



Bimodal Solutions Transforming Logistics in the Southern Africa Market

Railways Africa™ Magazine recently had the privilege of interviewing the key role players in the partnership between Transnet Freight Rail (TFR) and RailRunner SA (RRSA). These industry leaders are currently working in close collaboration to bring bimodal freight services to South Africa's road and rail industries for the first time.

Thuthuka Dladla, TFR's senior manager for inland intermodal and automotive operations; and Mike Asefovitz, TFR's senior manager of corporate affairs, Mike Daniel the chief executive officer of RRSA; Thabiso Buku, the chairman of the RRSA board; shared their journey through more than five years of collaboration, negotiation and business development at an interview conducted at TFR's head office in Parktown, Johannesburg.

Intermodal Solutions for Africa's Logistics Market

The technological revolution has brought many innovative changes to the logistics sector in recent years. In response to the ever-changing needs of the global supply chain as well as the introduction of new technologies that have forever shifted the way that goods are transported across the world, service providers have had to respond to market demands and adapt to new ways of doing business.

The introduction of containerized shipments, which started in the 1950s, has grown to dominate domestic and international freight on every level. Currently, it is estimated

that there are in excess of 100 million containers in active use across the world. Ultra-large container vessels are now able to load up to 18,000 TEU¹, and ports have had to ramp-up loading, offloading and container terminal capacities to respond to the demand. By extension, land transport modes have had to change the way that they do business to keep up with ever-increasing volumes.

As a result of the logistic challenges associated with large consignments, the movement of goods through the supply chain needs to be planned with greater efficiency and precision. Road infrastructure - particularly within the developing

world - is simply inadequate to support freight volumes of this scale. With congestion on the increase and carbon emissions on the rise, the need for efficient, well-integrated, and sustainable freight solutions has never been more relevant.

In response to these challenges, there has been a shift towards intermodal solutions that break down the barriers between transport modes, be it air, inland water, ocean, pipeline, rail or road². Each mode within the supply chain comes with its own unique set of strengths and limitations. The rail industry, for example, offers customers a service that allows for the seamless movement of goods across borders,

decreased delays as a result of road congestion, lower costs, and lower carbon emissions. At the same time, rail will never be able to achieve door-to-door delivery and, therefore, remains dependent on more flexible modes, such as road transport, to deliver on the first and last mile.

An intermodal approach to land transport provides flexible solutions to moving goods; a flexibility that will never be achieved by rail alone. However, to realise efficient intermodal logistic solutions, service providers need to adopt novel technologies, construct business models that respond to the needs of multiple stakeholders within the supply chain and put in place the



systems required to ensure the visibility and traceability demanded by customers in a modern, digitised world.

It is with this in mind that South Africa's Transnet Freight Rail (TFR) has explored intermodal solutions in recent years - a strategy that the organisation hopes will provide the opportunity to diversify and grow their market share. TFR represents the largest operating division of the Transnet Group and supports 15% of the nation's freight tonnage. The division owns and maintains a network of 22,000 route-kilometres of track, connecting to the country's ports and railway networks of neighbouring states. TFR operates approximately 1,200 trains per day, conveying 98 commodity groups over more than 4,000 origin-destination combinations. In the 2015/16 financial year, TFR moved 214 million tonnes of freight for their approximately 450 clients.

RailRunner - Innovating Bimodal Solutions for Road and Rail

RailRunner NA Inc. is an American-based rail products and services provider that specialises in delivering cost-effective transport solutions to underserved

markets worldwide. The company's unique 'Terminal Anywhere'® technology enables service providers within the freight industry to combine the economics of rail with the flexibility of trucking while linking directly into the international containerised shipping network.

RailRunner's 'Terminal Anywhere' system relies on specialised bogies together with bespoke trailers that are compatible with both road and rail transport. RailRunner's custom designed bogies perform two distinct functions, the first being the transitional unit that connects to a locomotive and the second being the intermediate units that connect trailers, chassis or swap-bodies to form a bimodal train. Bogies are placed on the rail using conventional 10t forklifts. A truck carrying a purpose-built trailer loaded with a container then backs up onto the railway line and loads it directly onto the intermediate bogie. This process is repeated until a train of the desired length is formed. A transitional bogie is then added to the first or last trailer, which is coupled to a locomotive. Upon reaching the desired destination, the train can be dismantled in the same manner and truck

Railrunner Terminal Anywhere – Modular system and terminal infrastructure

- Semi-Trailer
- Container chassis
- Special vehicles (i.e. for liquids, mass products or windmill products)
- Bogie (Transition Unit) behind locomotive and at end of train
- Bogie (Intermediate Unit) connects trailer and/or chassis
- Level grade track
- 10 t forklifts
- Tugmaster
- Air compressor
- Office container

