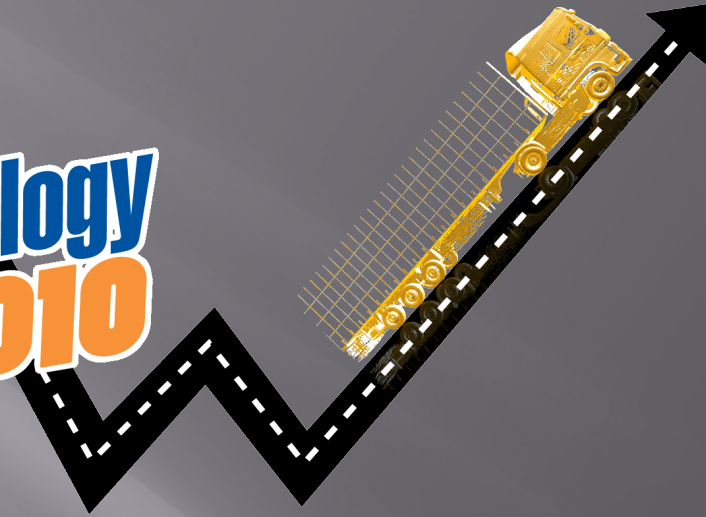


The logo for IRTENZ features the word "IRTENZ" in a bold, black, sans-serif font. Above the text is a blue trapezoidal shape, and below it is an orange trapezoidal shape, both pointing towards the right.

**IRTENZ**

**Transport Technology  
& Productivity 2010**



# **Monitoring Results of Two PBS Demonstration Vehicles in the Forestry Industry in South Africa**

**Paul Nordengen, CSIR, South Africa**



# How to Improve Your Rugby

by *Paul Nordengen*

**CANCELLED**



# How to Improve Your Rugby

*by Paul Nordengen*

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- ▣ Introduction
- ▣ Vehicle Monitoring
  - Distance travelled
  - Tons transported
  - Combination mass & payload
  - Road wear
  - Fuel consumption & efficiency
  - Safety performance
- ▣ Way forward



# Background

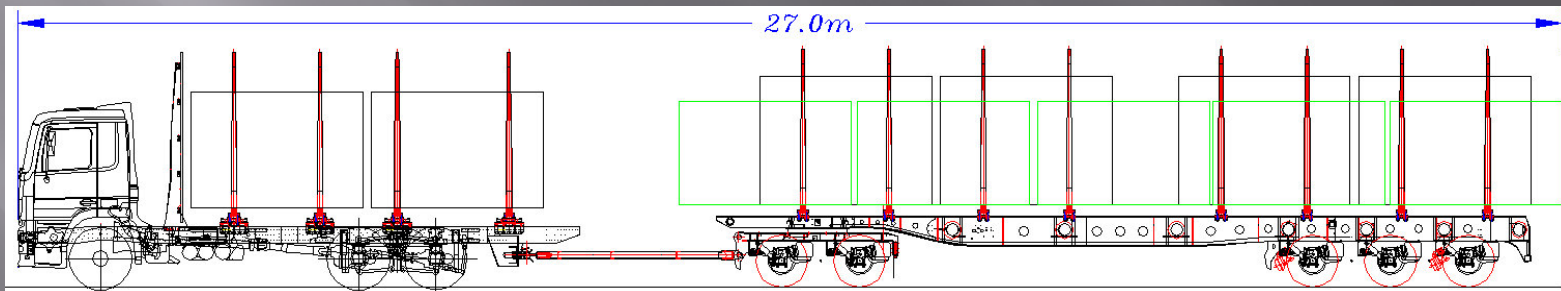
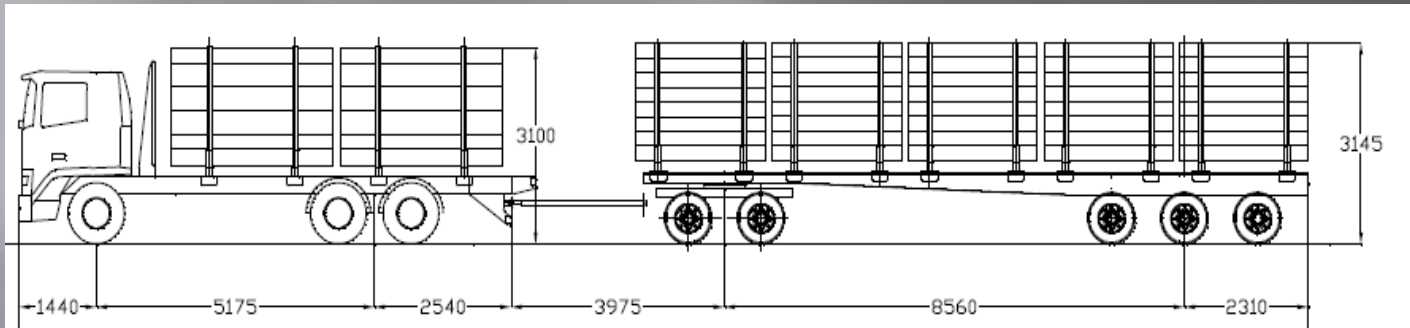
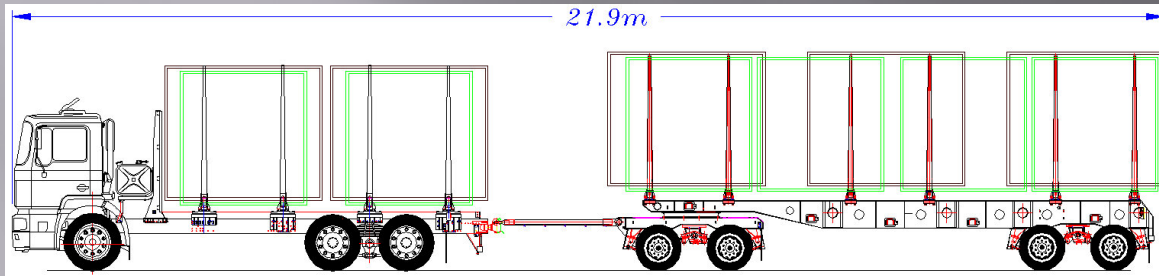
- ▣ 7ISHVWD, Delft, June 2002: PBS workshop
- ▣ Melbourne, Feb 2003: PBS seminar
- ▣ RTMS accreditation system initiated in the forestry industry in 2003 – prerequisite for PBS involvement
- ▣ April 2004, Study tour to Australia with DoT and forestry industry representatives
- ▣ PBS committee established in 2004
- ▣ April 2005, Study tour with Board Members of the SA Road Freight Association



# Background (cont.)

- ▣ Letter of support from Minister of Transport
- ▣ Two global forestry & paper companies, Mondi and Sappi, indicated an interest in PBS demonstration projects
- ▣ ARRB and MSD in Australia appointed to carry out PBS assessments based on Level 2 of the Australian system
- ▣ Two PBS demonstration vehicles commissioned in Nov and Dec 2007

# Forestry baseline and PBS vehicles





62

Timber24

62

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761-833-330 6400  
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ACTROS

