New technology to improve your bottom line

Chris Loose	Daimler Trucks	Engine servicing
Alan Sutton	Goodyear and Dunlop	Retreading
Peter Heatley	Michelin	Fuel efficient tyres
Chet Cline	AIR CTI	Tyre pressure
Colin White	Isuzu	Aerodynamics

Engine servicing

Chris Loose – Daimler Trucks

Detroit Series 60, 1987

DDEC® Reports - Monthly Activity #1

Print Date: Mar 28, 2012 03:56 PM (AUSEDT)

DDC

RAR 4.1

Driver ID:
Odometer: 188491.7 km

Distance	21747.5 km
Fuel	14862.00 L
Fuel Economy	1.46 km/L
Avg Drive Load	61 %
Avg Vehicle Speed	85.8 km/h
Driving Time	253:19:43
Driving Percent	93.82 %
Driving Fuel	14818.47 L
Driving Economy	1.47 km/L
Vehicle Speed Limiting	
Time	130:05:31
Percent	51.35 %
Distance	12984.8 km
Fuel	6641.98 L
Top Gear	
Time	184:32:46
Percent	72.85 %
Distance	17936.1 km
Fuel	10687.64 L
Top Gear - 1	
Time	17:34:39
Percent	6.94 %
Distance	1403.3 km
Fuel	1353.28 L
Cruise	
Time	130:06:23
Percent	51.36 %
Distance	12563.2 km
Fuel	8706.92 L
Top Gear Cruise	
Time	117:22:38
Percent	46.33 %
Distance	11604.2 km
Fuel	7537.23 L
Speeding A(>=106 km/h and <114 km/h)	
Count	213
Time	0:30:23
Percent	0.20 %
Speeding B(>=114 km/h)	
Count	0
Time	0:00:00
Percent	0.00 %
Highest Speed	111.8 km/h
Occurred	03/11/12 11:09:51 (EST)
Coasting Time	0:00:00
Coasting Percent	0.00 %
Predictive Cruise Control	

Time	270:01:01
Fuel Consumption	55.04 L/h
Idle Time	16:41:18
Idle Percent	6.18 %
Idle Fuel	43.53 L
Parked Regen Time	0:00:00
VSG(PTO) Total Time	0:01:04
VSG(PTO) Percent	0.01 %
VSG(PTO) Total Fuel	0.00 L
VSG(PTO) Working Time	0:00:00
VSG(PTO) Working Fuel	0.00 L
Stop Idle Time	7:51:23
Stop Idle Percent	2.91 %
Stop Idle Fuel	19.40 L
Over Rev Limit	1800 rpm
Count	13
Time	0:03:55
Percent	0.02 %
Highest RPM	2365 rpm
Occurred	03/07/12 18:04:53 (EST)
Diag. Records	22
Hard Brake Count	1
Firm Brake Count	98
Brake Count	3863
Eng. Brake Time	21:00:58
Optimized Idle Time	
Active	0:00:00
Run	0:00:00
Battery	0:00:00
Engine Temp.	0:00:00
Thermostat	0:00:00
Extended Idle	0:00:00
Continuous	0:00:00
Optimized Idle Battery Charging Starts	
Normal Count	0
Alternate Count	0
Continuous Run	0
Fan On Time	
Total Time	6:07:03 (2.2%)
Engine System	6:00:21
Manual	0:05:35
A/C	0:01:07
DPF Fan Time	0:00:00
Engine Utilization	40.70 %
Vehicle Utilization	38.18 %
DPF Regeneration	
Parked Completed	0
Driving Completed	50
Parked Regen Fuel	0.00 L

