

National Study Of Heavy Freight Vehicle Loading in Australia

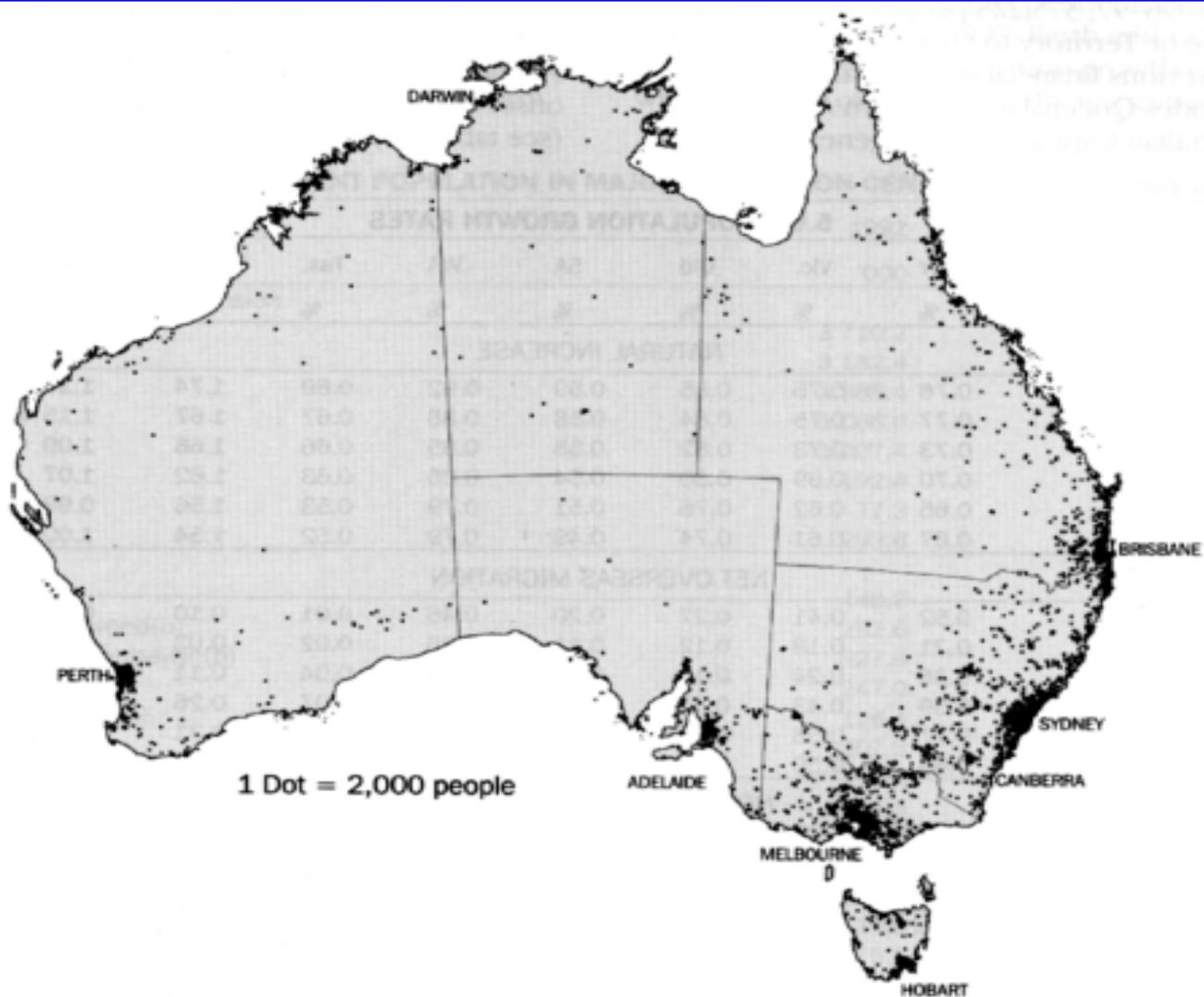
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Austroads

Format of Presentation

- General facts and freight movements about Australia
- National Study Of Heavy Freight Vehicle Loading in Australia
 - why study
 - details of study
 - results
 - conclusions

Australia - The Facts (1)

- Population 19,000,000
- Same geographical size as continental USA
- 2 people per square km.
- High population density in the major cities



(a) Estimated resident population.