M8

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AFRIT

AFRIT

ABNORMAL LENGTH  
VEHICLE - 27m

EDY204GP

AFRIT

AFRIT  
QUALITY ON TIME

AFRIT  
QUALITY ON TIME







ABNORMAL LENGTH VEHICLE 24m

RTMS

NP 157-944

super group

super group

LOADTACH

Life

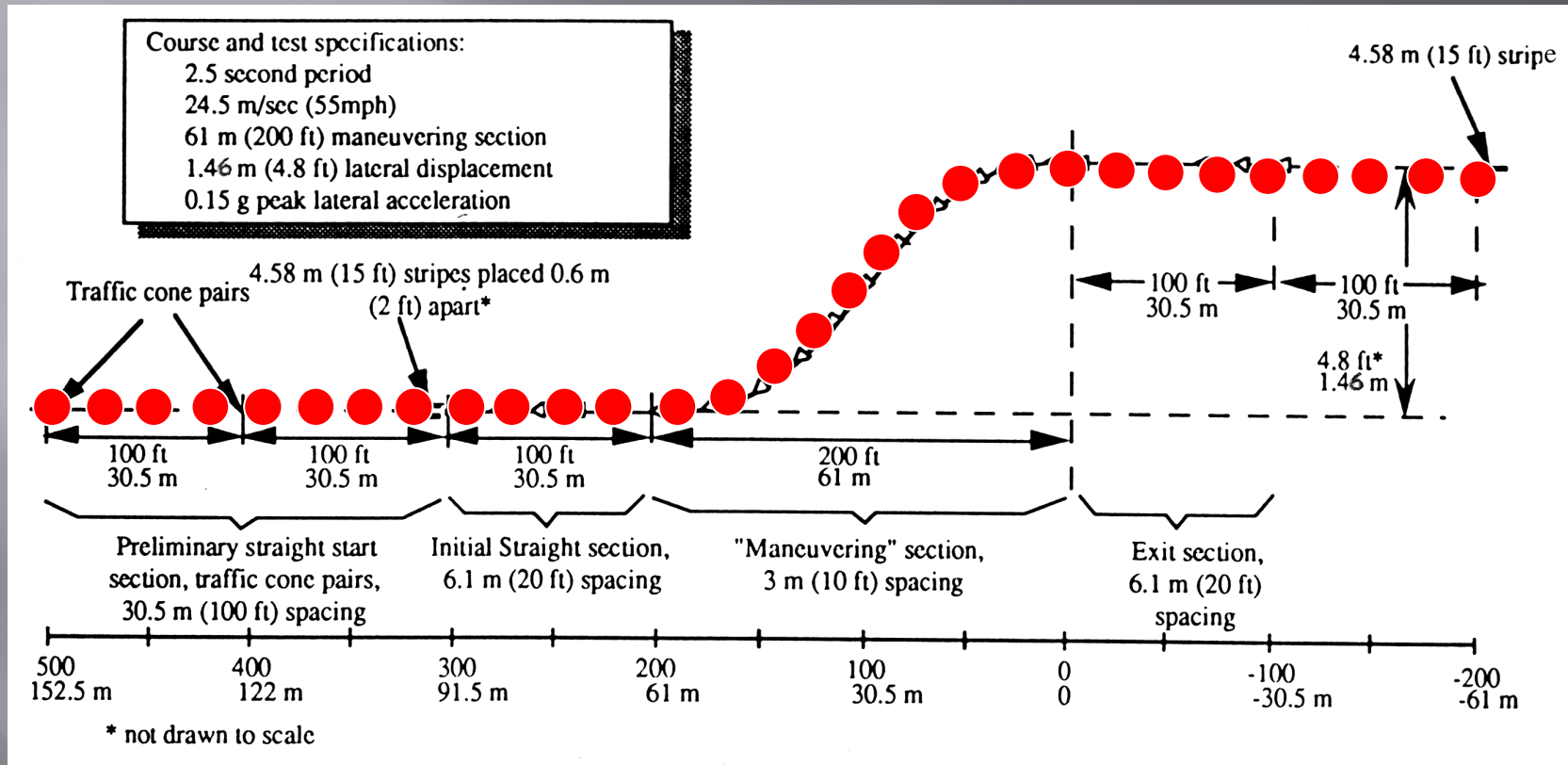
CAT





# PBS Lane Change Manoeuvre

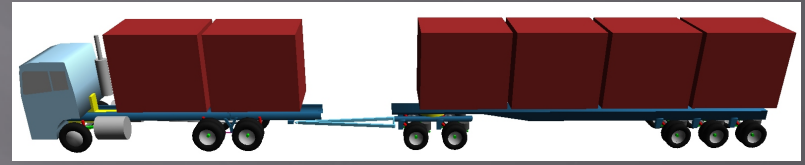
(SAE J2179)