MB Acrtos, 1995

Intelligent Management of Service Intervals

Distance – 30,000 km
Hours – 600 hours
Fuel Burn – 10,500 litres

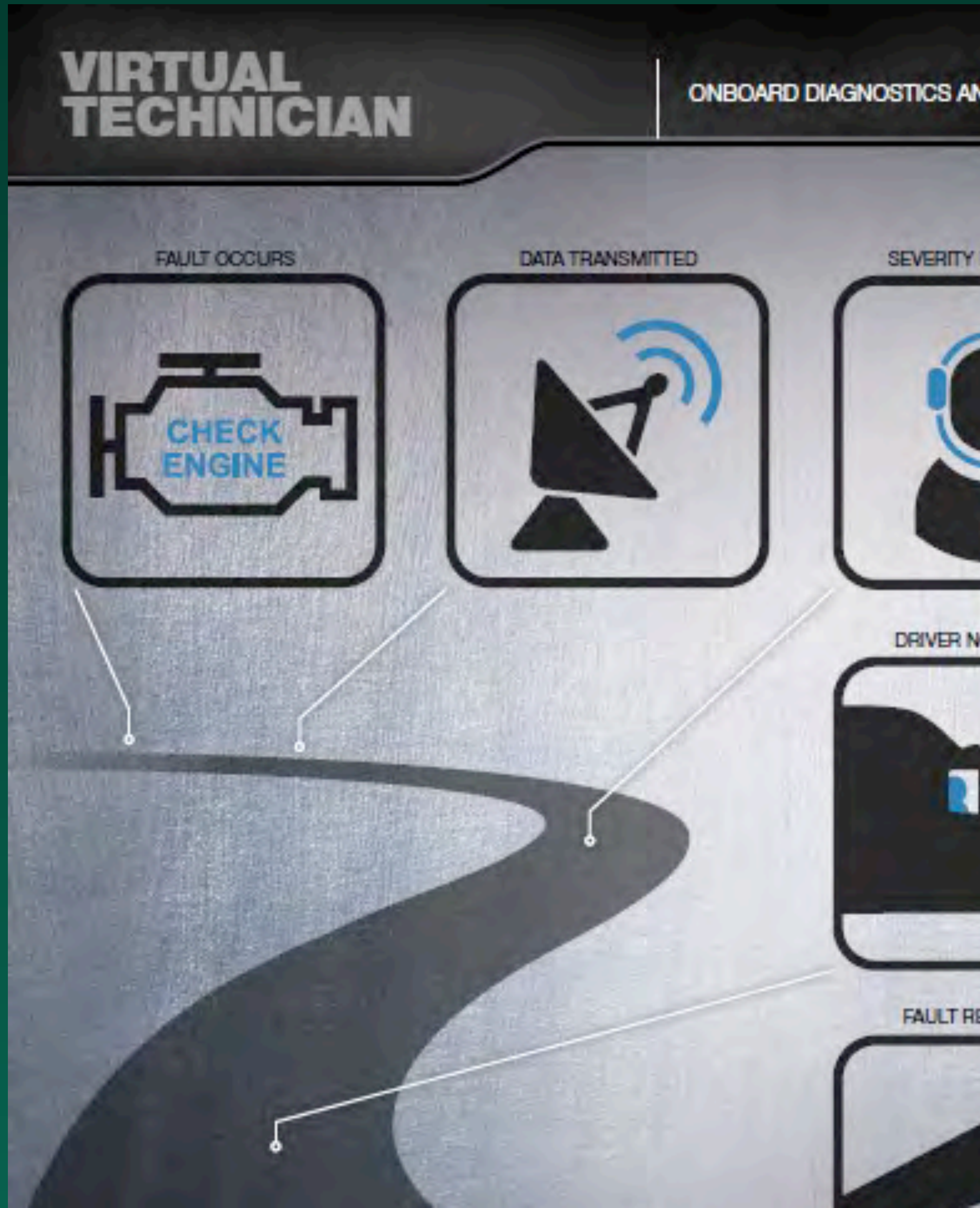
Or by need

Virtual Technician, 2010

Virtual Technician

mote engine diagnosis
m.
Alerts of check engine
events
Call Center Support
detailed resolution

ibility
Track & trace
Mileage Reporting
Alerts reporting



Real Time Data is Analyzed, Corrective Action Determined

Future

Retreading

Alan Sutton – Goodyear and Dunlop

Retreading:

Making tyres last longer.....