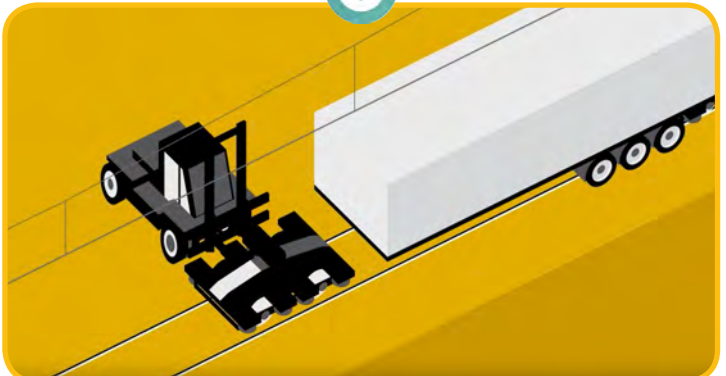


Intermediate Unit



Intermediate Unit

Transition Unit



drivers are then able to pick up individual trailers, with containers already loaded, for delivery to the customer's doorstep.

Not only does the RailRunner bimodal vehicle provide the flexibility needed to integrate road and rail modes seamlessly, but also offers significant improvements on traditional rail technology. Daniel explains that "a RailRunner train can be assembled and dismantled under the catenary, removing the need for heavy lifting equipment, which is costly and cannot be operated underneath the overhead wires."

In addition, RailRunner's self-steering bogies utilise air suspension technology that reduces vibration as well as vertical and lateral forces, which results in an impressive reduction in noise levels (5dB below

current standards). The ultra-compact bogie design achieves a mere 0,7m between units when coupled, in comparison to the 3,3m between traditional flat bodies. This compact design reduces wind resistance, saving on traction energy and allows for more units per train. The bimodal train can be configured to carry up to 40 trailers in one 700m-long train, with each bogie axle capable of carrying 20 metric tonnes.

The system provides for simple and fast implementation in regions with minimal intermodal infrastructure and can be adapted to suit various railway gauges. Dladla explains that: "Transnet has been driving the road to rail strategy for some time, and after exploring a diverse range of intermodal technologies we identified RailRunner as

the best suited intermodal solution for our needs."

RailRunner SA and Transnet Team Up for The Southern African Market

In light of the synergies between RailRunner's product offerings and TFR's business plans, the entities entered into initial talks in 2010, culminating in a formal request for information (RFI) in 2011. This was followed with Transnet issuing a request for proposal (RFP) in 2012, and RailRunner submitted their pilot proposal in 2013. With consultation well underway between the two entities by this time, a due diligence investigation was conducted in April 2014, and RailRunner was announced as the preferred bidder for Transnet's intermodal land project in November 2014.

Dladla explains that both parties have undertaken considerable market research, stakeholder consultation and careful business planning to ensure that implementation is successful: "We do not want a situation where the project fails not due to the technology, but because of a faulty business model." Dladla points out.

In May 2015, the negotiation process culminated in the signing of a Heads of Agreement (HOA) between the two parties. The HOA proposes a business plan where Transnet and RRSA will form a new operating entity, as a 50%-50% joint venture, currently termed "Newco" (as the entity has not officially been named at yet). RRSA will introduce an additional service company, called RailRunner Network Services (RNS) as its operating subsidiary, which will invite private logistics businesses, to be equity partners in the firm.

Dladla explains the approach by stating that: "Transnet is a reputable service provider with an already established market share. RailRunner may not provide services directly to the South African market as yet, but they have great technology. It was, therefore, decided to merge the two by establishing a company of common interest, which will function as an operating entity offering logistics solutions using bimodal technology."

According to Daniel, the intellectual property (IP) rights to the RailRunner technology will remain with RailRunner NA Inc, until the completion of the homologation process, at which time the (IP) for the Cape Gauge equipment will pass to RailRunner South Africa. However, the vehicles produced



"Once implemented, manufacturing of the vehicles will be done at local rolling stock manufacturing sites, and components and parts will be sourced through the local supply chain. This agreement will, therefore, have an impact on both direct and indirect job creation, skills development and will support local suppliers."

- Mike Daniel the chief executive officer of RRSA

for South Africa will be manufactured locally, using the local supply chain to provide parts and components. This is in line with the localisation targets set for original equipment manufacturers (OEMs) in all of TFR's current rolling stock contracts under the Market Demand Strategy (MDS).