# Baseline cf. PBS vehicle

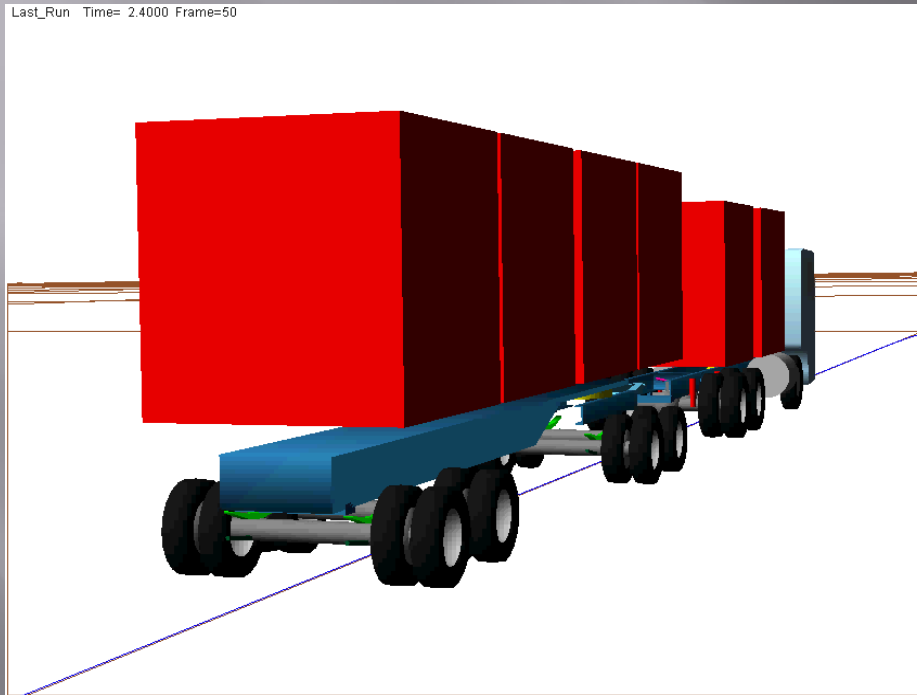


Baseline

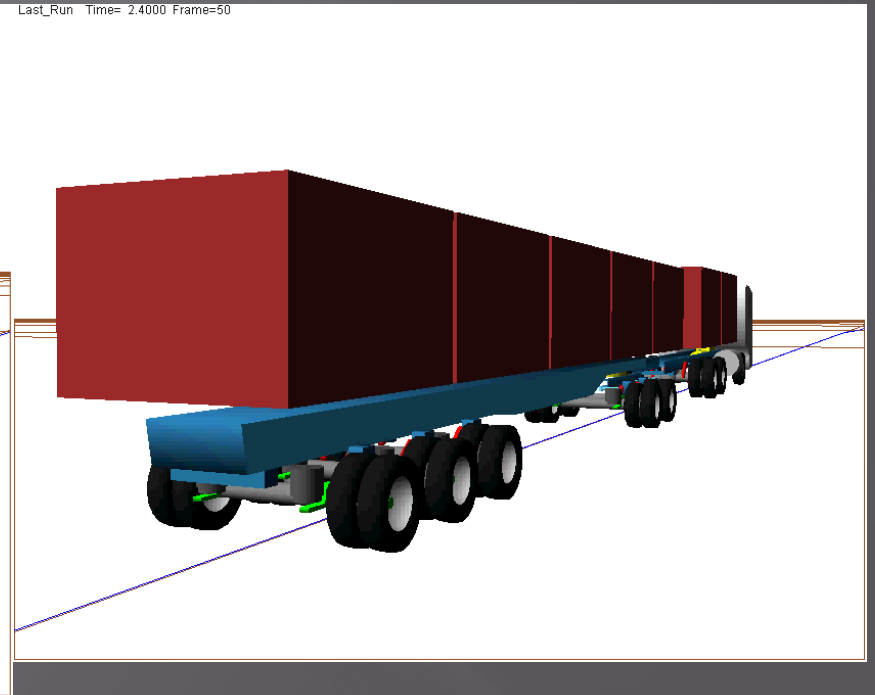


PBS

Last\_Run Time= 2.4000 Frame=50



Last\_Run Time= 2.4000 Frame=50

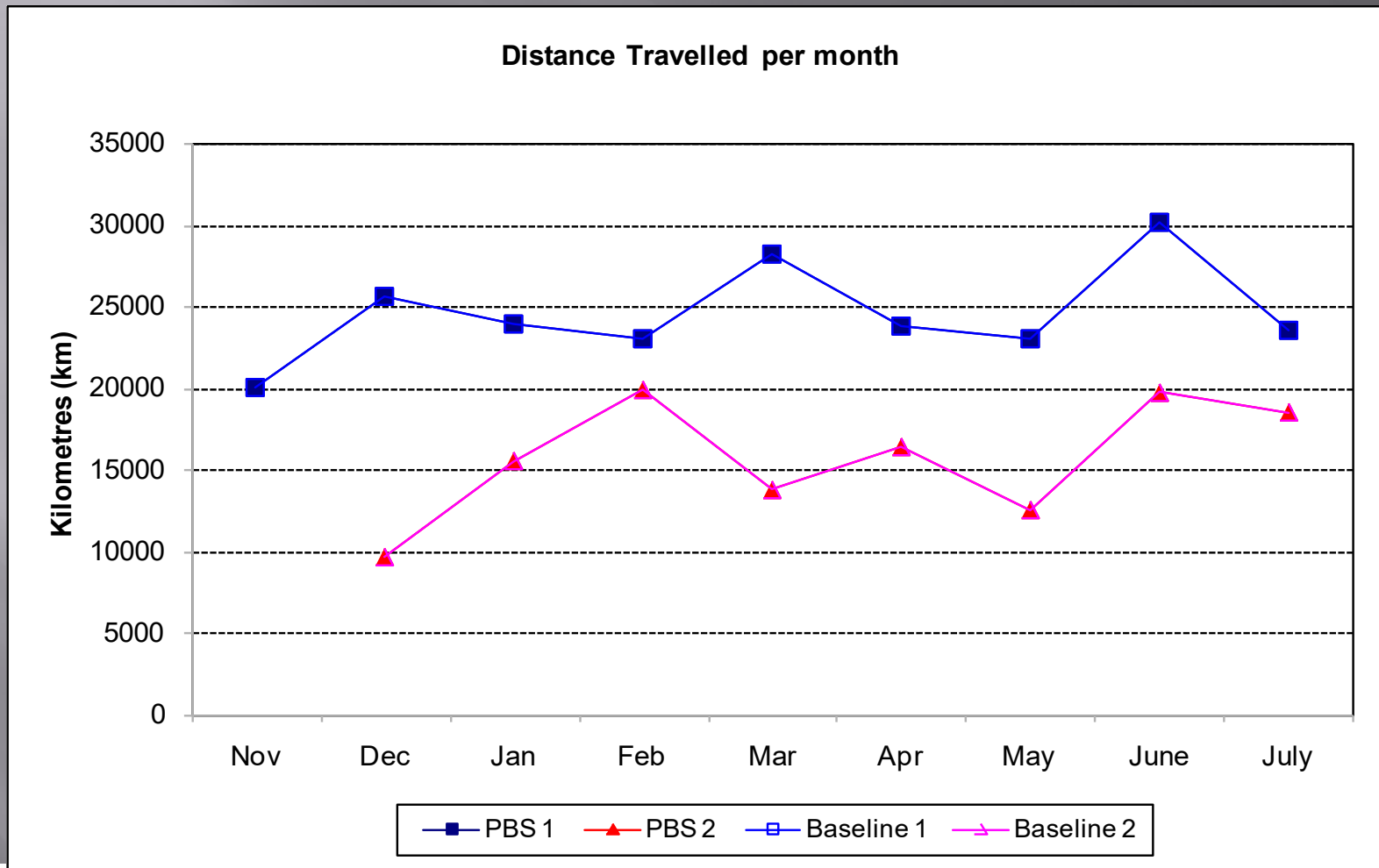




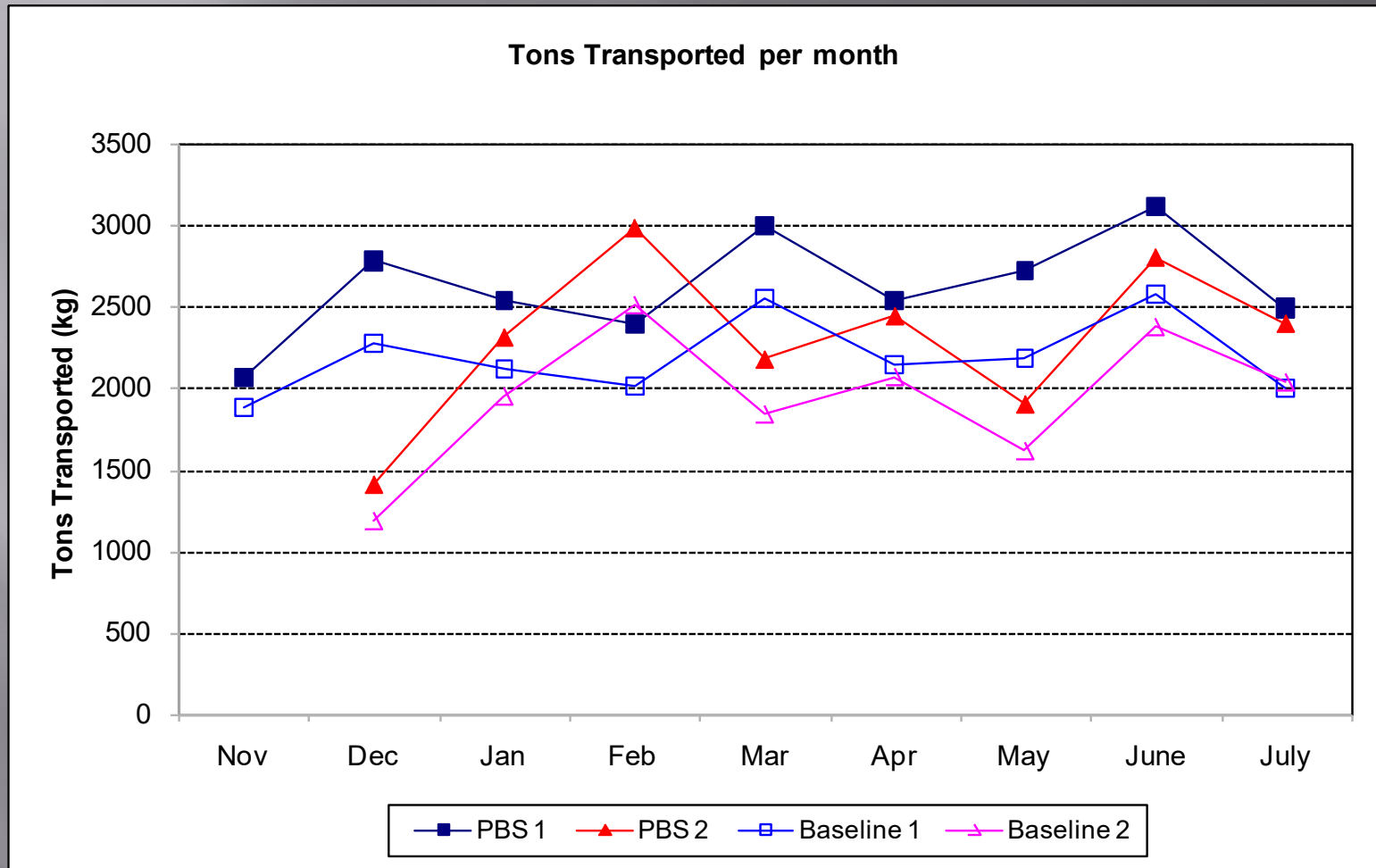
# Parameters to Monitor

- ❑ Distance travelled per month and lead distance per trip
- ❑ Combination mass and payload
- ❑ Average speeds (loaded & unloaded)
- ❑ Trip duration
- ❑ Fuel consumption & efficiency
- ❑ Incidents/accidents
- ❑ Breakdowns
- ❑ Tyre life and costs
- ❑ Life cycle of foundation brakes
- ❑ Suspension life
- ❑ Community reaction