Tyres in the Transport Industry

- New tyre costs increasing
  - Raw material costs
  - Regulatory requirements (EU tyre labelling)
  - New technology costs
  - Use and discard may become more and more expensive

- Environmental
  - Increasing environmental protection demands
  - Cost and limitations to landfill

Environmental impact of Tyres

rgy Used in Manufacture :

- For ONE tyre 85 Litres of Oil (in material) and 310 kgs. of "Greenhouse gas" generate
- Power consumed in manufacturing
- Raw material transport

ribution:

- International shipping / Transport within Australia

osal:

- Australians generate ~170,000 tonnes of waste tyres per year
- Half of these end up in landfill (Equivalent to 6 million car tyres!)

Retread Benefits

Around half the price of many premium tyres

Uses 2/3's less oil compared to making a new tyre.

Landfill reduced

Many industry developments:

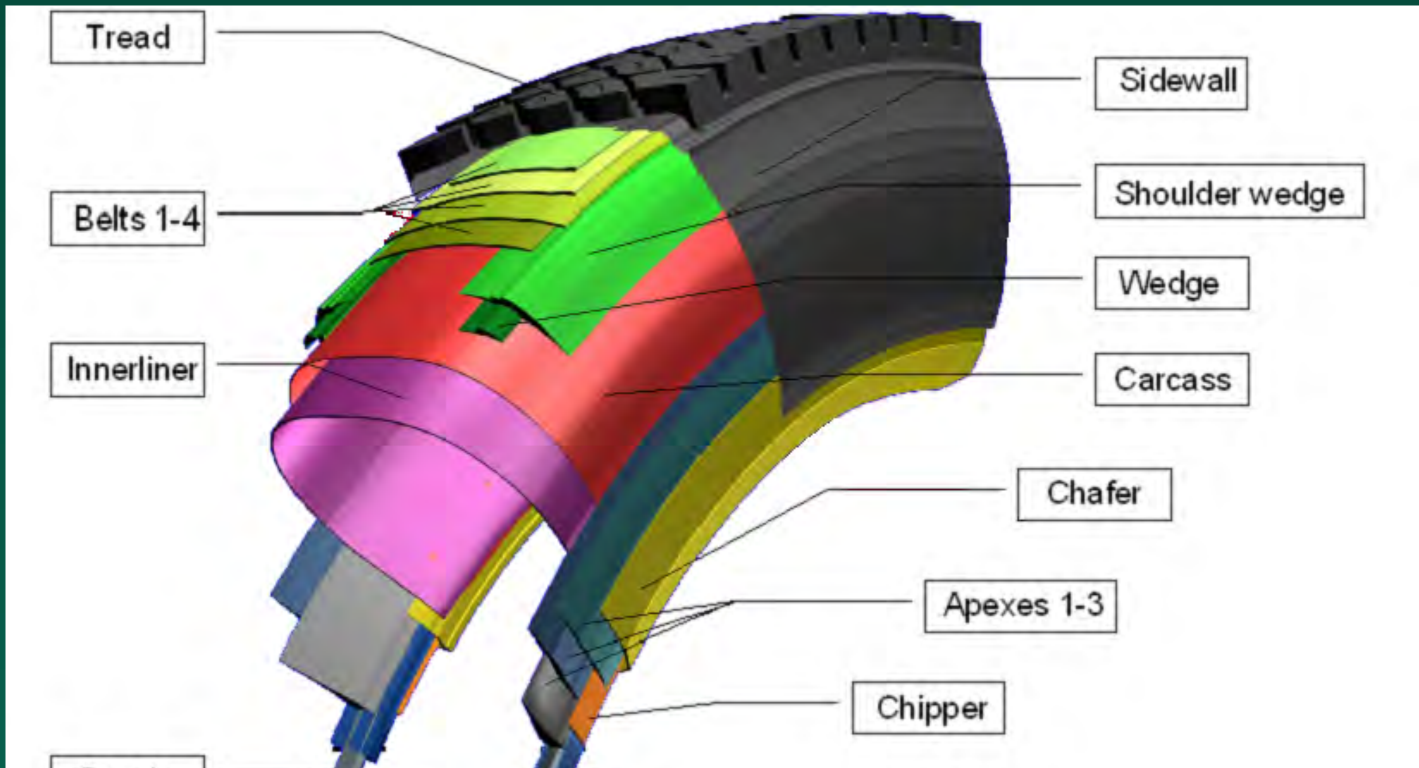
- New Patterns / Compounds / Processes

Strong local Industry manufacturers….

