

TRUCK & BUS

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Western Star shines in RBM road train operation

As Australian as kookaburras and kangaroos, road trains are also making an impact in South Africa – with Western Star proving its mettle in operation at Richards Bay Minerals

UNITRANS Mining and Agriculture is achieving solid results with what are reported to be South Africa's longest and safest road trains, which started operating at Richards Bay Minerals last year.

The efficiency achieved in designing the new road trains enables Unitrans to deliver more payload per trip, and thus per day, compared to the former three-trailer system.

Although Unitrans does not divulge proprietary load and axle configuration statistics, Gert Brits - GM of mining services at Unitrans Mining and Agriculture – says he is “very satisfied” with the performance achieved by this adaptation of heavy haul rigs in their first quarter of operation.

Designed to eliminate the whiplash effect any small steering correction up front can have on the last trailer, the new Unitrans road trains are 42,15 m long, with a Western Star 8x6 truck tractor hauling four side tipper trailers.

Unitrans co-operated with Afrit and the CSIR in developing a performance-based standard that would ensure the road trains are “among the safest in the world”.

Weighing 60 ton unladen, the side tippers have been designed to achieve the optimum balance between weight and durability. Afrit MD André van de Wetering says the company drew on its expertise gained delivering loads throughout southern Africa over the past four decades. Van de Wetering says the 60-tyre, four-tipper system has proven to track true on any road surface.

Four drivers operate each road train 24 hours a day, with teams reporting that

steering the new road train is easier than controlling the older and shorter three-trailer units.

Unitrans's crew of heavy haul drivers reports that the smooth power delivery to all the wheels makes driving the abnormally long and heavy loads “almost too easy”. A 15 litre Cummins ISX 565 delivers 2 508Nm of torque at 1 200rpm. The two-speed auxiliary transmission doubles to 14 the number of speeds available.

Duncan Prince, product manager for Western Star at Mercedes-Benz South Africa, attributes the ease of use to the fact that all Western Star trucks are built to purpose.

“Originally bred to deliver in the extreme conditions of Canadian Rocky Mountain logging operations, Western Star trucks also do a spectacular job here in South Africa. Western Star trucks offer both

the brute pulling power and performance required to pull abnormal loads, haul multi-trailer road trains or tow other disabled trucks.”

Prince says the first fleet of Western Star truck tractors, which Unitrans Mining and Agriculture had purchased in 2004, has now covered more than 1,5-million kilometres and clocked up some 45 000 hours of day and night service. “That means that in the past eight years, the old trucks' engines ran on average for 16 hours a day, 365 days a year.”

Prince says Western Star likes to think of its trucks as being literally the strongest link in the delivery chain that eventually ensures that Richards Bay Minerals products reach end customers.

This consignment of Western Star trucks was sold and is supported on site by Liebherr Africa, a Mercedes-Benz South Africa authorised outlet.



Heavy duty – Western Star is pulling its weight at Richards Bay Minerals. From left: Arie de Lange, special projects manager, Unitrans Mining and Agriculture; Gert Brits, GM, Unitrans Mining and Agriculture; Duncan Prince, product manager, Western Star Trucks; and Johan Hagg, Afrit Trailers

Curbing the car-carrier tail wag

An interesting presentation to guests at the IRTE May meeting detailed a recent study that has helped to curb the notorious tail wag of South African car-carriers

By Jim Campbell

Car-carriers have been operating under an abnormal load permit, which is only intended for vehicles carrying indivisible loads, and with dimensions or total mass, or both, in excess of permissible maximums. A fully loaded car-carrier is marginally in excess of the permissible overall height and length limits, though for many years they have enjoyed the exemption of operating under abnormal load permits.

However, the authorities have indicated that abnormal load permits will no longer be issued, as motor vehicles transported on car-carriers are considered to be a divisible load, and that such vehicle combinations must conform to legal limits. An alternative and relatively short-term solution is to have existing combinations assessed and certified for operation under the Performance Based Standards (PBS) programme.

The third in a series of PBS related topics was presented by Christopher de Saxe of the CSIR to the May meeting of the Johannesburg Centre of the IRTE, and covered the issue of tracking stability and tail swing stability of car transporters.

He highlighted the problems that had been found when assessing a baseline combination, causing it to fail the initial qualification requirements for PBS certification. The majority of car-carriers used in South Africa are a combination comprising a rigid truck with a close-coupled (or tag type) trailer with a two/three axle, centre-mounted axle unit. The configuration results in an excessively long rear trailer overhang of 4-6 m, resulting in excessive tail swing when

turning through a low-speed 90 degree swept path, which can be critical to the safety of pedestrians and cyclists.