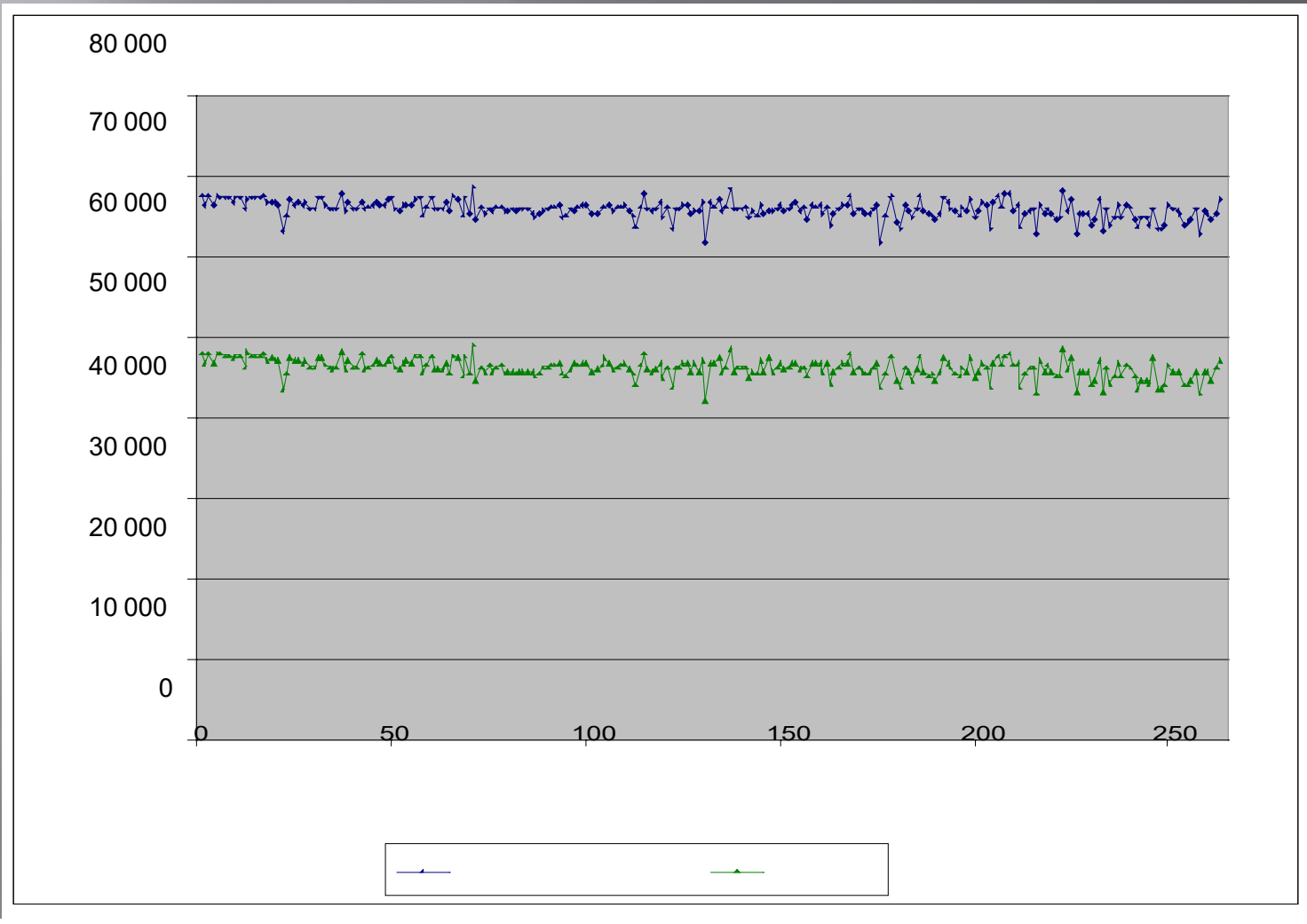
# Distance Travelled per Month



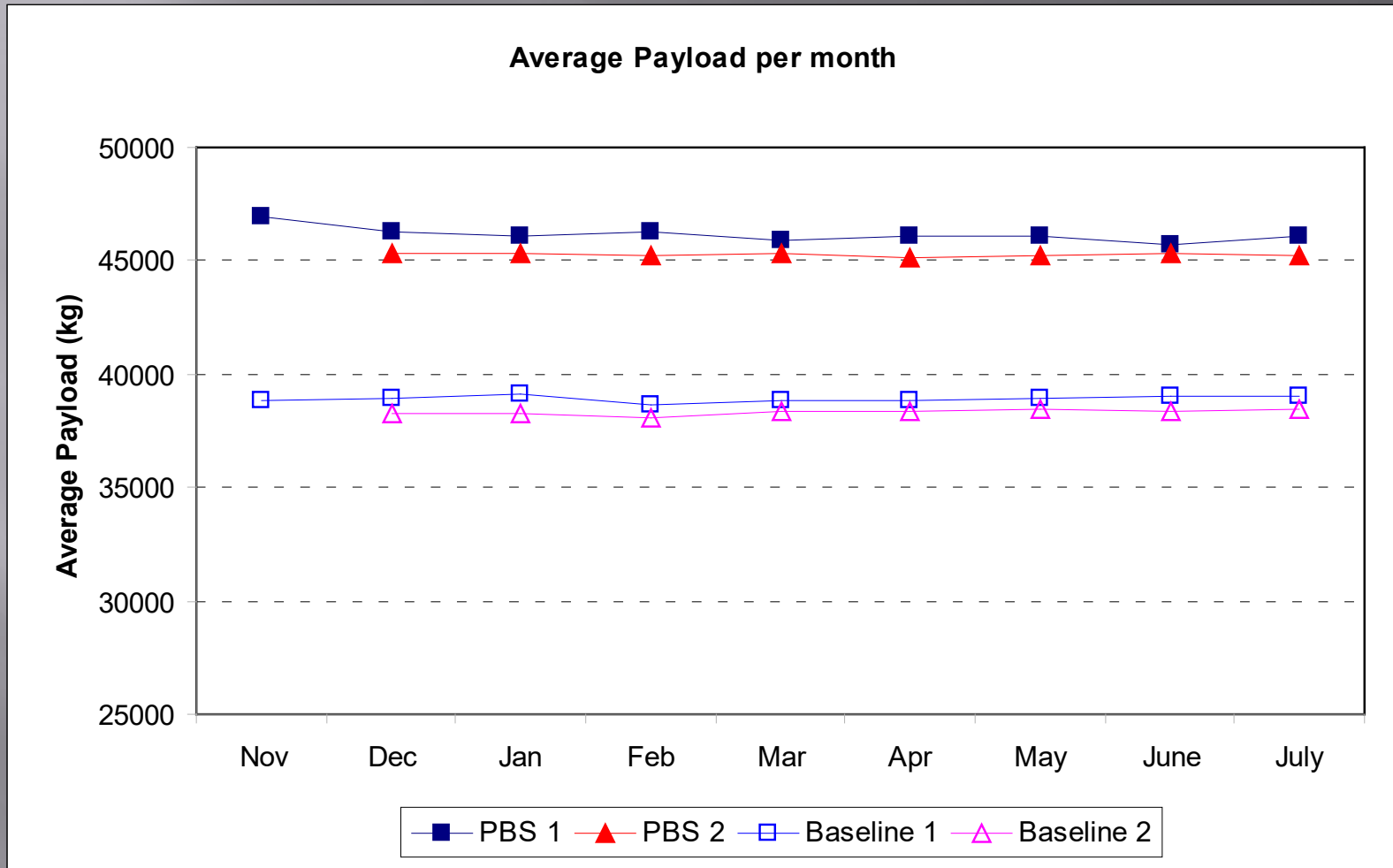
# Tons Transported per Month



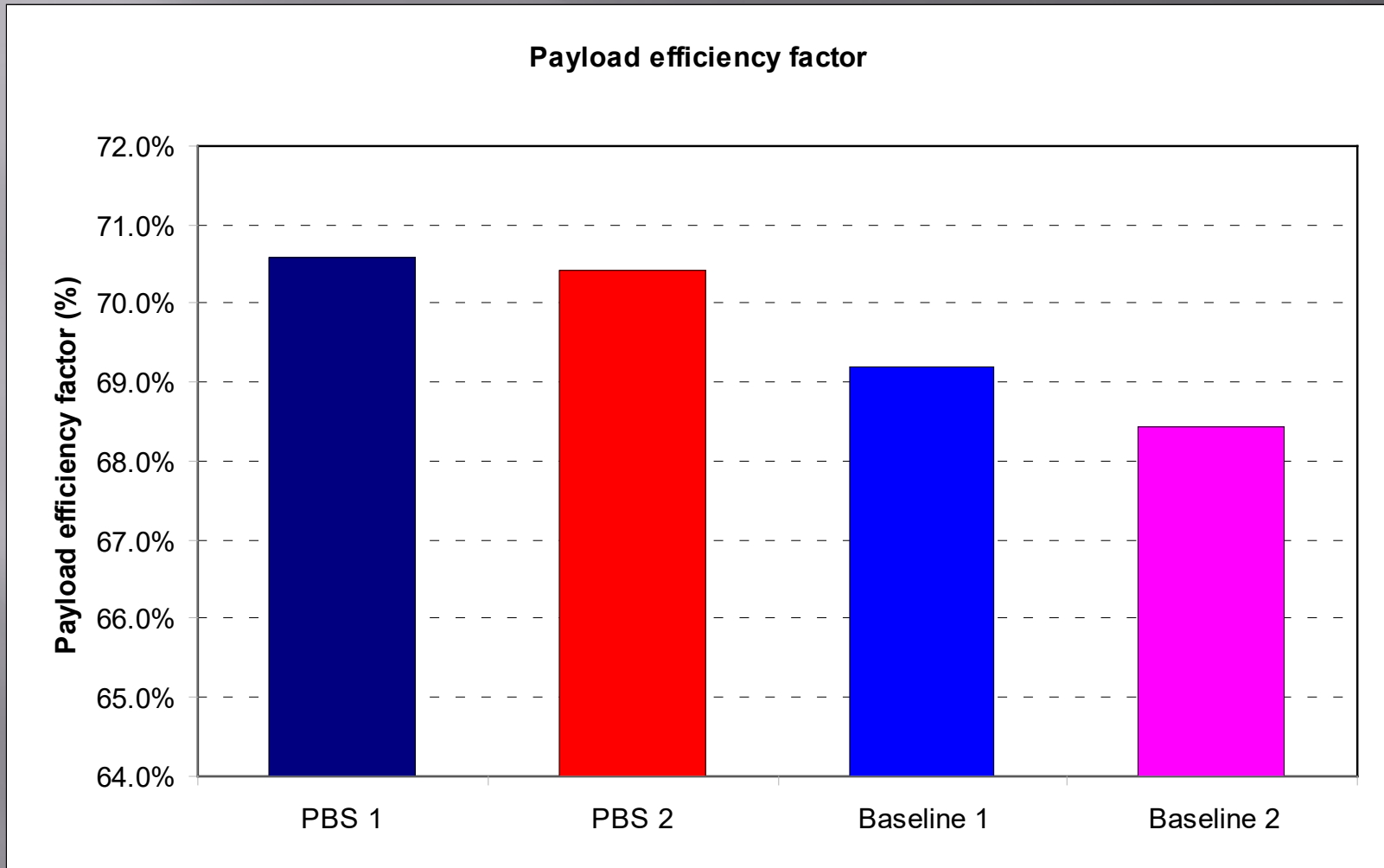
# Payload and Combination Mass per trip



# Average Payload

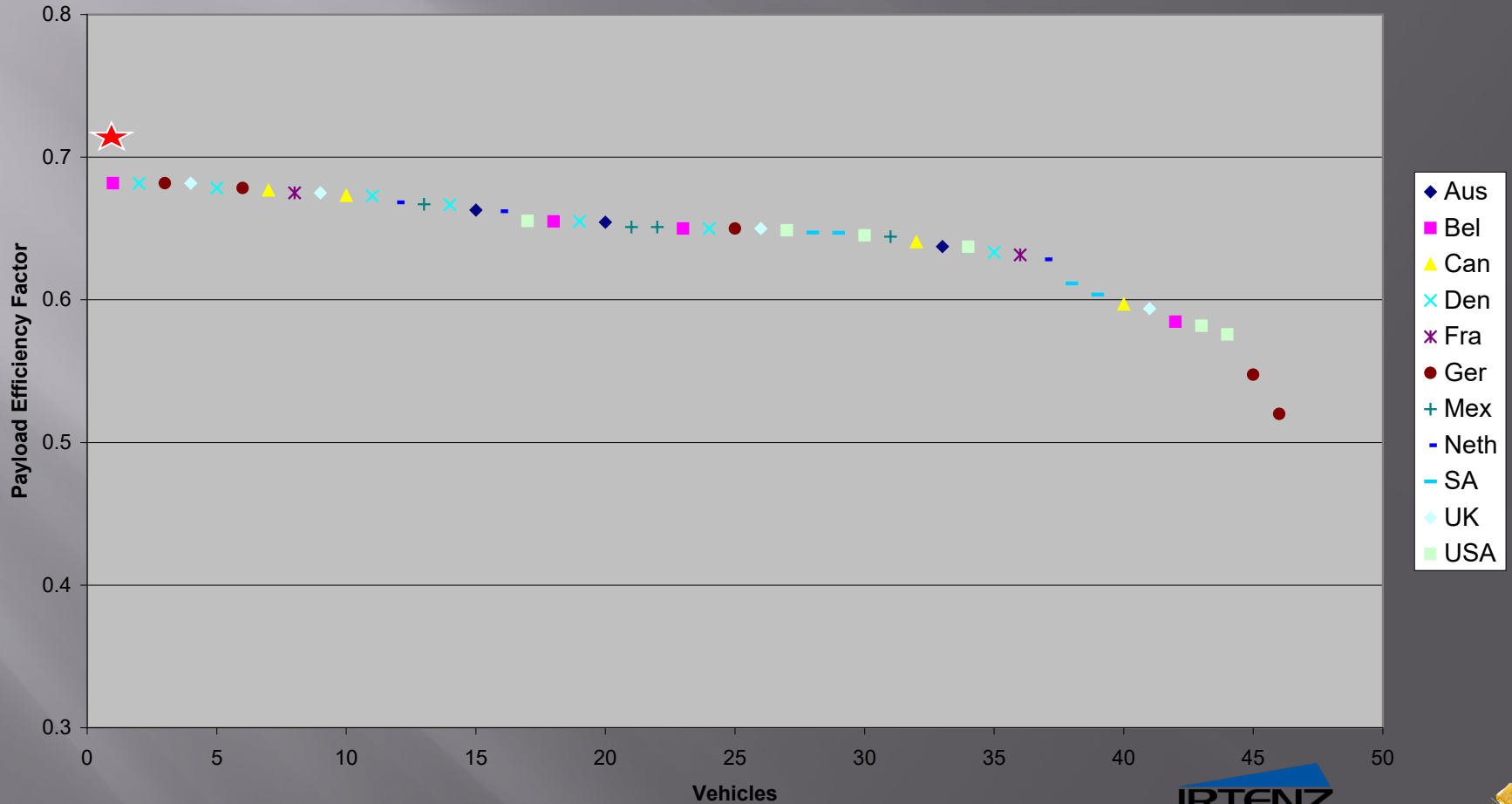


# Payload Efficiency Factor (PEF)

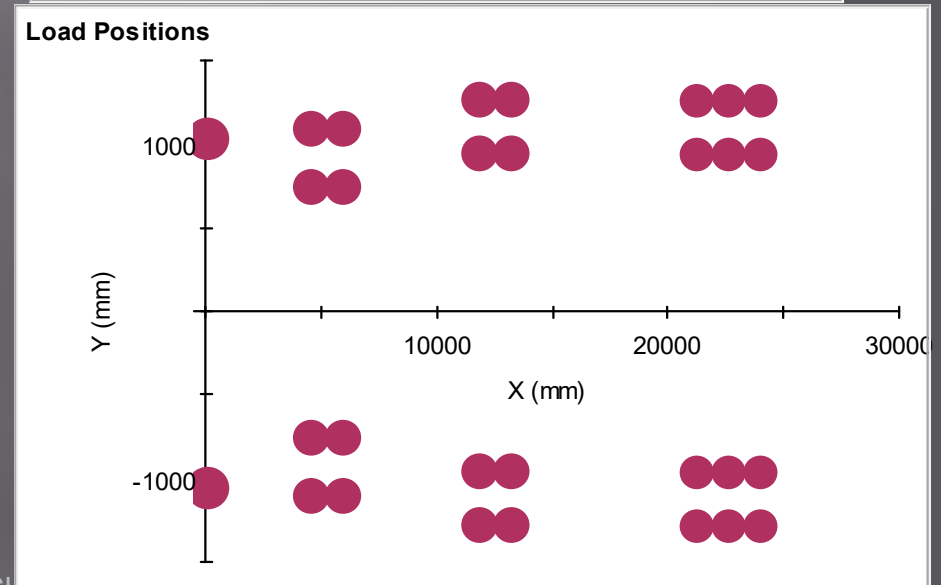
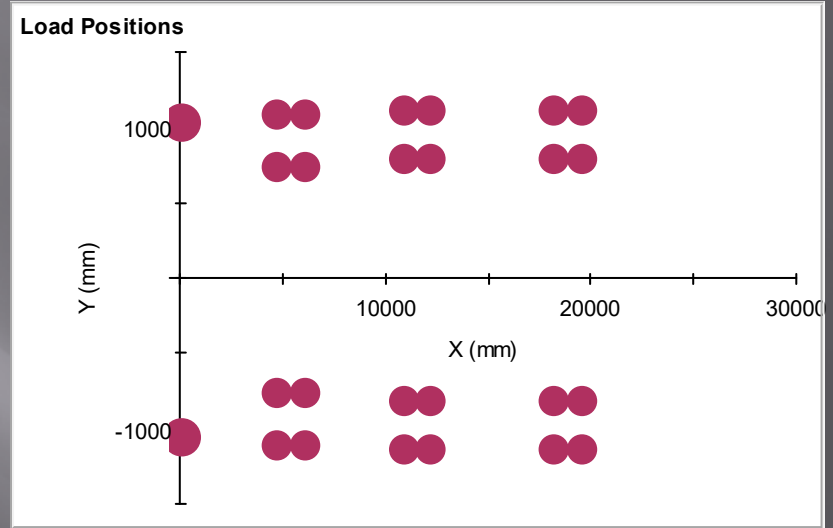
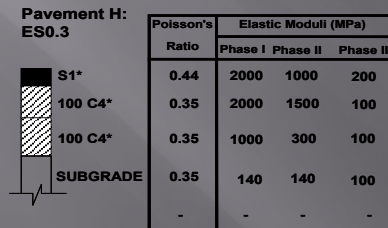
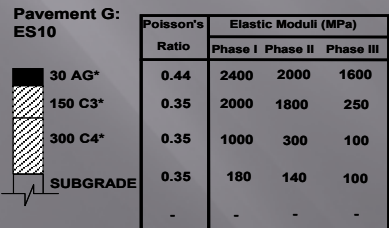