- Example Goodyear / Michelin / Bridgestone (Bandag)
- Reduced transport inputs
- Jobs

New Tyre Construction

Quality truck tyres are designed to last for more than one tread life…

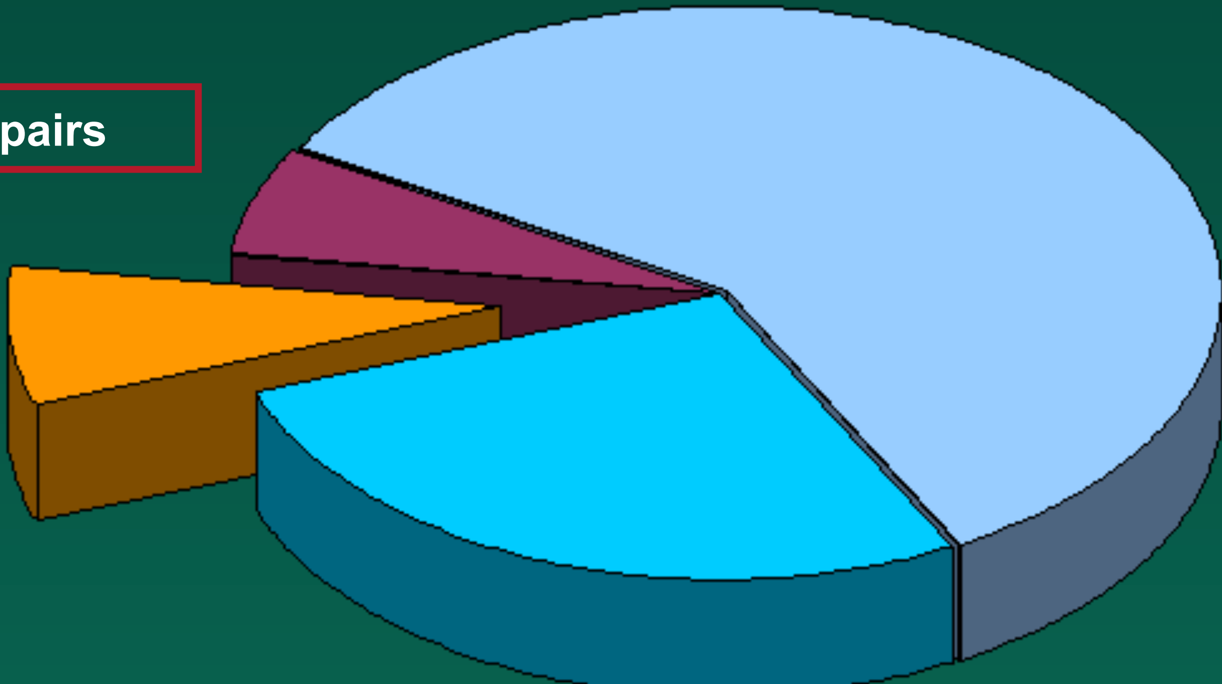


The Reputation of Retreads

ple often think tyre remnants at the roadside are
d retreads - this is incorrect

ysis of 2,200 tyres failed tyres done by
pendent experts for the USA Truck Association

lost often retread had not failed!



