

Performance-Based Standards in South Africa: Vehicle safety performance improvements

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Performance-Based Standards in South Africa: Vehicle safety performance improvements

- Background
- Safety standards
- Pilot project
- Car carriers
- Monitoring results
- Conclusions

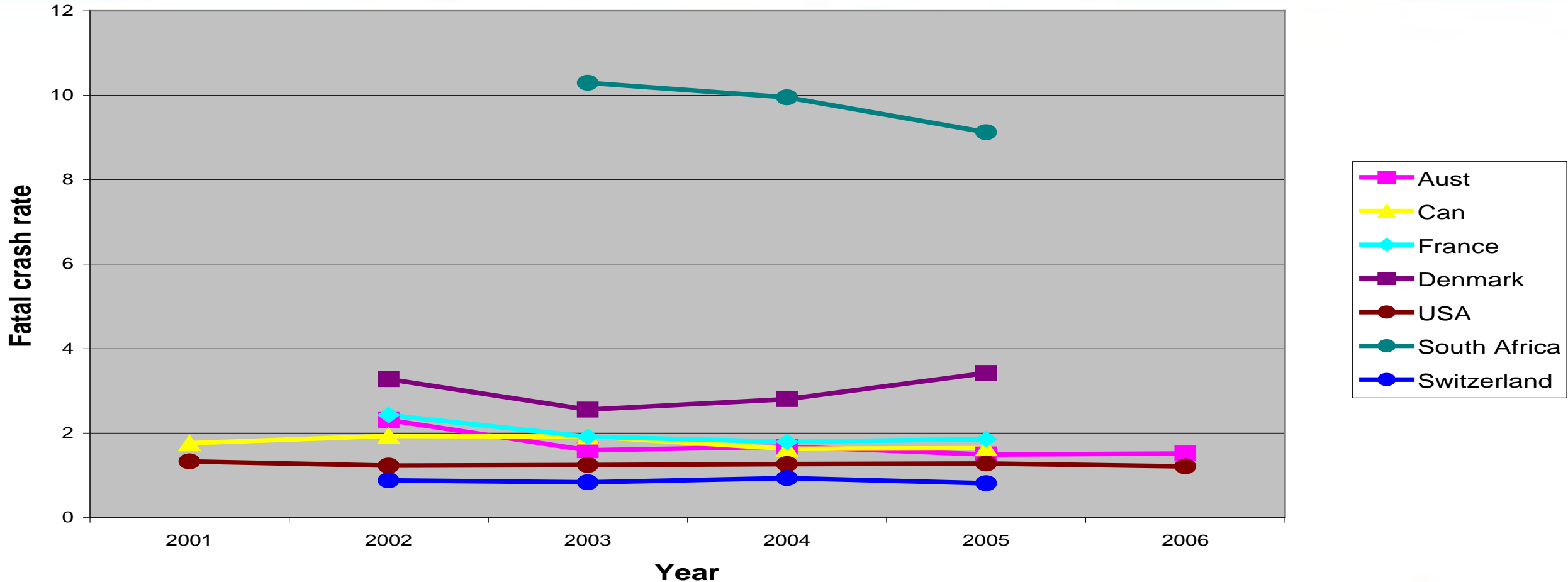




Performance-Based Standards



Heavy Vehicle Fatal Crash Rates



Fatal truck crash per 100 million vehicle kilometres travelled

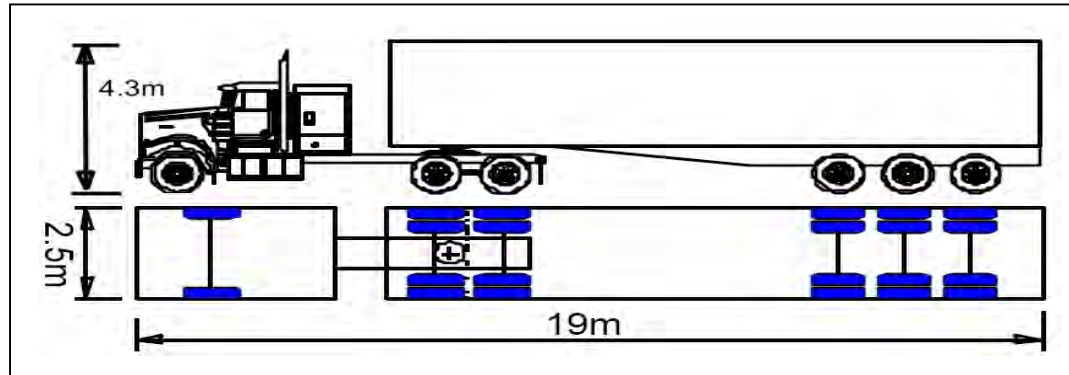
Source: OECD report, Moving Freight with Better Trucks, 2010