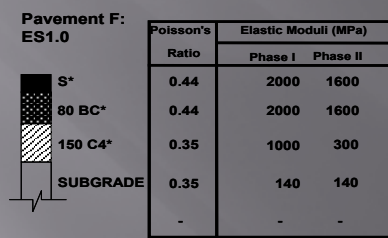
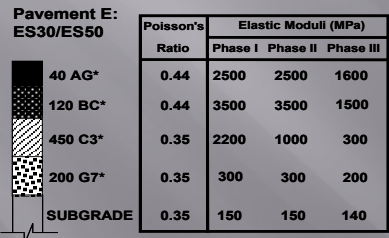
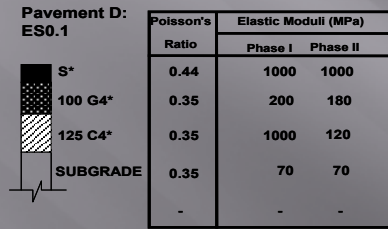
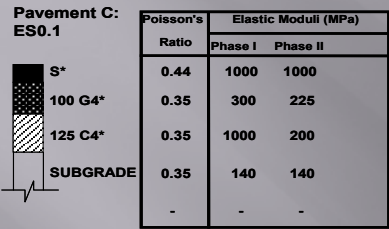
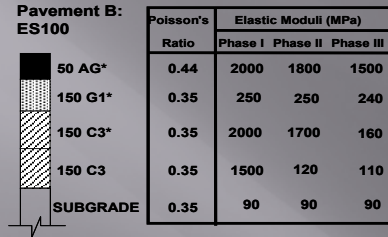
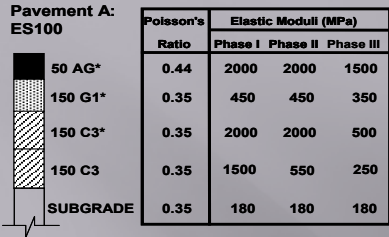


# Comparison of PEF with Sample of Trucks: OECD Project

Payload Efficiency Factor - vehicles



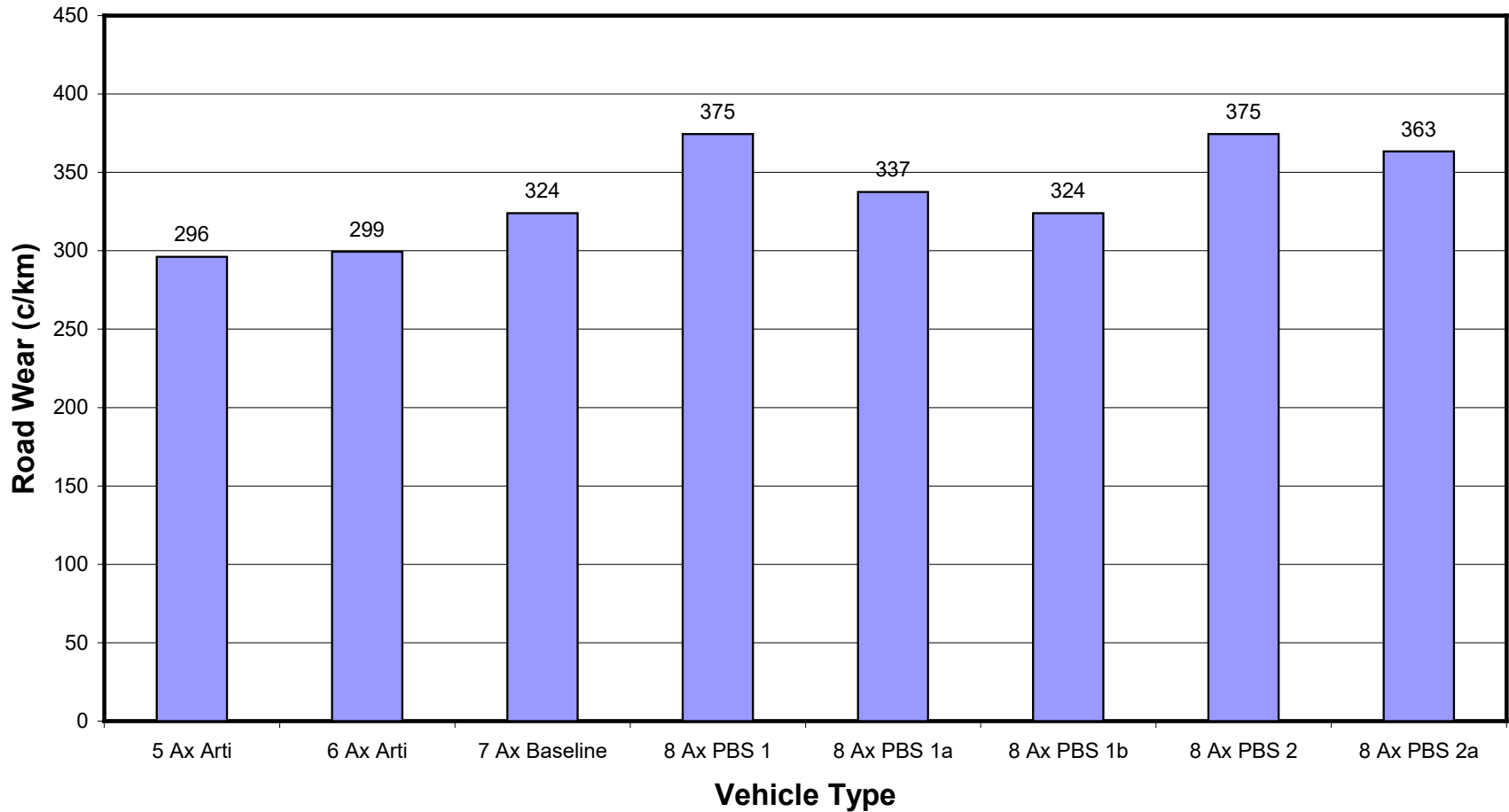
# Comparison of Baseline and PBS vehicles on Road Wear: Input data