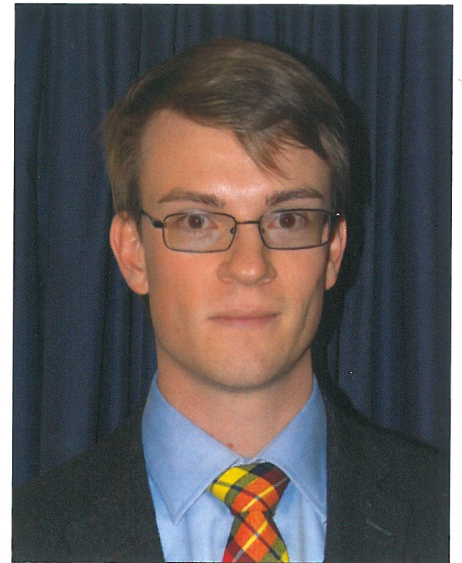
The objectives of the tail swing study included:

- Quantifying the tail swing performance of typical SA car-carriers
- Calculating the maximum tail swing of existing trailers
- Carrying out a full PBS assessment of a typical SA car-carrier combination.

There is no basic and simple formula to determine tail swing, and in each case this must be calculated for each individual trailer design. Based on six different SA combinations, and using a mathematical model to determine the incremental position of the trailer as it passes through a curve, it was found that the average tail sweep-out, at 0,71 m, was almost double that allowed under Australian PBS rules. This indicated there was a need to re-engineer existing local trailer designs to ensure compliance with PBS requirements.

The next stage was to carry out a detailed full PBS assessment using a typical SA combination loaded with nine large SUVs to simulate the largest possible load combination, together with various part-load mixes and possible configurations. Whilst the baseline original design failed the test, subsequent changes – including an increased trailer wheelbase dimension – resulted in a final design that was in line with PBS regulations.

De Saxe demonstrated the resultant simulation design by showing a moving graphical representation of the revised design, superimposed over the original baseline vehicle, which clearly displayed the differences in the tracking of the two



Christopher de Saxe of the CSIR

combinations when passing through a double lane-change manoeuvre.

In summarising De Saxe stated:

- About 80% of the existing SA car-carrier fleet fail the PBS tail swing standard.
- The 0,3 m tail swing limit correlates well with the 3,7 m rear overhang limit in Australia.
- South African legislation allows rear overhangs of up to 7 m and a tail swing up to 1,25 m.
- The baseline combination initially failed four performance standards, but the proposed modifications resulted in a PBS-compliant design, with improved safety in six areas required by the standards.

The benefits of a PBS approach to heavy vehicle safety, for car-carriers in particular, have been clearly demonstrated both under simulated conditions and with the actual performance of a number of different designs currently in operation under PBS permits.

Smarter trucking is key to tackling tough times

Delegates to the recent RFA conference were urged to find solutions to challenges facing the commercial transport industry to ensure a sustainable presence for truck operators in the SA logistics sector

By Jim Campbell

THE 2013 Road Freight Association (RFA) Conference, held recently in Phalaborwa, was opened by RFA CEO Sharmini Naidoo who welcomed deputy president Kgalema Motlanthe, dignitaries, guests and delegates.

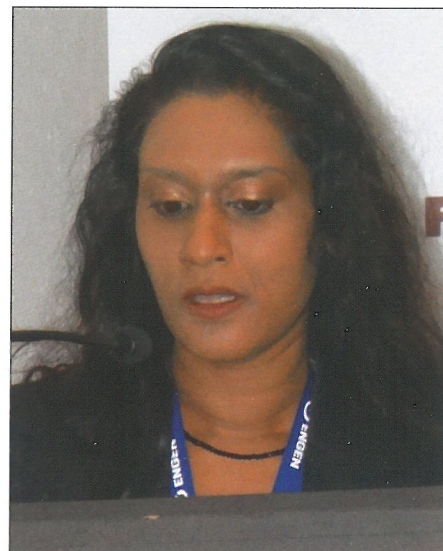
Over recent years the RFA had enjoyed a growing and successful relationship with government, says Naidoo, interacting on matters of importance to the road freight industry and the economy. The crippling 19-day strike in 2012 has caused the road freight industry to review its position, and create initiatives to cause the sector to think smart and increase efficiencies in operations.

Truckers have a passion for their industry and a will to survive against

adversity in a 24/7 business environment, said Naidoo, and solutions must be found to ensure a sustainable presence of truck operators in the SA logistics sector. The industry must push for cleaner fuels, introduce new technologies to increase efficiencies, and strive to improve fuel consumption and reduce CO₂ emissions.

In a closing, she expressed the hope that government, and the country, appreciated the important role of the road freight industry, repeating the creed of the RFA, 'Without trucks, South Africa stops!'

National deputy minister of Transport Sindiswe Chickunga, called on to introduce Motlanthe, agreed that the RFA and road freight industry play an important role in the freight logistics sector, and in local and regional economies.