PBS Pilot Project in South Africa

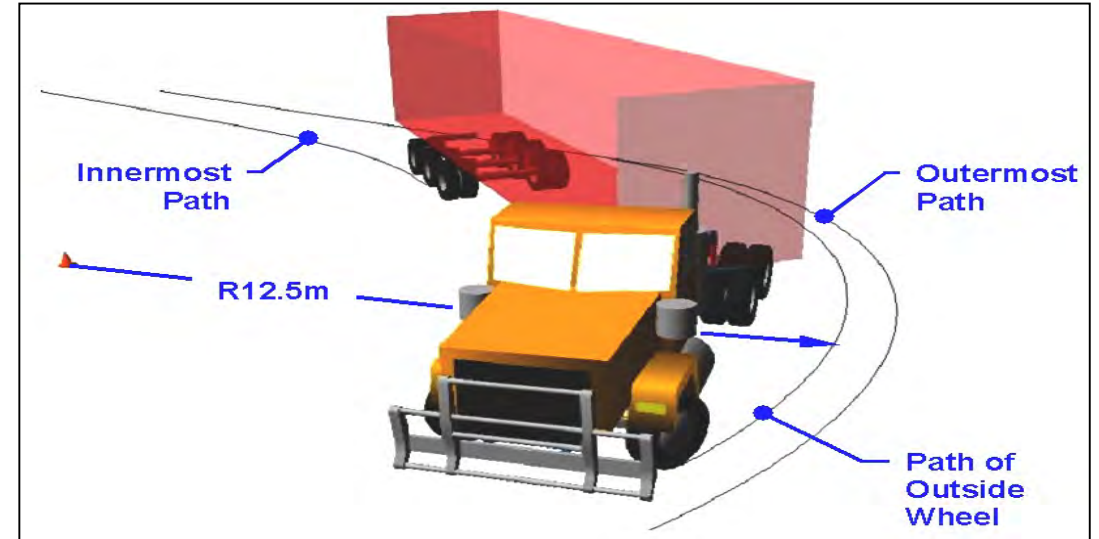
- ISHVWD in 1998, 2000 & 2002
- PBS seminar in Melbourne in 2003
- Committee established in 2004
- First 2 PBS vehicles (timber) commissioned in Nov 2007

Performance-Based Standards

Prescriptive Standards



Performance-Based Standards



What the vehicle looks like

Governs **mass and dimensions**

Constrains productivity

Constrains innovation

What the vehicle can do

Governs actual **on-road performance**

Allows **heavier and/or larger vehicles**

Promotes **innovation**

Performance-Based Standards: Safety

Manoeuvre/Test	Performance Standard
Low-speed 90° turn (5 km/h)	Low-speed swept path Tail swing Frontal swing Steer-tyre friction demand
High-speed lane-change (80 km/h)	Rearward amplification High-speed transient offtracking
Rollover	Static rollover threshold
High-speed pulse steer (80 km/h)	Yaw damping coefficient
High-speed on uneven road (90 km/h)	Tracking ability on a straight path
Various (driveability standards)	Startability Gradeability A Gradeability B Acceleration Capability

PBS braking test



PBS Pilot Project in South Africa

Target kms: 100 million

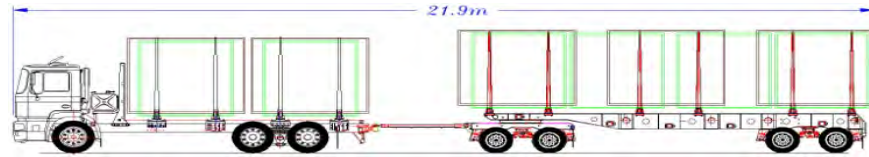
Kms travelled to date: 51.5 million (end-June 2015)

No. of Smart Trucks per Province: July 2015

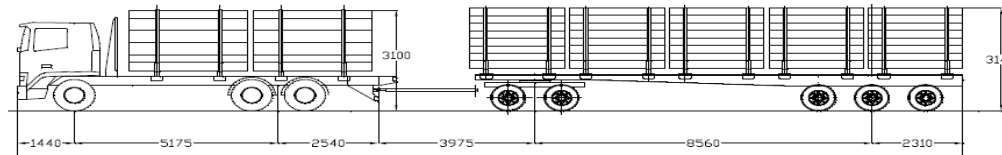
Commodity/ Industry	E. Cape	W. Cape	N. Cape	Mpum.	Gauteng	Limpopo	KZN	Free State	N. West	Total
Timber	0	0	0	30	0	0	54	0	0	84
Mining	0	5	2	7	0	29	11	0	0	54
Processed Sugar	0	0	0	0	0	0	9	0	0	9
Buses	0	0	0	12	0	0	0	0	0	12
Total	0	5	2	49	0	29	74	0	0	159

Current projects: Fuel, Beef cattle, containers, beer, tomatoes, paper reels, coal, general freight