In September 2016, a definitive Memorandum of Agreement (MoU) was signed between Transnet and RRSA ratifying a 20-year partnership that will bring bimodal vehicles to the Cape Corridor, among others. The Cape Town to Gauteng corridor is well suited to bimodal transport that incorporates rail and road, as the 1,400km commute between Johannesburg and the Cape Town via the N1 highway brings with it considerable driver fatigue, road safety risks, congestion and the high fuel cost and carbon emissions associated with extreme long-haul road freight services. Payloads that will be moved using RailRunner trailers will include domestic freight along the CapeCor and NatCor networks; international freight containers to and from port facilities; coal for power generation; heavy haul commodities for the mining industry; and agricultural and food products, among others.

Bimodal Technology Furthering Transnet's Market Demand Strategy

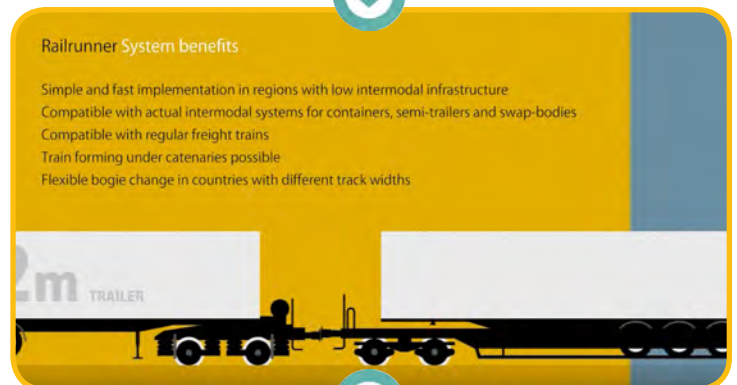
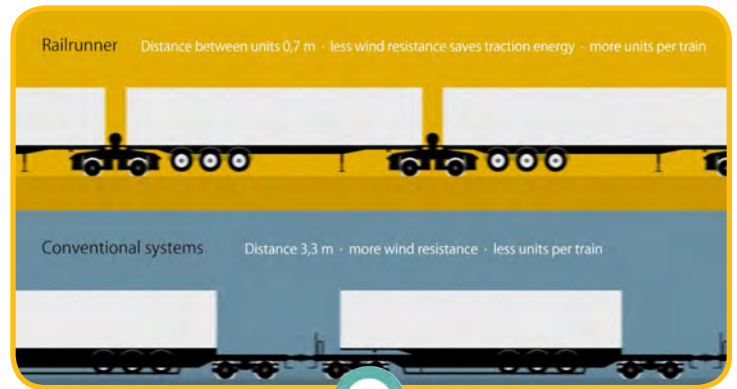
While TFR started investigating in bimodal technology prior to the implementation of the company's MDS business plan, the synergies between the business models being pursued by Transnet and

RailRunner's intermodal technology are clear.

According to Sandra Gertenbach, Transnet's executive manager for strategy and business planning, the MDS encapsulates a major recapitalisation programme with a proposed budget of approximately R333.6 billion, to be spent over the 2012-2017 period on capital projects aimed at modernising South Africa's ageing railway infrastructure, as well as upgrading port and pipeline facilities managed by the group. The bulk of the capital spending will be directed towards TFR with the view to recapitalising and restructuring TFR's service offerings to meet their customer's demands.

First introduced in 2012, the MDS has several key targets that Transnet management wish to achieve over the medium to long term. These include addressing the company's capacity shortages with the procurement of new rolling stock and locomotives to drive freight services in the country. Additionally, in line with the South African government's development goals and transport policies, Transnet aspires to spearhead the shift from road to rail in response to the ever-increasing levels of road congestion and the rising number of road accidents associated with high volumes of heavy haul vehicles on the country's provincial highways.

In addition, the use of rail for heavy haul freight is far more fuel efficient and by extension produces less carbon emissions than road vehicles over the long haul, a point that is



Watch Video:

<https://youtu.be/wsBJ1AZH788>

1. TEU - Twenty Foot Equivalent or TEU is an inexact unit of cargo capacity often used to describe the capacity of container ships and container terminals, which is based on the volume of a 6.1m intermodal container. - Wikipedia.
2. DeWitt, W & Clinger, J (2007) Transportation in the New Millennium Committee on Intermodal Freight Transport Chairman: Gerhardt Muller, U.S. Merchant Marine Academy.

highlighted in Transnet's MDS. A shift to rail is equivalent to a shift to greener transport, and therefore a step in the right direction for the achievement of the UN's sustainable development goals, to which South Africa and the greater SADC region ascribe. According to Source: Modern Materials Handling, recent studies have shown that customers are willing to wait as much as a full business day for their payloads if it means that a more sustainable transport system is used.