Source: *Regional Population Growth, Australia 1997 (3218.0)*.

Australia - The Facts (2)

- 850,000 km. of road
- Long distances of travel
- High dependency on road freight

	Aust.	USA	UK
Road Freight tonne – km. per capita	6,000	5,240	2,739
Persons per km. of road	23.6	41.6	159.9





Meall	14
Birkdale	34
Mait	78
Annandale	100
Brisbane	200



Rural

Some of
the Larger
Australian
Freight
Vehicles



Urban

Aim of Study

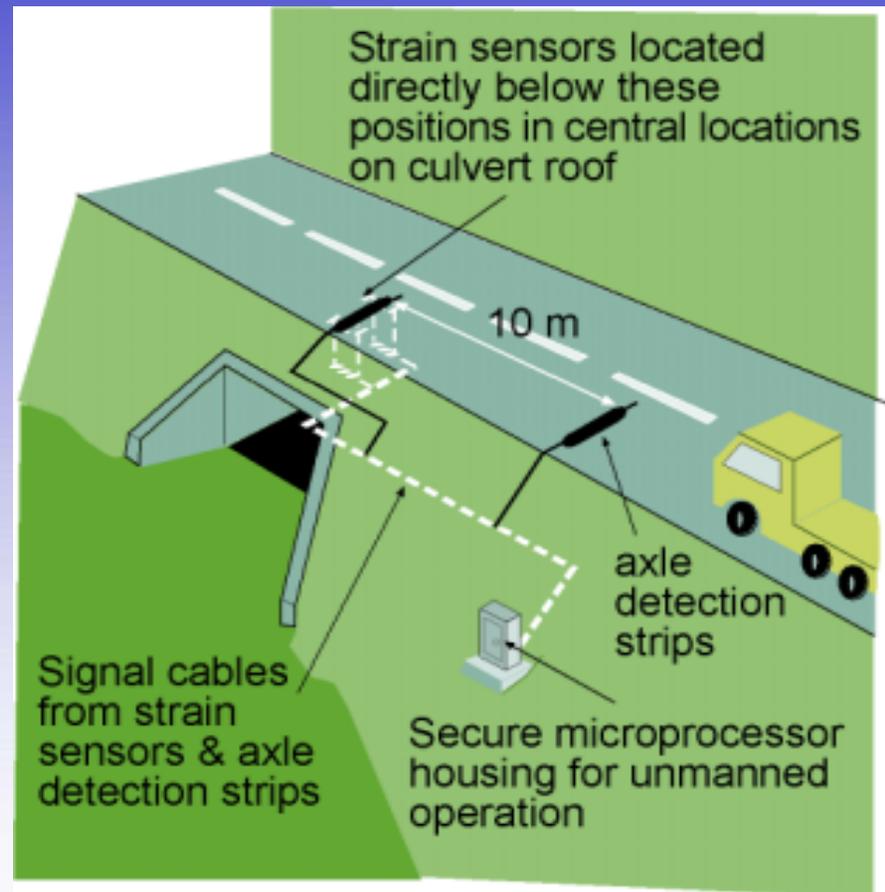
- Qualitative evidence of gross overloading
- Australian national level approach
- Investigate the incidence of heavy freight vehicle overloading
 - use of HS WIM (traffic not vehicle data)
 - only good quality data
 - State and National reporting, and
 - rural and urban perspective
 - demonstration of WIM data use

WIM Use in Australia

- WIM used since middle of the 1960s
- 200 high speed WIM systems
- numerous public and private low speed WIM systems
- CULWAY is the main HS WIM system in operation

Culway WIM System

- Culvert based, unobtrusive
- Utilises strain sensors installed under-road culvert
- Conforms to ASTM E1318-94 Type I



Australian Standard Mass Limits

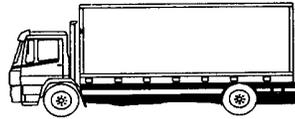
<u>Axle Group Type</u>	<u>Mass Limit (Tonne)</u>
single axle single (conventional) tyre	6.0
twin steer (conventional) tyre	11.0
single axle dual (conventional) tyre	9.0
tandem axle dual (conventional) tyre	16.5
tri-axle dual (conventional) tyre	20.0
quad-axle dual (conventional) tyre	20.0