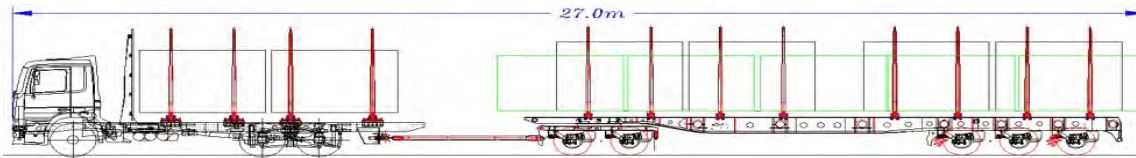
Forestry baseline and PBS vehicles



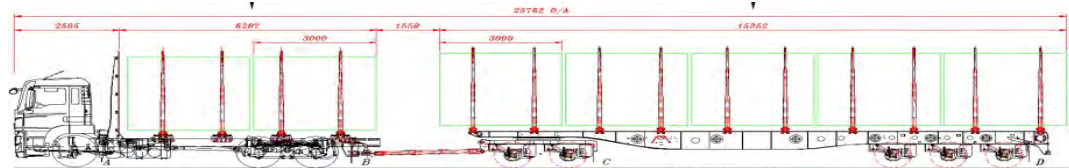
22,0 m, 56.0 tons



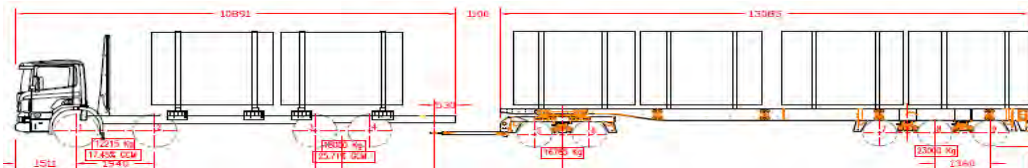
24.0 m, 64.1 tons



27.0 m, 67.5 tons



25.8 m, 67.5 tons



25.0 m, 70.0 tons





SMART TRUCK

SMART TRUCK

TIMBERNOLOGY

TIMBERNOLOGY

SCANIA

SCANIA

TRUCK OF THE YEAR

S02

TRUCK OF THE YEAR

R 500

R 500

ABNORMAL
NRB 61311

ABNORMAL

Timber PBS vehicle: High Speed Transient Offtracking



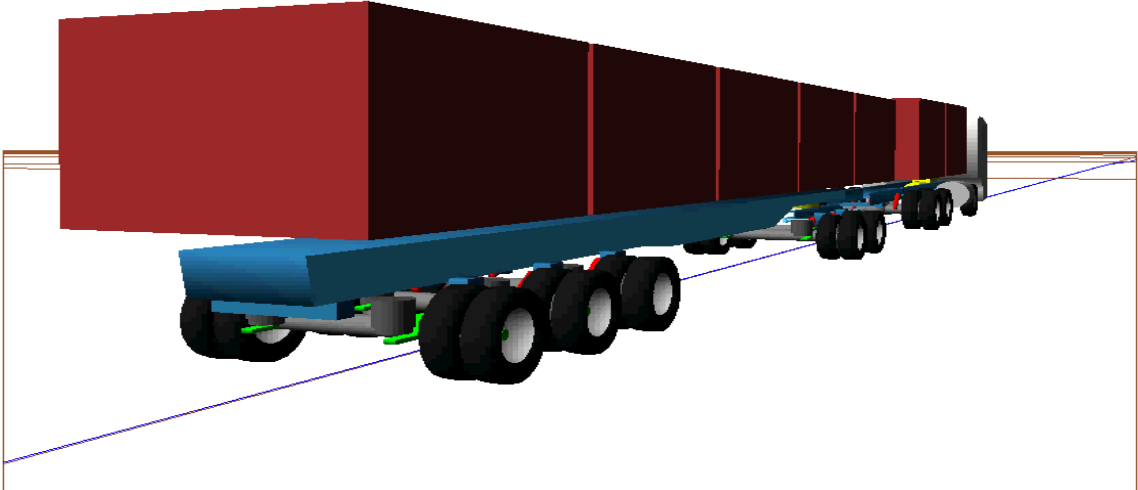
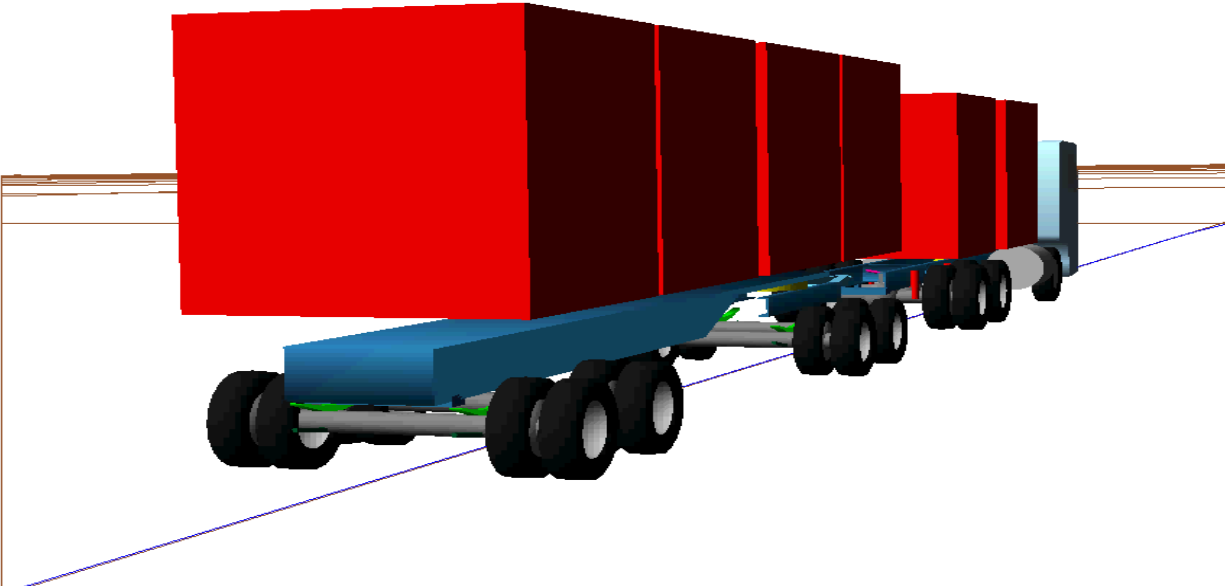
baseline