Retreads retain their strength

read Strength / Fatigue Testing done by a USA State Department of nsport :

Plunger Test

unger **Casing** strength / fatigue test

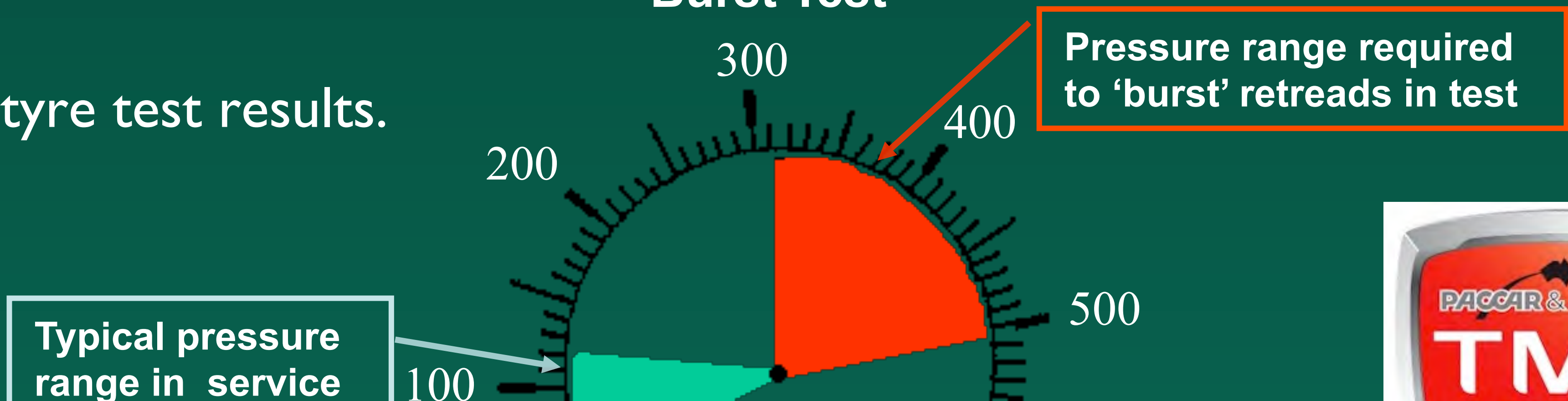
urst test to evaluate casing fatigue.

oth tests, retreaded tyres:

xceeded legal requirements

ere similar to new tyre test results.

Burst Test



Tips in using retreads….

Buy premium quality new tyres

- Use your OWN casings
- Brand your tyres (or RFID chip) for ID

Maintain new tyres for retreading.

- Regular pressure / tread-depth checks
- Inner duals have valve extensions
- Inspect regularly / remove tyres for retreading ‘on time’

Buy Premium Retreads.

- New designs and compounds good for durability / Treadwear
- Low Rolling resistance / Wet grip – To Meet “Tyre Labelling Scheme” in Europe

Don’t retread tyres :

- When they have been run underinflated for a long or unknown time
- Damaged from impacts with kerbs / stones badly drilled into the tread
- You don’t know the history of.
- Without discussing with your tyre supplier technical rep. to get the correct retread

Fuel Efficent Tyres

Peter Heatley - Michelin

Fuel Efficient Tyres

Should the question be fuel prices are rising how do I manage my costs?

All companies in the field of transport confirm: "The rise in fuel prices systematically weighs on **company operating accounts** " as fuel, on average, represents between **18 to 24 % of company spending**.

From all of the factors influencing fuel consumption, **one third of all full tanks are directly absorbed by the rolling resistance of tyres used on motorways**.

Rolling resistance areas

Line haul operation	Regional operation
Idle/deceleration – 5 %	Idle/deceleration – 7 %
Inertia (brakes) – 12.5%	Inertia (brakes) – 31.5%
Drive train losses – 4%	Drive train losses – 5.5%
Accessories – 5.5%	Accessories – 7%
Aerodynamics – 38%	Aerodynamics – 25%
Tyre RR – 35%	Tyre RR – 25%

The way that Manufacturers manage the reduction of the rolling resistance is always taking in account the 2 main performances : **mileage** and **grip**