RailRunner's bimodal technology very efficiently provides solutions to achieve a number of these goals. One of the primary reasons that clients favour road freight services over rail is the ability of trucking to deliver goods from the destination to the customer's door, without the delays, cargo security issues and logistics challenges traditionally associated with moving between modes. RailRunner's bimodal vehicles are compatible with the tracking technology used by the trucking industry, which provides customers with the visibility needed to plan the movement of their payloads through the supply chain - another significant advantage that road has traditionally had over rail. By removing a number of barriers to the uptake of rail services, the shift from road to rail becomes a more implementable strategy, both for customers and for service providers.

RailRunner provides a first, long-haul and last mile solution in one - an approach that Daniel believes will revolutionise the freight industry, stating that: "Bimodal technology will do for African logistics what cellular phones did for African telecommunications".

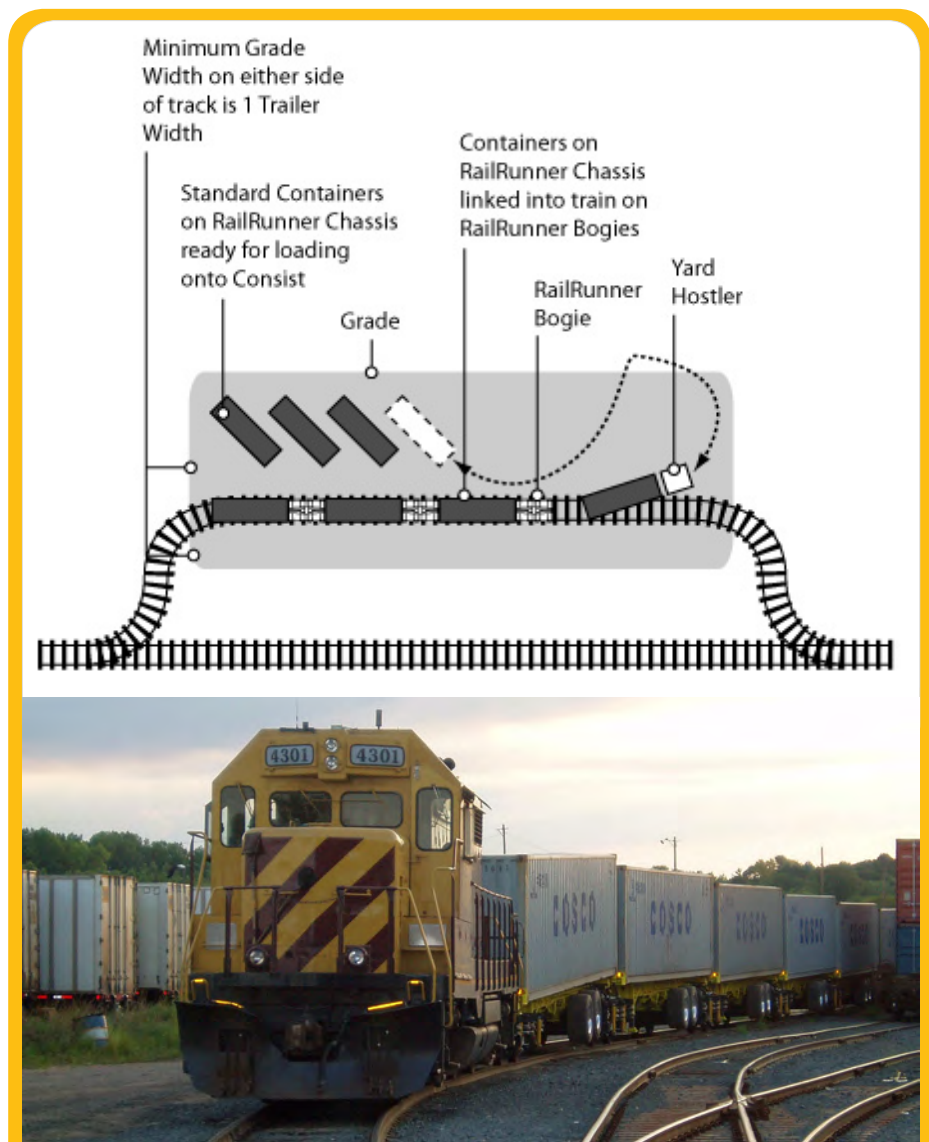
Dladla reiterates this point by saying that: "Transnet sees bimodal technology as a disruptive force. However, it will not be the introduction of the technology that will disrupt the market, but rather, this entirely novel business model."