RFA CEO Sharmini Naidoo: truckers have a passion for their industry and a will to survive against adversity in a 24/7 business environment

Infrastructure

Motlanthe commenced his presentation by recognising the importance of logistics to the country's economy and



Interesting perspectives emerged from the panel discussion debating the imposition of more taxes, more tariffs, or privatisation. From left: Ravi Naidoo, IDAP; Nazir Alli, Sanral; Irvin Naidoo, Transnet; Dennis Dykes, Nedbank; and Mike Schüssler, Economists SA

Smart technologies in trucking

Smart Truck evaluation and certification allows vehicle configurations to be optimised without the restriction of limits set by road traffic regulations.

A panel discussion at the RFA conference dissected the topic

By Jim Campbell

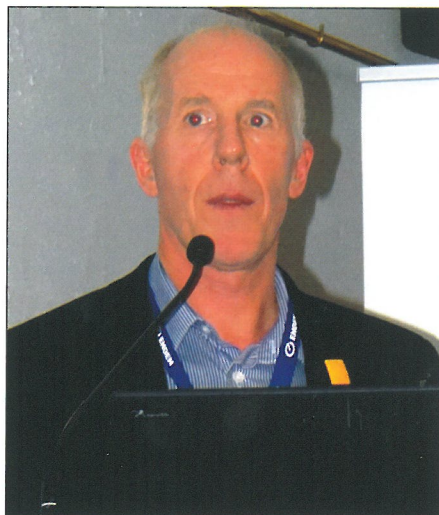
A panel discussion at the recent RFA conference focused on the progress of the Performance Based Standards (PBS) programme in South Africa that has seen the emergence of so-called Smart Trucks offering significant benefits to users.

Paul Nordengen, of the CSIR, who was instrumental in introducing the Australian Performance Based Standards (PBS) programme to South Africa, presented the panel, including road freight operators, a consignor/consignee, an academic, and a law enforcement representative. Panel members were Adrian van Tonder of Barloworld Logistics, Eric Aspeling of Sappi, Gert Brits of Unitrans, Professor Peter Lyne of the University of KwaZulu-Natal, Chris Stretch of the KZN Department of Transport, and Brian Hunt of Timber Logistics Services.

Smart Trucks background

Nordengen gave a brief history of how PBS had been established, starting in the 1970s when the US Federal Highways Administration commissioned research into truck dynamics and causes of rollover incidents. Findings led to the publication of a number of books, still in use today, and this work was the precursor to the development of the first performance based standards in Canada and New Zealand in the 1980s. In the 1990s, research into PBS was established in Australia by the country's National Transport Commission, which carried out extensive work to further develop PBS.

Nordengen came across the PBS concept in the early 2000s and he arranged for a SA forestry delegation to visit Australia to investigate operator self-regulation and the PBS concept, with a view to introducing both to SA.



The CSIR's Paul Nordengen has been instrumental in driving the PBS concept in SA

In 2004 a local PBS committee was formed. In 2006 a letter of support of the PBS concept, for use on SA roads, was issued by the SA Department of Transport, opening the door to the increasing introduction of Smart Trucks to SA roads.

In 2003 the local forestry industry was starting to develop the concept of a Load Accreditation Programme (LAP) to better manage loads on timber vehicles. However, it was swiftly realised that the initial programme needed to encompass operator accreditation, vehicle maintenance procedures, formal record keeping and auditing practices, and so the Road Transport Management System (RTMS) was born, which co-ordinated closely with the introduction of the PBS programme.

First PBS vehicles

In May 2007 the first two vehicles designed to PBS requirements, with a gross combination mass of 67,5 ton and overall length of 27 m, were introduced into the forestry industry to operate under the RTMS accreditation. There are now 60 Smart Trucks in operation, with a further 30 in design and approval stages. Most are in forestry, though there is a growing

acceptance by other transport sectors, such as mining and commuter transport.

A condition of operating a vehicle under PBS/Smart Trucks regulations is that the operating company must be RTMS certified before being permitted to operate PBS vehicles.

The establishment of PBS and RTMS at almost the same time has caused many individuals, and even some regulatory and enforcement authorities, to think of the two programmes as being one and the same. However, while there is a link between the two, this is not the case.

Understanding PBS

PBS assessment has four levels, L1 to L4, where each level is determined by overall combination length. The increase in level number relates to an increase in overall length, with longer vehicles having more restriction regarding area of operation. All PBS vehicles are required to comply with a number of criteria:

- Tracking ability on a straight path: the vehicle's total swept width while travelling on a straight path.
- Low-speed swept path: the maximum width of the vehicle's swept path, in a prescribed 90 degree low-speed turn.
- Steer tyre friction demand: the maximum friction level demanded of the prime mover steer tyres in a prescribed 90 degree low-speed turn.
- Static rollover threshold: the steady state level of lateral acceleration during a constant radius steady-speed turn that the entire vehicle can sustain without rolling over.
- Rearward amplification: the degree to which the trailer, or trailers in a combination, amplifies the lateral acceleration of the prime mover in a prescribed lane-change manoeuvre.
- High-speed transient off-tracking: the maximum lateral distance, or sideways distance, that the last-axle on the

rearmost trailer tracks outside the path of the steer axle in a prescribed lane-change manoeuvre.