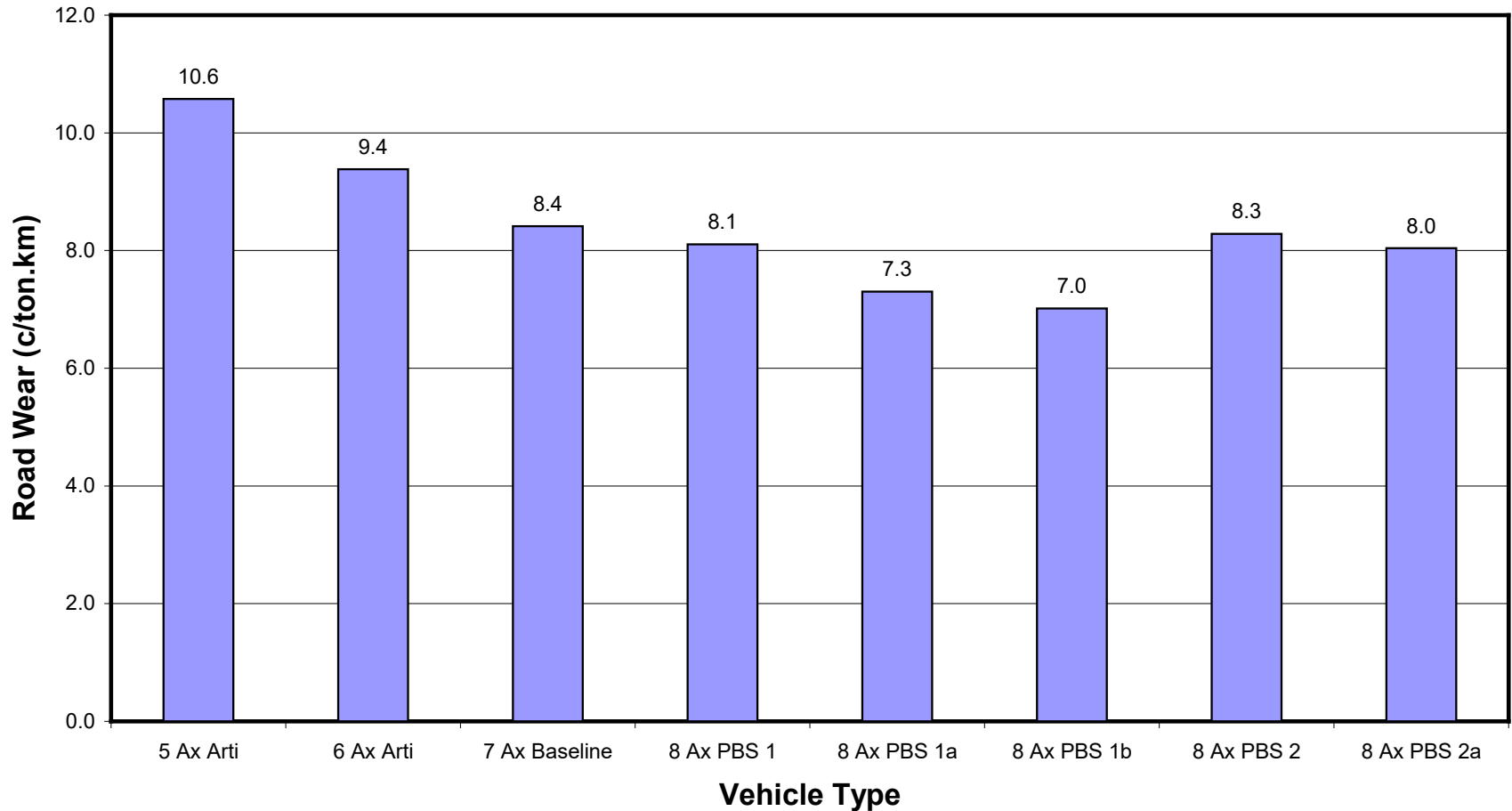
\* Classification according to TRH 14 (CSRA, 1985)  
 8 Pavement Structures-1.ppt