Last_Run Time= 2.4000 Frame=50



PBS

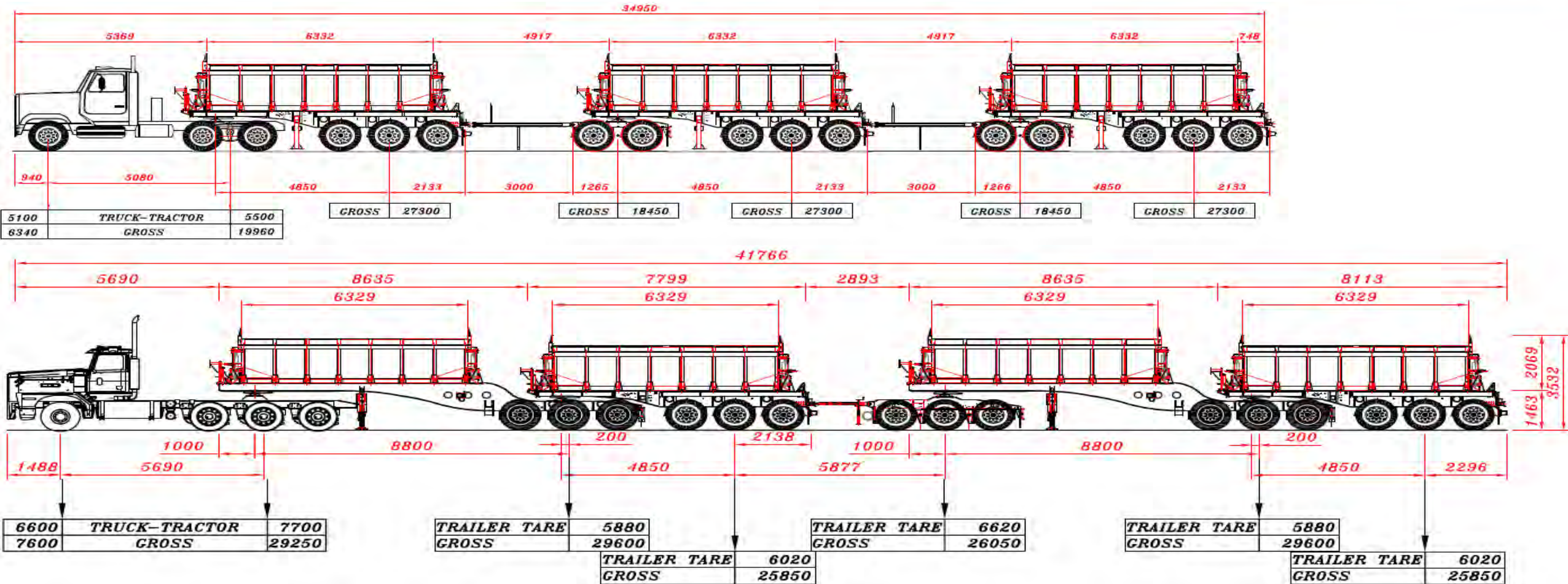
Last_Run Time= 2.4000 Frame=50



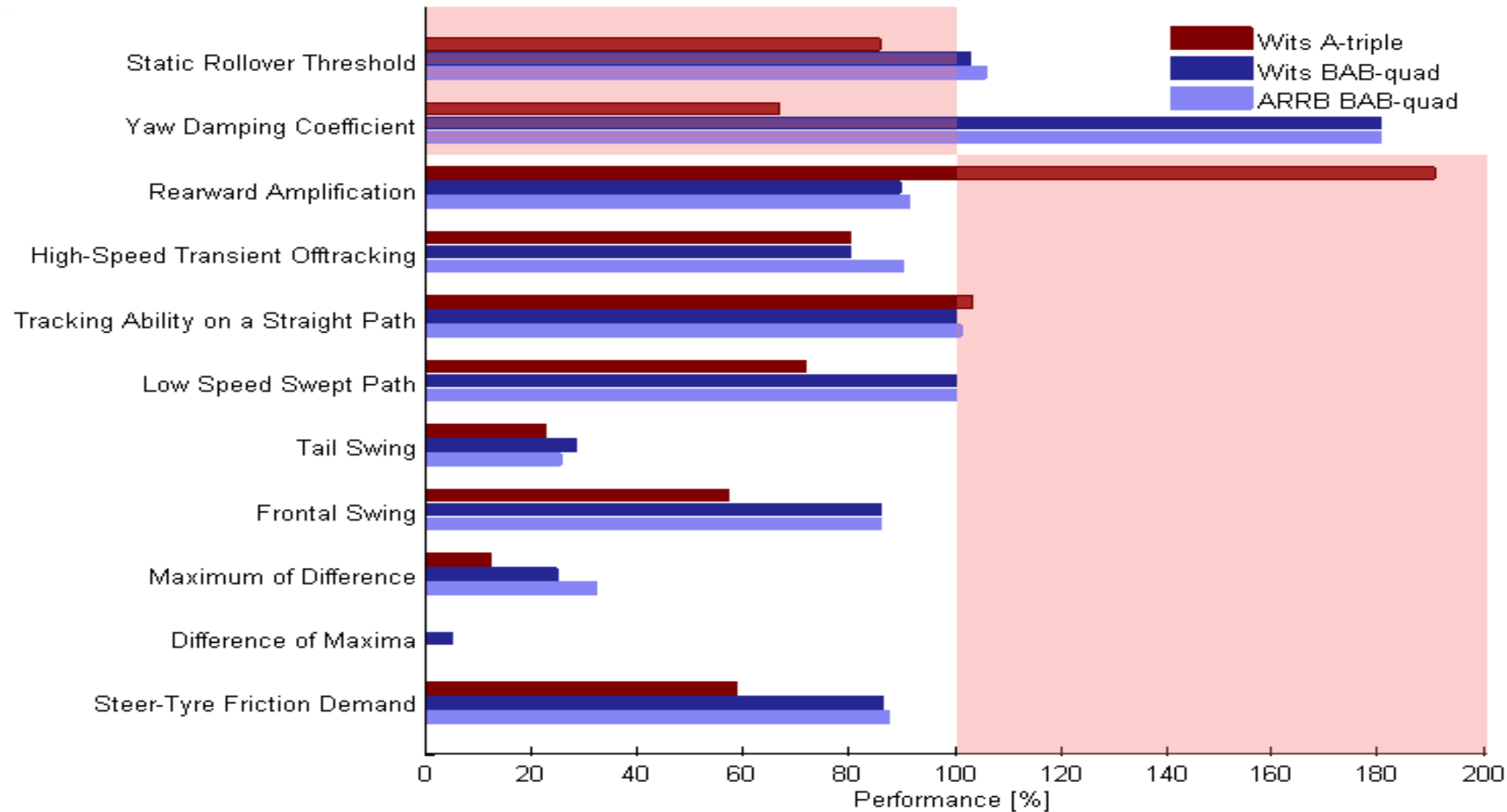
Unitrans BAB Quad



