in association with China Railway Construction. It will be funded through Private Public Partnership.

Construction is expected to take 36 months generating over 2,000 direct jobs and over 5,000 indirect jobs from the numerous services needed to operationalise the facility. The port will be connected to five major maritime ports namely, Beira, Mombasa, Dar es Salaam, Walvis Bay and Durban ports, integrated into the international logistics chain for eastern and southern African.

Once completed, the facility is expected to resolve congestion currently experienced at the Kasumbalesa border owing inadequate facilities as it will also operate as a terminal of containers with a dedicated area for parking oil tankers and trucks with dangerous goods.

Mr Kalonji, who represented the Secretary General of COMESA, described the project as a game changer for trade facilitation at the border.

“This facility will be the ultimate solution to many challenges that cross-border traders are facing at the Kasumbalesa which is a strategic location connecting Cape to Cairo through the Trans-African high way corridor,” he said. “It will accommodate COMESA trade facilitation instruments such as the Yellow Card, the Regional Customs Bond Guarantee Scheme and COMESA Virtual Trade Facilitation System.”

SCA INTERMODAL SIDE TIPPER BINS FOR EFFICIENT BULK HANDLING ON RAIL WAGONS AND SHORT HAUL ROAD TRANSPORT

Specialised Container Agencies (SCA) - suppliers of niche market container products - has developed an intermodal side tipper bin, that provides efficient bulk handling rail solutions, encouraging greater utilisation of rail wagon container haulage.

“SCA’s intermodal tipper bins ensure quick, safe and cost-efficient bulk handling in rail and road applications. What’s notable is this intermodal side tipper bin system increases payload on rail wagons – from 54 metric tonnes to 60 metric tonnes. A single tipper bin is able to hold 30 metric tonnes for road transport,” explains Ken Mouritzen, director, Specialised Container Agencies. “Robust intermodal side tipper bins are easily handled onto container rail wagons and road trucks by a container handler.

“Side tipper bins have been designed for rapid and efficient off-loading of materials from both rail wagons and road trucks, using specially designed hydraulic tipping cylinders.

“An important feature of these intermodal side tipper bins - which are able to be stacked two-high for storage - is they can be used across different modes of transport, including road and rail, without the need for investment in double handling cargo. This system is boosting the utilisation of rail infrastructure, which significantly reduces transport costs, decreases national road congestion and minimises product damage.

“In areas that are not fully serviced by rail, the intermodal side tipper can be loaded onto road transport, for closed loop, short-haul operations. Road vehicles are then used to carry the tipper bin containing bulk material to the railhead. This means cargo can be received at non-rail serviced facilities, for example on mines, terminals and ports.”

For the transporter, benefits of using robust intermodal side tipper bins are lower operating costs, minimal cargo loss and weather-proof tarpaulins ensure product integrity during transport. Advantages also include cost-efficient, easy handling of bulk, improved safety for drivers, vehicles and cargo, as well as reduced insurance premiums.

Road infrastructure benefits include less long haul bulk traffic on national roads, resulting in reduced congestion, greater safety and decreased wear of road surfaces.

SCA provides a technical advisory and support service throughout the African continent.

TBM MODERNISES CZECH INFRASTRUCTURE

A convertible Herrenknecht multi-mode tunnel boring machine (TBM, Ø 9,890mm) was used for the project to modernise the Czech railway line between Rokycany and Pilsen. The machine excavated two single-track tunnels, each about 4km long. Because of the heterogeneous soil conditions, the TBM initially worked in EPB mode, then on the last third in open single-shield mode. Thanks to the resulting high-speed rail link, the West Bohemian countryside will be better connected to the capital Prague and thus to the European railway network.

With the expansion of the railway line between Rokycany and Pilsen as a high-speed rail link, the Czech railway network is being modernised. The line in the western part of the Czech Republic is part of the railway corridor linking Pilsen to Prague and thus to the European railway network. Over a distance of 4,150m it consists of two single-track tunnel tubes. The tubes were built by the Czech contractor Metrostav. For the first time in Eastern Europe, a convertible multi-mode TBM (from EPB mode to single-shield mode, S-799, Ø 9,890mm) specifically designed and manufactured by Herrenknecht at its Schwanau plant, was used for the project.

The multi-mode TBM built two-thirds of the two tunnels through quartzite shale stone and clay soils in closed EPB mode with screw conveyor muck removal. On the last 1,1km of each route the machine S-799 had to penetrate hard spilite rock, for which it was converted to open single-shield mode with belt conveyor removal. Each of the conversions was realised inside the tunnel in only two weeks. "For variable ground conditions along the tunnel alignment, a convertible multi-mode TBM is the best and most flexible solution. It can be run in different tunnelling modes and thus operate in changing geologies," explains

Korbinian Kröger, responsible project manager at Herrenknecht.

The cutting tools were also changed for the second section of each drive. 19 inch disc cutters were thus installed for the single-shield mode section instead of the previously used 18 inch disc cutters. The larger disc diameter allowed higher contact pressure in the solid hard rock and longer running times. With small overburdens in parts, the flexible all-rounder among the tunnel boring machines achieved weekly top advance rates of up to 182m. After 12 months, in October 2017 the site crew was able to celebrate the final breakthrough for the second tunnel tube. In addition to the TBM, Herrenknecht provided additional equipment, such as multi-service vehicles from subsidiary TMS, a cooling tower and belt conveyor systems.

The new high-speed rail link reduces the average travel time between Rokycany and Pilsen by around 10 minutes, and the capital city of Prague can be reached from Pilsen in less than one hour. As a result the region around Pilsen – with about 170,000 inhabitants the fourth largest city in the Czech Republic – will be better connected to the trans-European transport network. The modernisation project not only makes the railway line faster, but also brings it up to the state of the art. This includes, for example, special safety features such as fire protection solutions and escape routes in the new tunnels.

Herrenknecht is also involved in other infrastructure development projects in Eastern Europe. They include Poland's largest tunnel structure – the 10km long 'Slowacki Route' in Gdansk. The road tunnel crosses under the Vistula River and connects the airport to the motorway and the deep sea port. Tunnel boring machines from Herrenknecht have also been used in the expansion of the metro in numerous Eastern European cities, such as Moscow, Sofia and Warsaw.

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Underlining Africa's opportunities and ABB's key role in unlocking value through for its customers through automation is the 40-percent rise in 2017 orders across all the divisions, sub-regions and channels.

"Africa has the world's most youthful population. This combined with improving economic fundamentals, the continent is ideally positioned to take advantage of new technologies," said Leon Viljoen, Managing Director of ABB South Africa. "Training and preparing the next generation of engineers is pivotal for the continent. That is why ABB has joined forces with the Wits University in Johannesburg and why we have a number of other projects across the continent."

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