With regards to some of the socio-economic aspects of the MDS - including job creation, the development of supplier industries for all modes of transport, and the effective implementation of skill development initiatives - Daniel highlights the far-reaching benefits that the partnership between Transnet and RRSA will offer the local economy. Daniel explains that: "Once implemented, manufacturing of the

vehicles will be done at local rolling stock manufacturing sites, and components and parts will be sourced through the local supply chain. This agreement will, therefore, have an impact on both direct and indirect job creation, skills development and will support local suppliers."

Transnet lists among its MDS objectives the goal of providing world-class technology and infrastructure for the South African market. As a world-leading rail technology innovator, RailRunner is well positioned to deliver on this objective. RRSA chairman Thabiso Buku points out that, as an international company, RailRunner offers the

highest international standards in rail technology, which can now be adapted for the local market. Additionally, Buku highlights the benefits of the public-private partnership (PPP) framework that has been used in constructing the agreement between Transnet and RRSA. "In South Africa, we speak a lot about the importance of public-private sector engagement to create jobs, build our economy and make South Africa a better country to live in. We see this partnership as an opportunity to form a joint venture that will serve the local economy." Buku highlights the potential that bimodal technology holds for building the transport infrastructure necessary to facilitate



trade, both domestically and within the broader SADC region to boost economic growth.

Finally, one of the cornerstones of the MDS is to level the playing fields between road and rail services, thereby moving loads that are better suited to rail, back onto rail, while allowing the truck industry to dominate in the areas that they do best – which remains short haul, first and last mile service delivery. Dladla, however, makes it clear that the adoption of bimodal technology is in no way designed to compete with the trucking industry but, rather, is aimed at creating a mutually beneficial business model that takes advantage of the strengths of each mode. Buku points out that “stimulating competition in the market creates an environment where service delivery is more likely improve across modes and regions.”

Bimodal Vehicles in South Africa's Future

The process of synergising Transnet's bimodal needs with RailRunner's service offerings has been a time consuming and cautiously implemented programme. And rightly so, as the introduction of this technology has the potential to define the future of freight transport in the country and across the broader region, if implemented correctly.

Daniel explains that “RailRunner does not want to establish new manufacturing facilities, as there are already numerous facilities in the country that are currently under-utilised. As such, following the signing of agreements in September last year, we issued a number of local suppliers with RFPs, which closed on 15 December 2016.” Daniel confirms that the company has received a number of viable bids, which are currently

being sorted into a short list. Once bidders are approved, pricing and time frames will be established.

Currently, RailRunner vehicles are designed to run on standard gauge, and as much of the Southern African region still runs on narrow Cape gauge, the necessary modifications need to be developed and tested. This is further complicated by the fact that the United States uses the imperial system for parts and components while South African uses metric measurements. A homologation process is currently underway with various suppliers to ensure that the vehicles can be manufactured to specification in the country. As such, while it is clear that bimodal technology will be rolled out on South Africa's transport corridors in the near future, it is not clear at this time when that will be.

The introduction of bimodal road and rail vehicles will no doubt be a disruptive force in the freight market – a move towards the seamless, integrated and highly visible freight solution that is so desperately needed to drive economic growth in the SADC region. ‘Business as usual’ in the freight industry has a very limited lifespan, as our road infrastructure weakens and congestion, road accidents and pollution catch up with us. TFR has, without question, put their best foot forward in adopting new technologies to implement the MDS for the betterment of the institution's service offerings as well as to meet the needs of their customers with highly flexible, market appropriate transport solutions through their partnership with RailRunner.



EXCELLENCE IN RAILWAY & MINING ENGINEERING

Surtees Engineering (Pty) Ltd based in Johannesburg, has been servicing the railroad industry in Southern Africa since 1982.

Surtees Engineering concentrates its efforts on the manufacturing, repair and machining of specialised mining, steel production and railway related products for both freight and passenger rolling stock.

Surtees Engineering specialises in the supply, refurbishing and the assembly of new wheelsets for a variety of rolling stock applications such as hoppers, locomotives, motor and trailer coaches as well as the manufacture of axles.

In addition, the company is competent in the refurbishment and supply of a wide range of crane and rail bogies and crane wheels, carrying a comprehensive inventory of spares to efficiently cater to client needs.

Other equipment reconditioned or manufactured by the company include:

- Vacuum pumps
- Compressors
- Air, hydraulic and mechanical jacks
- Air and vacuum brake equipment
- Automatic slack adjusters
- Automatic couplers
- Drawgear assemblies
- Traction motors
- General engineering and fabrication
- And other locomotive and rail wagon equipment



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