Unitrans B-Triple vs BAB Quad



Mining Road Train: Assessment Results



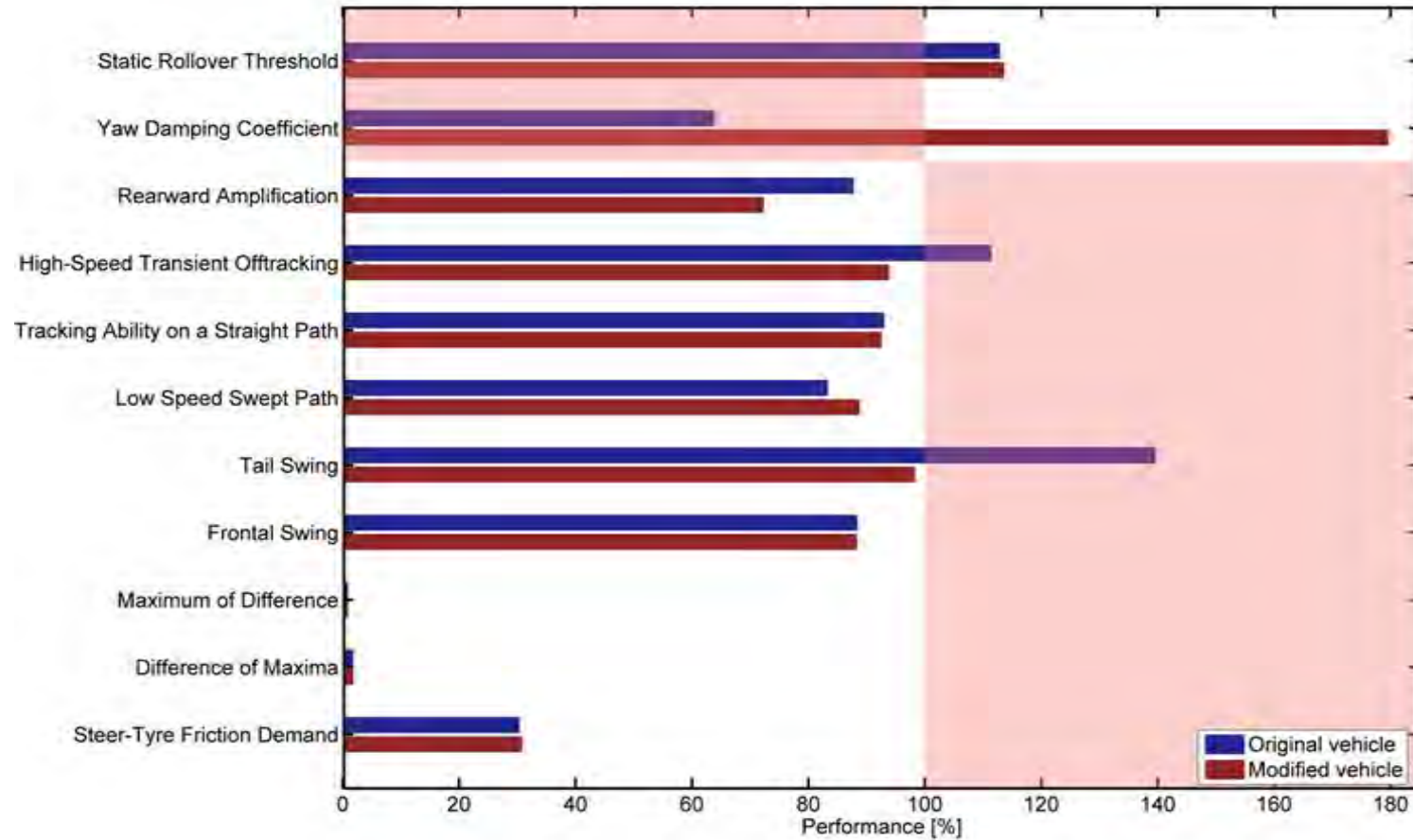
Mining Road Train: Rearward Amplification