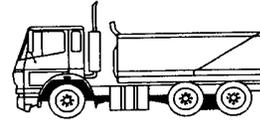
Class 1
Short Vehicle



Class 2
Short Vehicle Towing



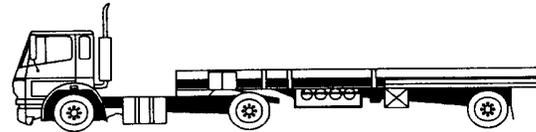
Class 3
Two Axle Truck



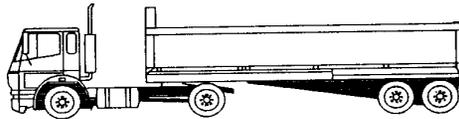
Class 4
Three Axle Truck



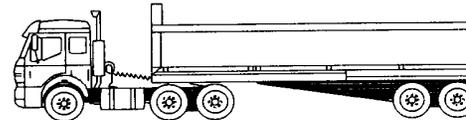
Class 5
Four Axle Truck



Class 6
Three Axle Articulated Vehicle

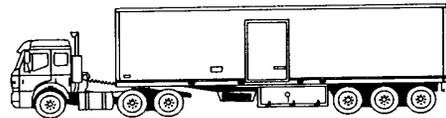


Class 7
Four Axle Articulated Vehicle



Class 8
Five Axle Articulated Vehicle

42.5 T



Class 9
Six Axle Articulated Vehicle

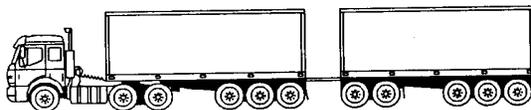


Class 10
B Double

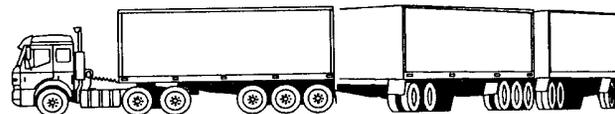
39 Tonne

62 T

76 T



Class 11
Double Road Train



Class 12
Triple Road Train

115.5 T

WIM Data Used in Study (1)

<u>Urban</u>			<u>Rural</u>		
Number of Sites	Number of Monitored Days	Number of Heavy Vehicles	Number of Sites	Number of Monitored Days	Number of Heavy Vehicles
16	1,494	868,280	88	20,267	4,817,050

WIM Data Used in Study (2)

- Specific fixed HS WIM sites
- Main Routes (National and to a lesser degree State Roads)
- Only Australian Standard Mass Limits Used
 - No ability to identify permit or concessional loaded vehicles