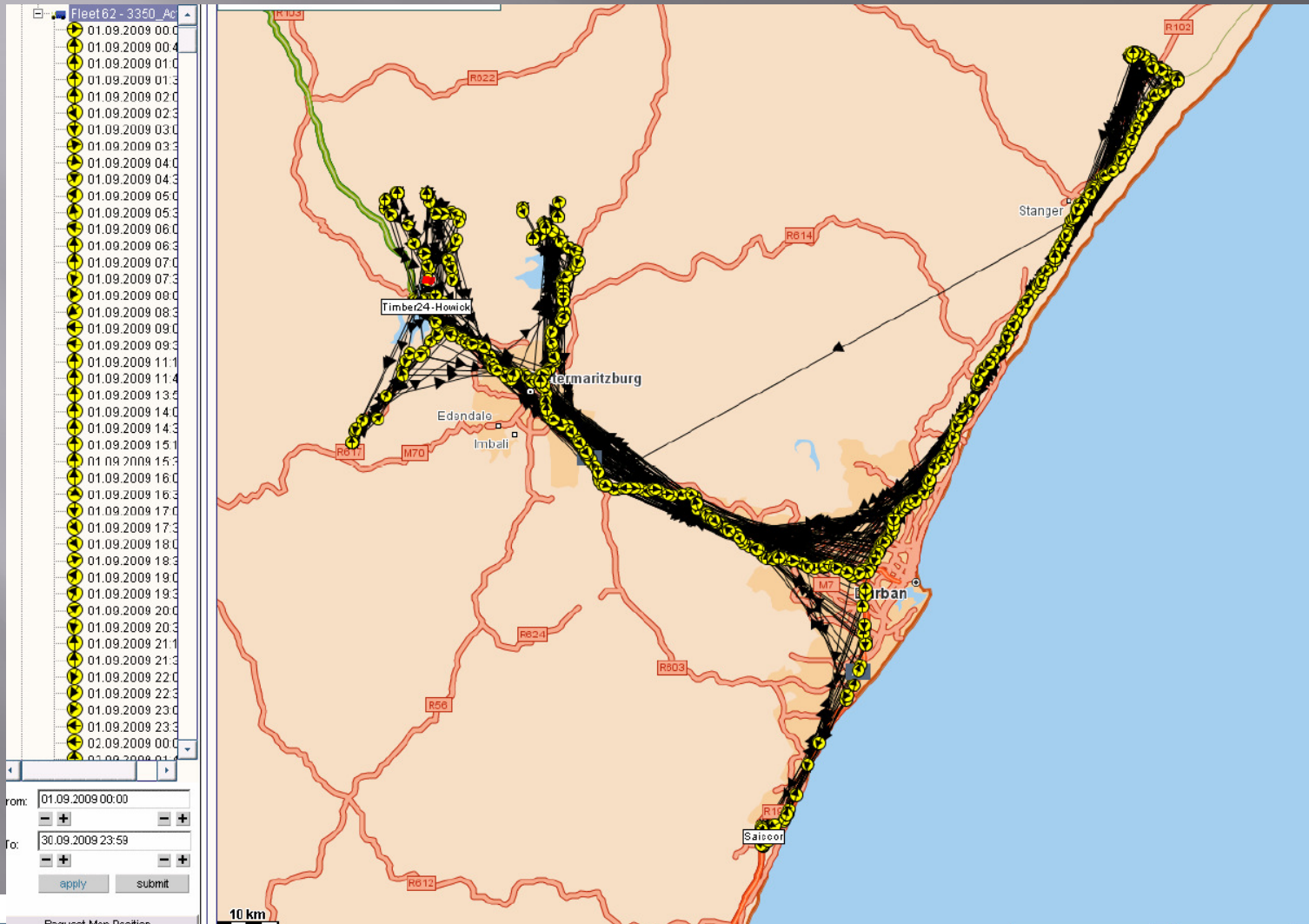
# Road Wear Effects



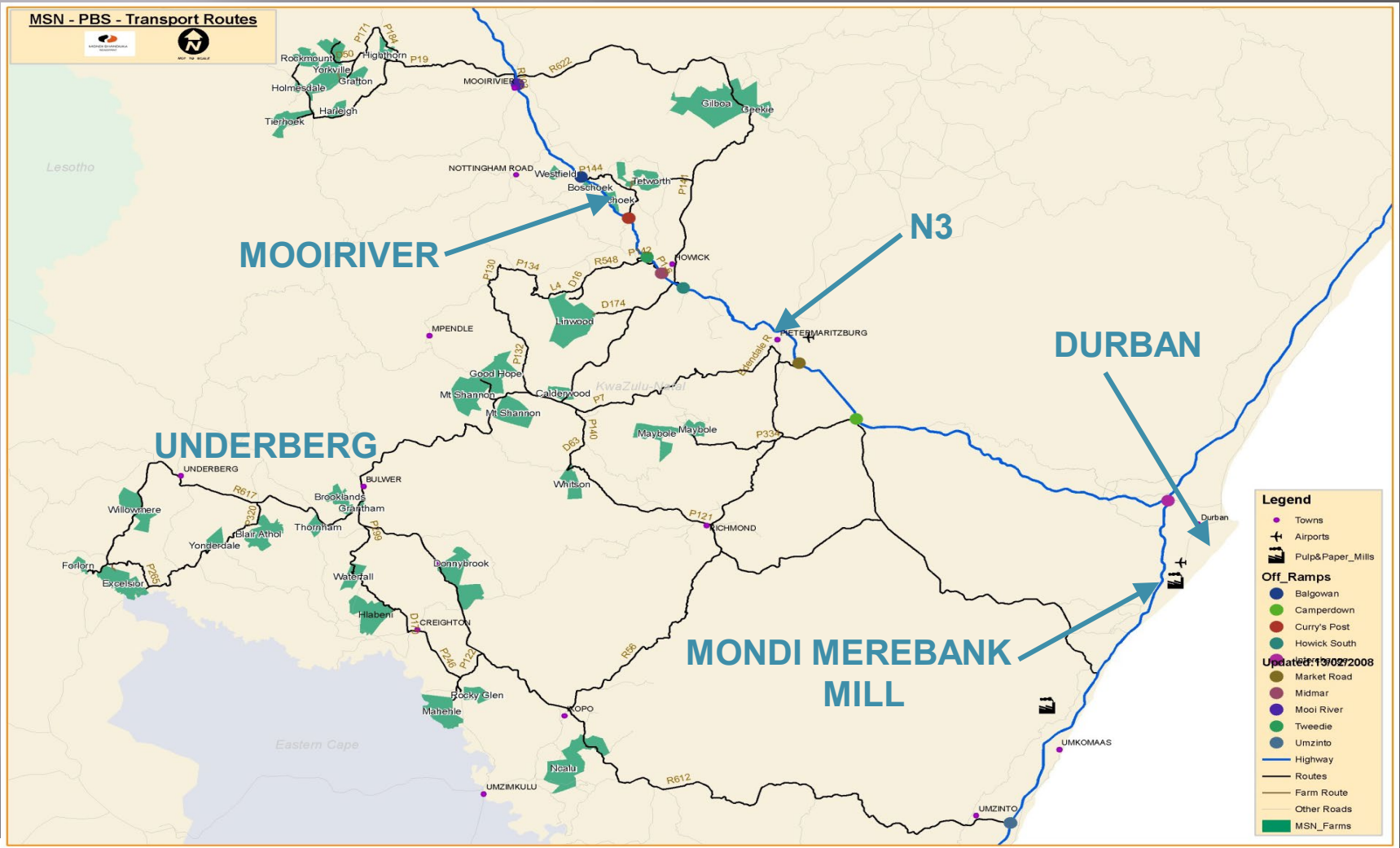
# Road Wear Effects (cont)