- Yaw damping coefficient: the rate at which 'sway' or yaw oscillations of the trailer/s settle down.

Stakeholder comments

Nordengen asked each panel member for his view of PBS and its benefits to the road freight industry.

Timber Logistics Services' Hunt stated that the Smart Trucks programme is not just "a high falutin' process from the CSIR". If introduced into a fleet operation it can offer realistic solutions to reducing transport costs. SA operators are well able to incorporate PBS into their fleets.

Though a PBS designed combination may not be suitable for all road conditions, the 'horses for courses' principle must apply. He made the point that when Timber Logistics Services first introduced PBS, drivers had to be in possession of a Dangerous Goods class PrDP for reasons he could never understand.

Professor Lyne, University of KwaZulu-Natal, confirmed that the prescribed regulations did not always allow vehicles to be designed and constructed to optimally meet operator requirements. PBS requirements ensure that the configuration can meet the vehicle's functions safely at its maximum PBS certified load rating under all normally anticipated road conditions.

Brits (Unitrans) indicated that PBS is applied within the Unitrans mining operations primarily for safety and stability reasons, and to increase operating efficiency. The resulting road train is almost 42 m in length with a GCM of up to 176 ton gross, and yet is safe within its operating parameters, especially in terms of off-tracking stability.

Barloworld's Van Tonder stated that by law stock trucks and trailers have to comply with road traffic act regulations, but even if a vehicle combination falls within the prescribed limits for loads and dimensions, it does not guarantee the safety and stability of the vehicle under all road conditions.

However, adherence to PBS guidelines does allow Smart Trucks to carry higher payloads, reducing the number of vehicles for a given total load to be carried, with less fuel used, and a consequent reduction in CO₂ emissions.



Smart panel on Smart Trucks: Adrian van Tonder, Barloworld Logistics; Eric Aspeling, Sappi; Professor Peter Lyne, University of KwaZulu-Natal; Gert Brits, Unitrans; Chris Stretch, KZN Department of Transport; and Brian Hunt, Timber Logistics Services

Nordengen added that while some legal vehicles would not meet PBS requirements, it did not follow that all are unsafe, though PBS would readily identify those vehicles that are considered risky.

Sappi's Aspeling indicated that the company had been involved with the PBS project since the beginning. During an early visit to Australia to investigate how PBS worked in practice, his company had identified that potential roll instability problems could be present in its existing fleet.

Also, overloading was a major issue in the timber industry, though in terms of optimising payloads, under-loading was sometimes as much of a problem as overloading. A PBS compliant truck/trailer design results in payloads approaching 40 ton within the 56 ton permissible maximum GCM, without encroaching on the unofficial 2% load tolerance. PBS certified combinations permit an increased GCM and payload, improve safety, ensure more uptime and better utilisation, result in fewer accidents and related repair costs, with a subsequent reduction in insurance costs.

Stretch (KZN DoT) stated that, from the regulatory and law enforcement perspective, all parties benefited from the introduction of PBS, as there were fewer accidents and less road damage. Improved road safety assisted the road traffic authorities to successfully carry out their duties.

What are the benefits?

Smart Truck evaluation and certification allows vehicle configurations to be optimised for a particular application, dimensions and load, without restriction of the prescribed limits set by the road traffic regulations.

However, each design is assessed on the basis of the criteria already listed, to confirm that the design will be as safe, if not safer, in the loaded condition than the base line vehicle that it replaces.

Properly trained and competent drivers are an important factor in the success of Smart Truck operations to achieve maximum performance from the larger vehicle sizes.

Nordengen indicated that while prescriptive regulations required more enforcement to ensure compliance, PBS and RTMS were based on higher levels of self-compliance on the part of the operator, supported by withdrawal of RTMS certification if an operator defaulted.

Vehicles designed and built to the requirements of PBS/Smart Trucks regulations and certification offer:

- Improved safety performance
- Reduced vehicle trips
- Reduced fuel consumption per ton/km
- Reduced CO₂ emissions per ton/km
- Reduced vehicle trips and road wear per ton/km
- Improved performance of the SA vehicle fleet.

Data gathered from Smart Truck fleets in operation in 2012 showed significant benefits including:

- Saving 10 260 trips
- Saving just over 1-million litres of fuel
- Reducing CO₂ emissions by 2 650 tons
- Reduced accidents by a factor of more than 2:1 over the period 2008 to 2012.