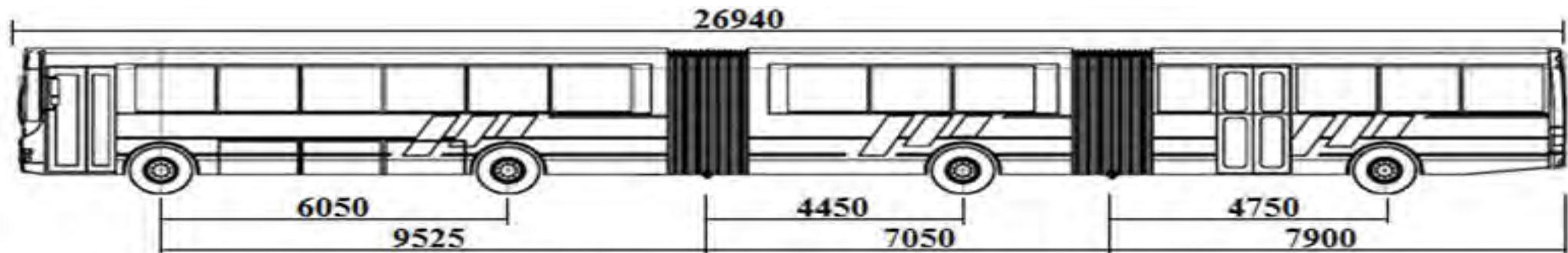
PBS 27 m Bi-articulated Bus



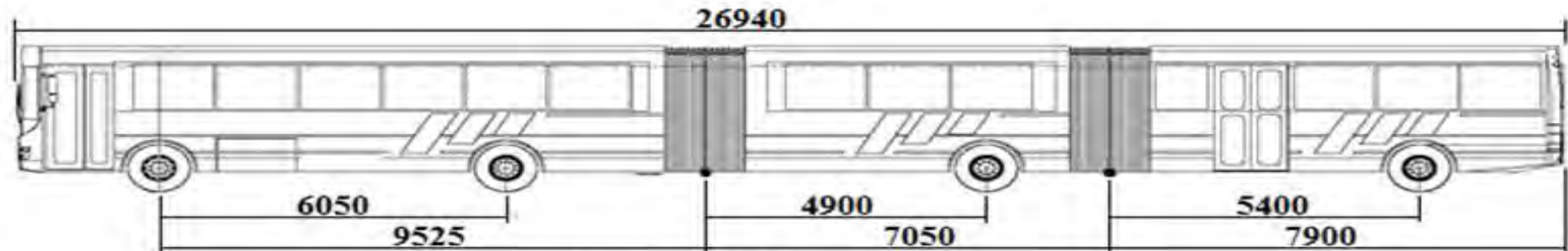
PBS 27 m Bi-articulated Bus



PBS 27 m Bi-articulated Bus



Original Vehicle



Modified Vehicle

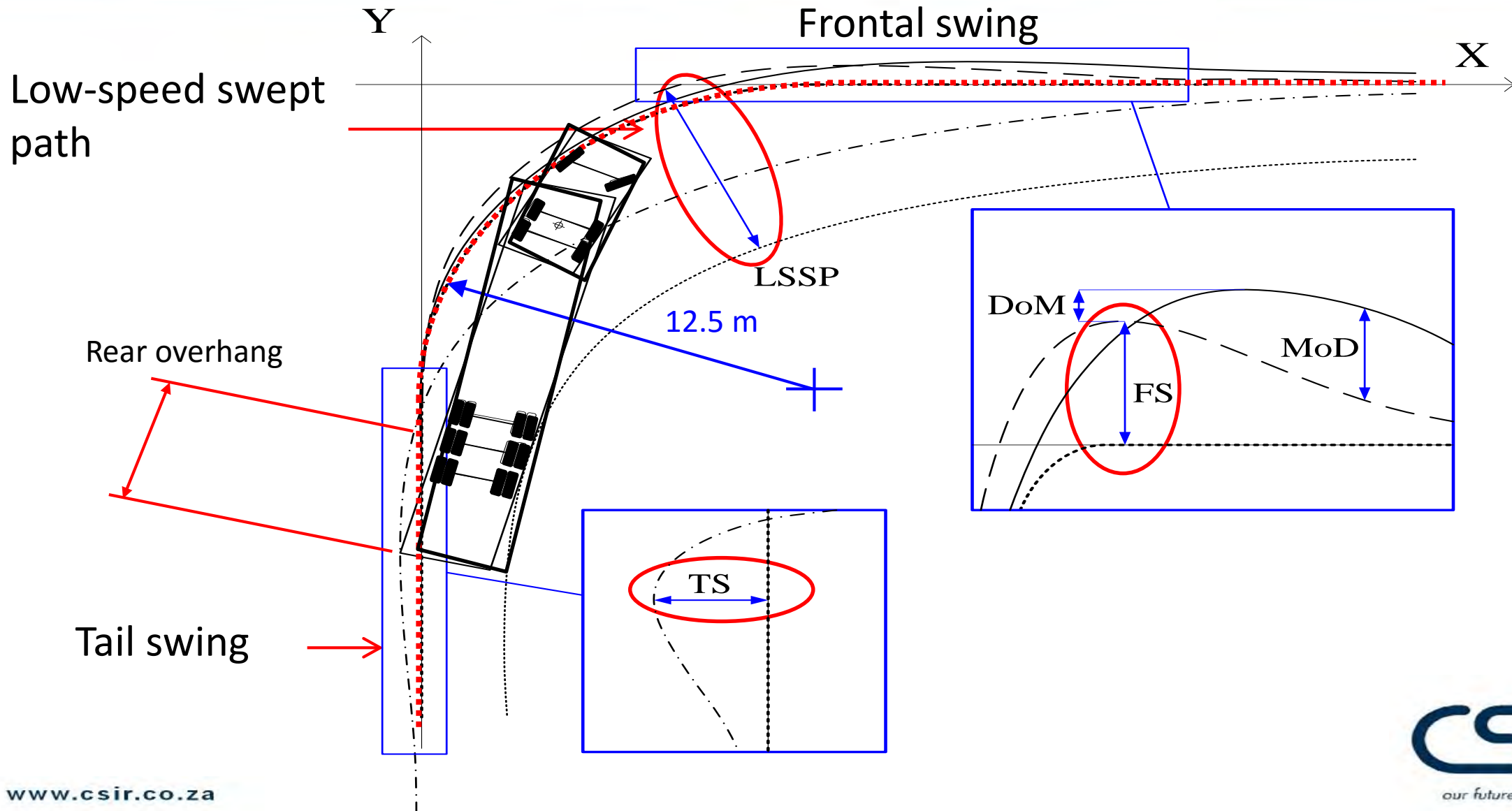
PBS 27 m Bi-articulated Bus: crash statistics

	Crashes per million kilometres					
	Cause: Driver Err.	Cause: Third Party	Passenger Fatalities	3rd Party Fatalities	Pedestrian Fatalities	Total crashes
Solo Bus	6.5	9.8	0.0	0.1	0.0	16.2
Bus Train	3.1	6.9	0.1	0.0	0.02	10.1
PBS bi-artics	0.0	1.3	0.0	0.0	0.0	1.3

Car Carriers







Car-carriers: Tail swing



Car-carriers: Tail swing

- Existing car-carriers were shown to exhibit poor tail swing performance due to excessive rear overhangs.
- Tail swing of up to 710 mm was calculated (limit = 300 mm).
- This was shown to be a result of lenient rear overhang legislation.