# Route Monitoring

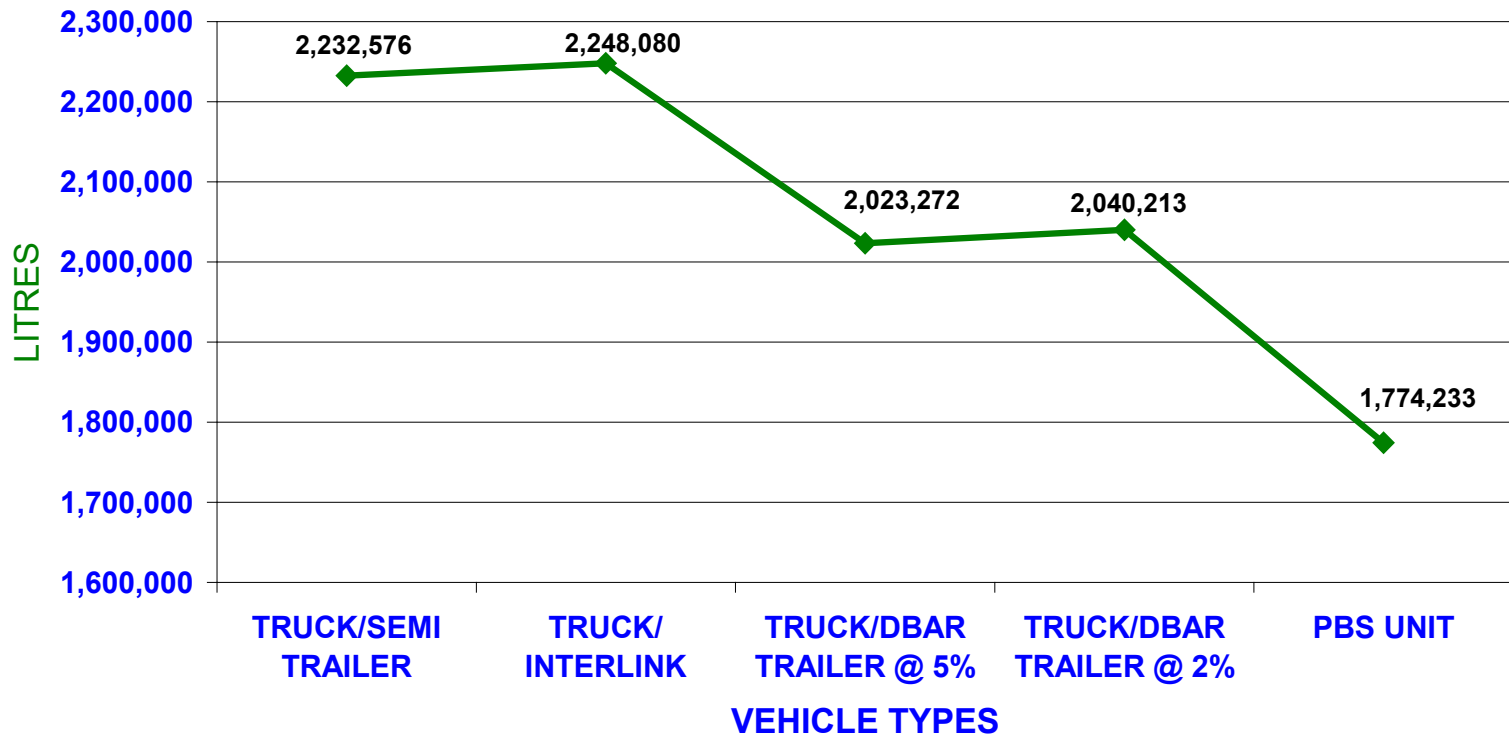


# Mondi PBS Vehicle Route

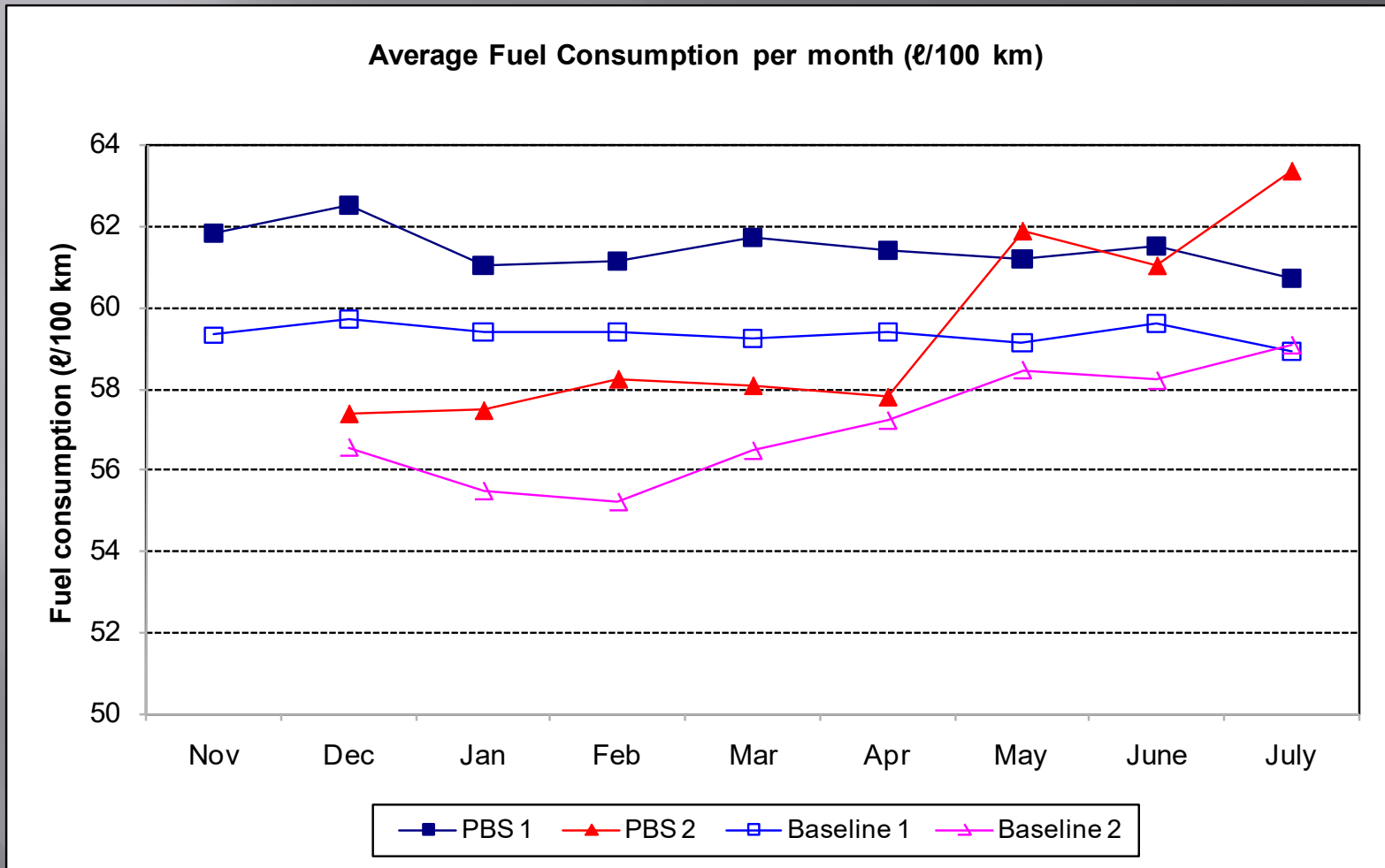


# Fuel Consumption: Mondri PBS vehicle

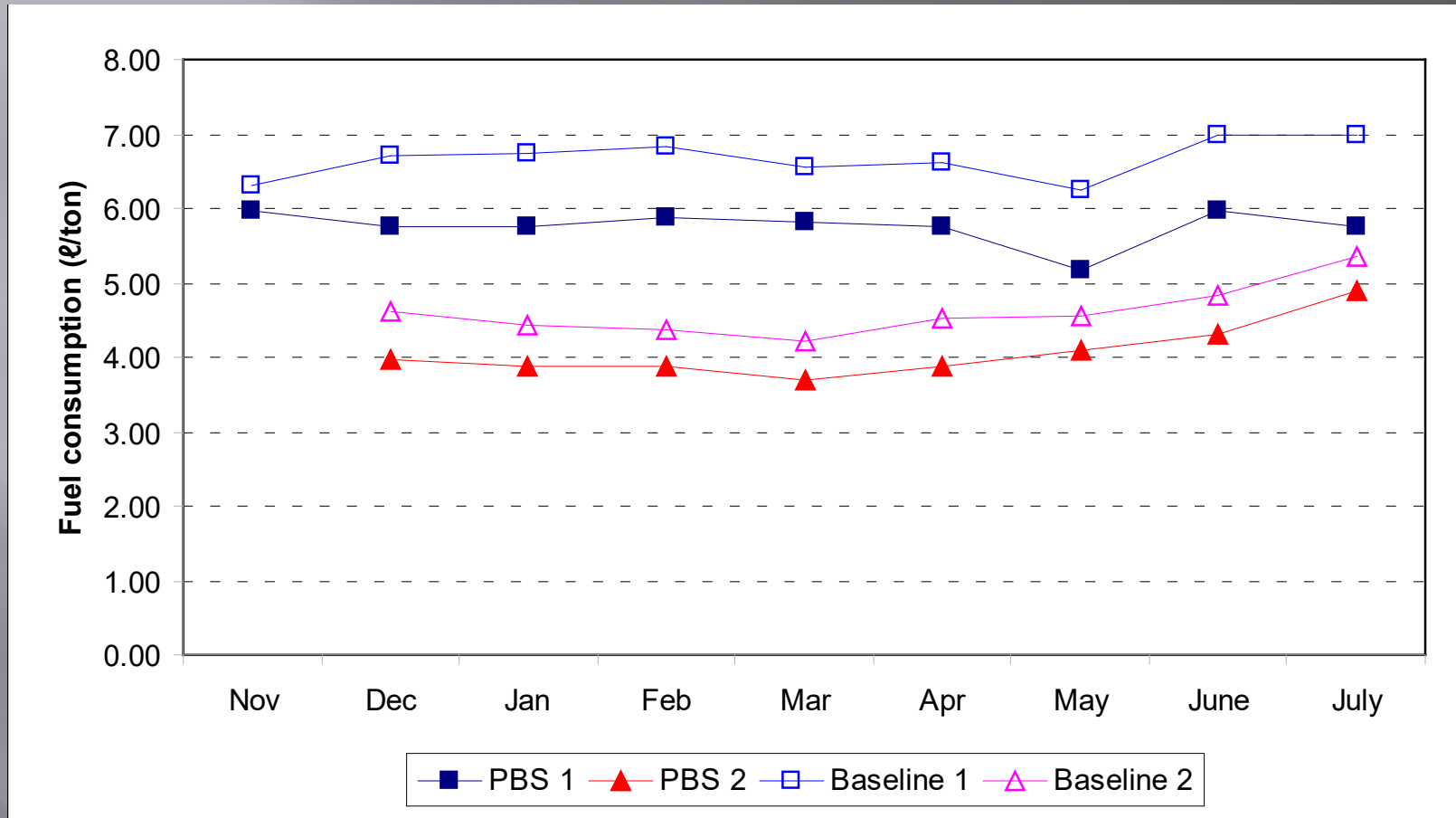
LITRES FUEL USED PER 400,000 TONNES @ 171 KM LEAD DISTANCE



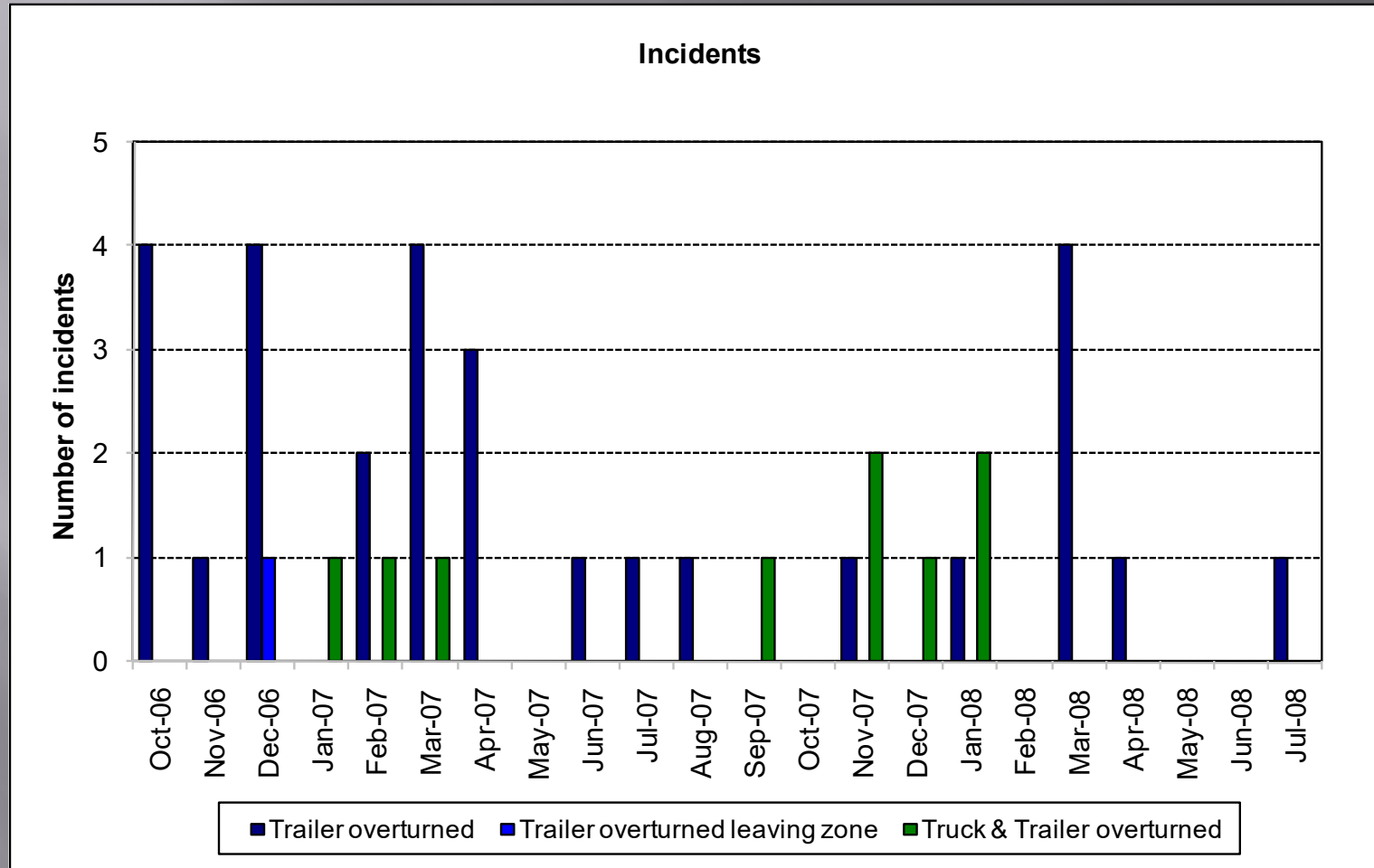
# Fuel Consumption



# Fuel Efficiency



# Safety Performance





# Summary of Performance Outcomes

Two vehicles, 8 months operation

Performance indicator	Measured result
Payload	Average improvement: 19.3 %
Payload Efficiency Factor	Increase from 69.3 % to 70.5 %
Tons transported per month	Average increase: 19.3 %
Fuel efficiency	Average savings: 12.7 %
Fuel savings (based on 700 000 tons/annum contract)	485 000 litres per annum
Fleet size	Reduction of 17 %
Incident/accidents*	Reduction from 3.1 to 1.1 per month
CO <sub>2</sub> emissions (based on 700 000 tons/annum contract)	Reduction of 1 280 tons of CO <sub>2</sub> per annum
Road wear	Reduction varies from 2 to 23 %

\*Based on a fleet of 45 new vehicle combinations incorporating a number of PBS design features

# Way Forward

- ❑ DoT approved 30 additional permits in Feb 2009
- ❑ 15 additional PBS vehicles commissioned by Dec 2009
- ❑ Others are in the design phase
- ❑ Other PBS demonstration projects in the concept/design phase:
  - General freight (vehicle parts)
  - Mining
  - Steel pipes
  - Sugar
  - Car carriers
- ❑ Route classification
- ❑ Manage negative publicity from rail lobbyists and others

Thank you for your attention