Incidence of Overloaded Heavy Freight Vehicles for all Roads in Australia

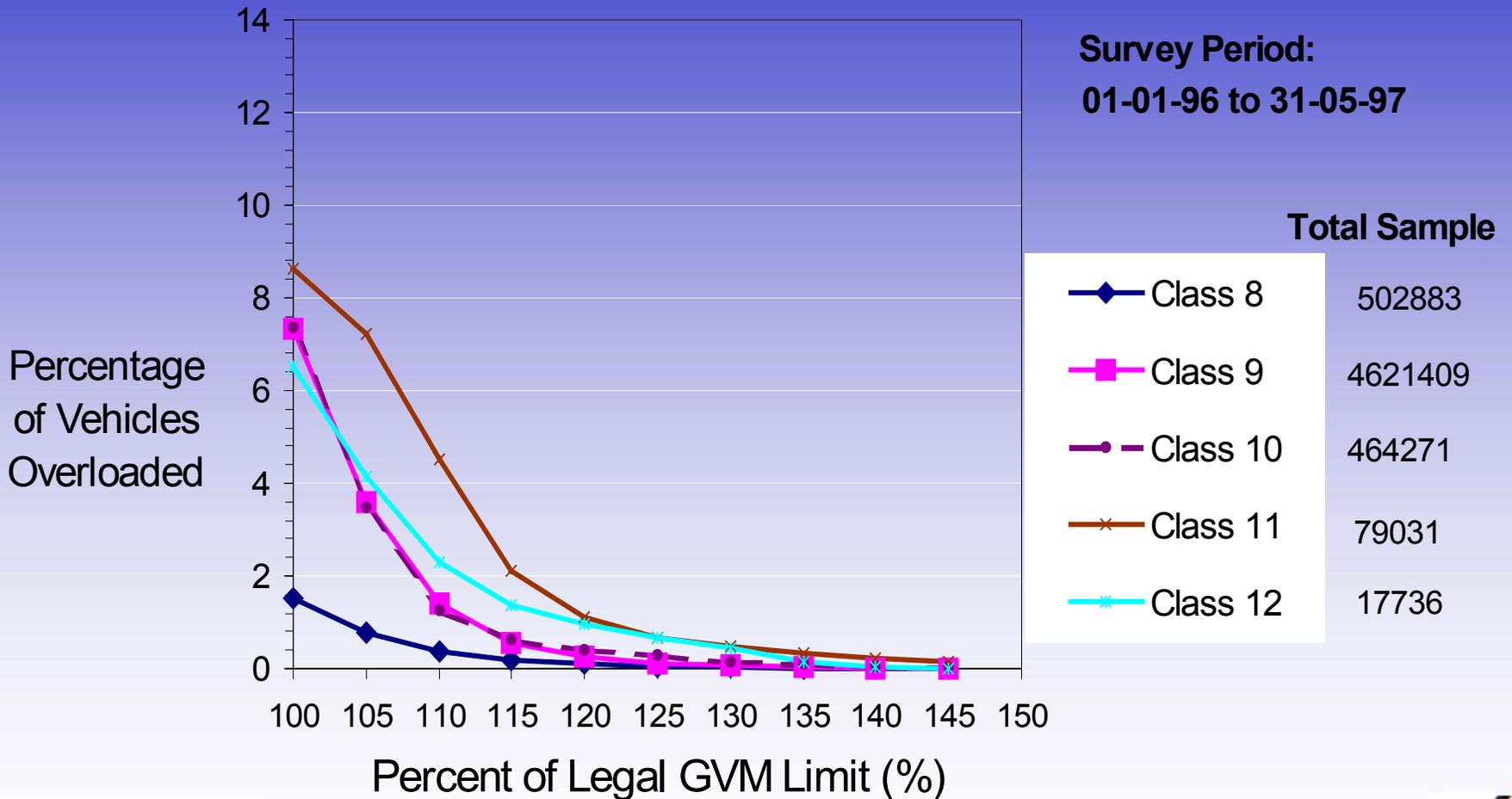
AUSTROADS Vehicle Classification	Number	Percent More than 30 % of their GVM Limit	Percent More than 50 % of their GVM Limit
Class 8	502,883	0.06	0.00
Class 9	4,621,409	0.13	0.01
Class 10	454,271	0.35	0.02
Class 11	79,031	1.37	0.17
Class 12	17,736	0.63	0.01
All Heavy Vehicles	5,685,330	0.16 (9,344)	0.01 (771)

Incidence of Overloaded Heavy Freight Vehicles for all Roads in Australia

AUSTROADS Vehicle Classification	Urban			Rural		
	Number	Percent More than 30 % of their GVM Limit	Percent More than 50 % of their GVM Limit	Number	Percent More than 30 % of their GVM Limit	Percent More than 50 % of their GVM Limit
Class 8	107,331	0.03	0.00	395,552	0.07	0.00
Class 9	696,729	0.03	0.00	3,924,680	0.15	0.02
Class 10	61,221	0.16	0.02	403,050	0.38	0.02
Class 11	2,881	0.35	0.00	76,150	1.41	0.18
Class 12	118	0.00	0.00	17,618	0.64	0.01
Total	868,280	0.04 (365)	0.004 (32)	4,817,050	0.19 (8,979)	0.02 (739)

Distribution of Overloads

All Australian Roads



Conclusions (1)

- Australia's problem is not with Gross but Marginal overloading (5 to 10 % overloading)
- Rural worse than Urban
- Marginal overloading is within the measurement tolerance of Culway
- This was a National view of overloading not site specific

Conclusions (2)

- Need WIM sites to be more strategically located and as necessary flexible
- Need WIM sites to be integrated with other systems
- Good to use and demonstrate HS WIM as a mainstream tool