Vehicle type	Rear Overhang		Tail Swing	
				
Rigid truck	3.7 m	5.01 m	0.30 m	0.60 m
Semitrailer	3.7 m	6.32 m	0.30 m	0.87 m
Tag-trailer	3.7 m	7.00 m	0.30 m	1.25 m

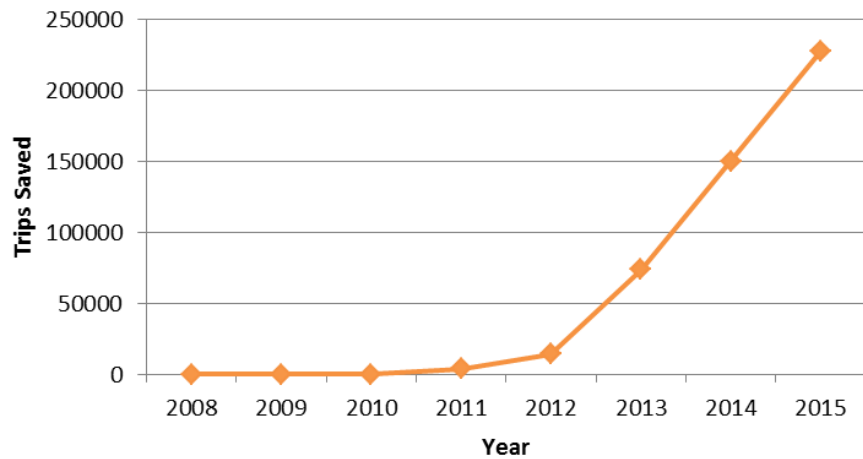
De Saxe, C.C., Kienhöfer, F. & Nordengen, P.A., 2012. Tail swing performance of the South African car-carrier fleet. In 12th International Symposium on Heavy Vehicle Transport Technology. Stockholm.

SA Breweries baseline: SRT (Rollover)

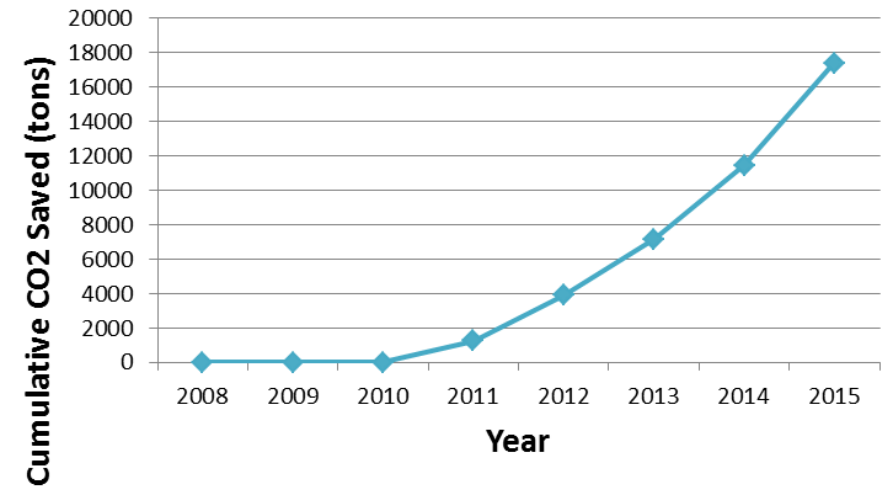


Smart Truck monitoring: Productivity & Environmental Impacts

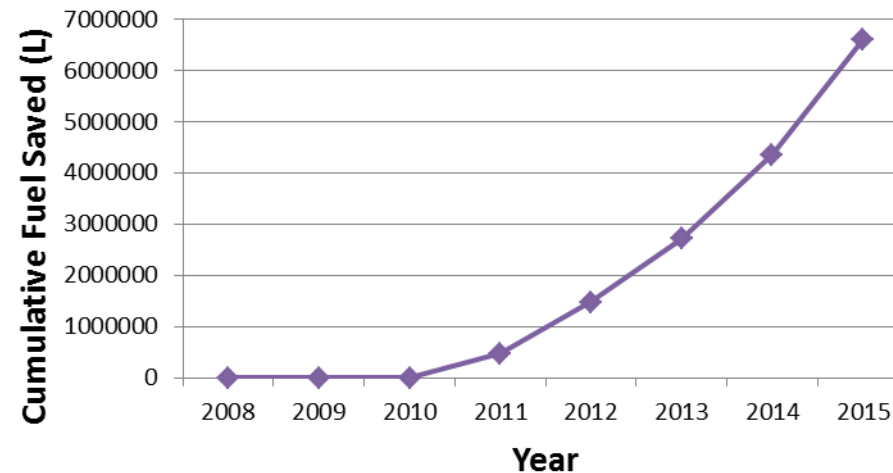
Cumulative Trips Saved by Smart Trucks



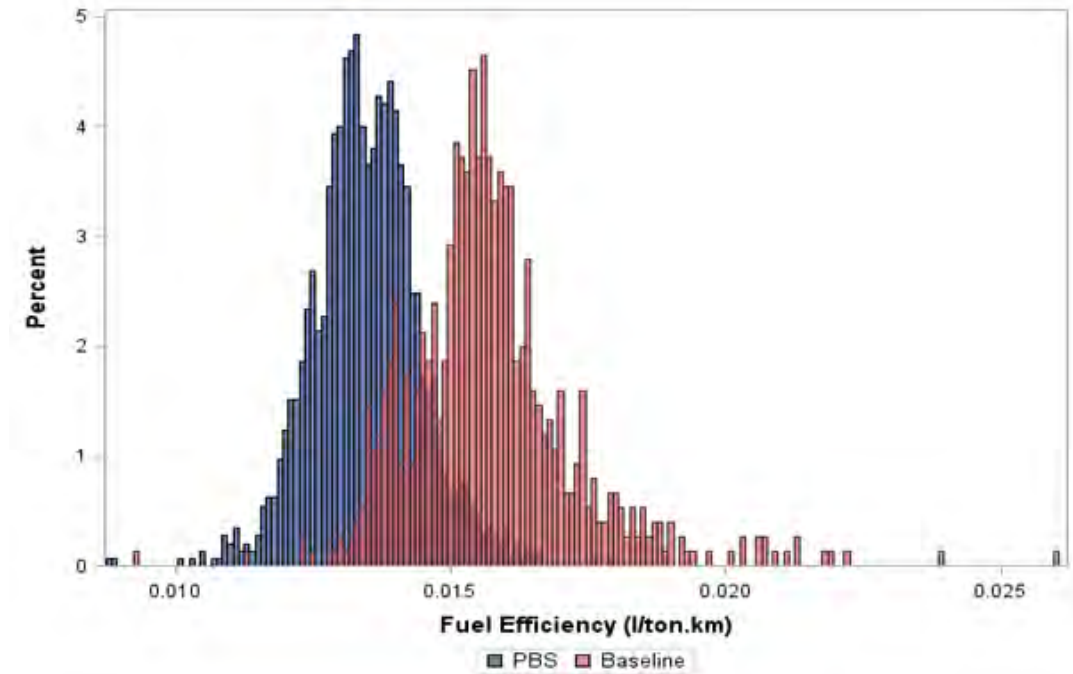
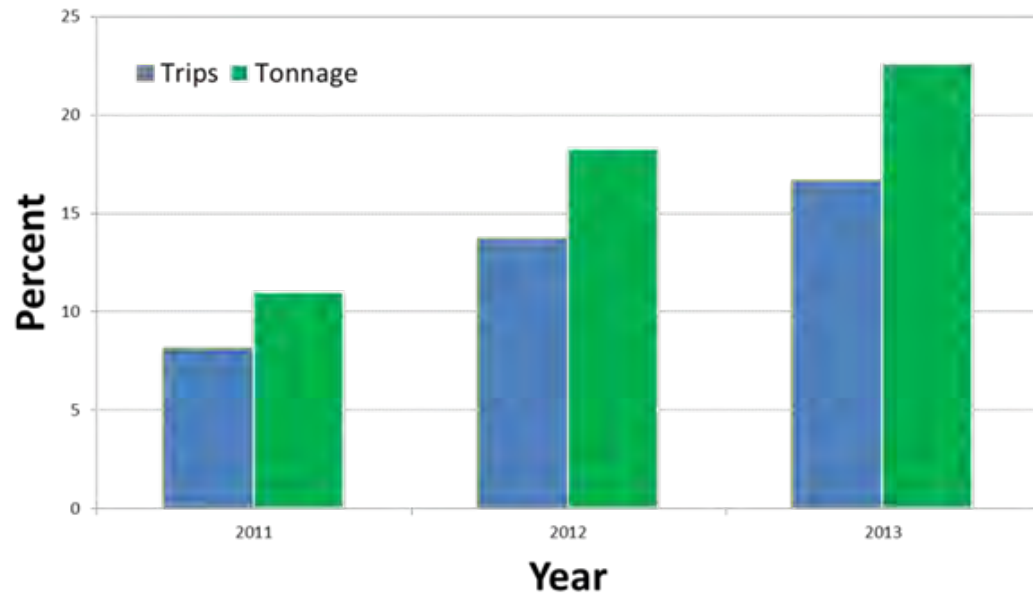
Cumulative CO₂ Saved by Smart Trucks



Cumulative Fuel Saved by Smart Trucks



PBS Pilot Project: Forestry



Smart Truck Safety Performance Results: Jan 2008 – June 2015

		Timber Logistics Services	Unitrans Timber	Buhle Betfu	Timber24	Total
No of Crashes	Smart Trucks	30	8	9	3	76
	Baseline	101	2	27	52	410
	Total	131	10	36	55	486
Total Kilometres	Smart Trucks	16 554 920	4 698 908	5 019 000	3 378 162	51 525 276
	Baseline	23 490 641	1 183 134	9 212 970	21 981 042	164 923 560
	Total	39 409 884	5 882 042	14 231 970	24 654 106	214 791 116
Crashes per million kms	Smart Trucks	1.80	1.70	1.80	0.90	1.48
	Baseline	4.30	1.70	2.90	2.40	2.49
	Total	3.30	1.70	2.50	2.20	2.26
Caused by Third Parties and Pedestrians (included in figures above)						
No of Crashes	Smart Trucks	11	3	0	0	45
	Baseline	44	13	0	0	206
	Total	55	16	0	0	251
% of Total	Smart Trucks	91.7%	33.3%	0.0%	0.0%	59.2%
	Baseline	51.2%	650.0%	0.0%	0.0%	50.2%
	Total	56.1%	145.5%	0.0%	0.0%	51.6%

**Crash rate ratio:
Smart Truck : Baseline 1:1.69**

Smart Trucks: Potential Gains

- Reduced vehicle trips i.e.
 - Reduced congestion
 - Reduced safety exposure risk
- Improved safety performance
- Improved transport productivity
- Reduced road wear (per ton.km)
- Reduced emissions (per ton.km)
- Improved performance of the SA heavy vehicle fleet

Thank you