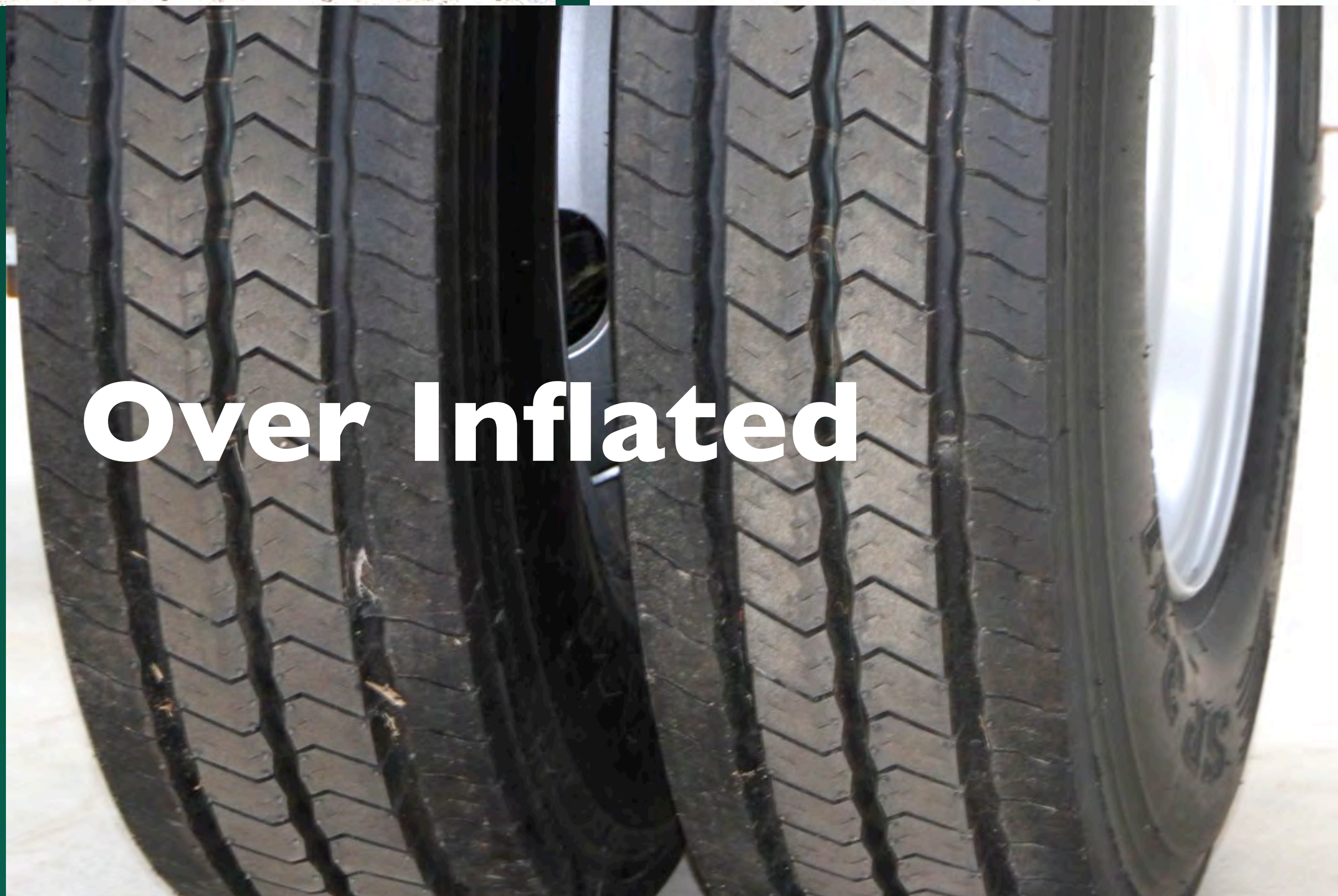
It's very easy for any tyre maker to get in his catalogue a low rolling resistance tyre , but more difficult for them to be competitive in mileage or adherence.

The only performance that energy tyres cannot meet is on/off road conditions because the compound cannot resist aggression and tear off damages.

Tyre pressure

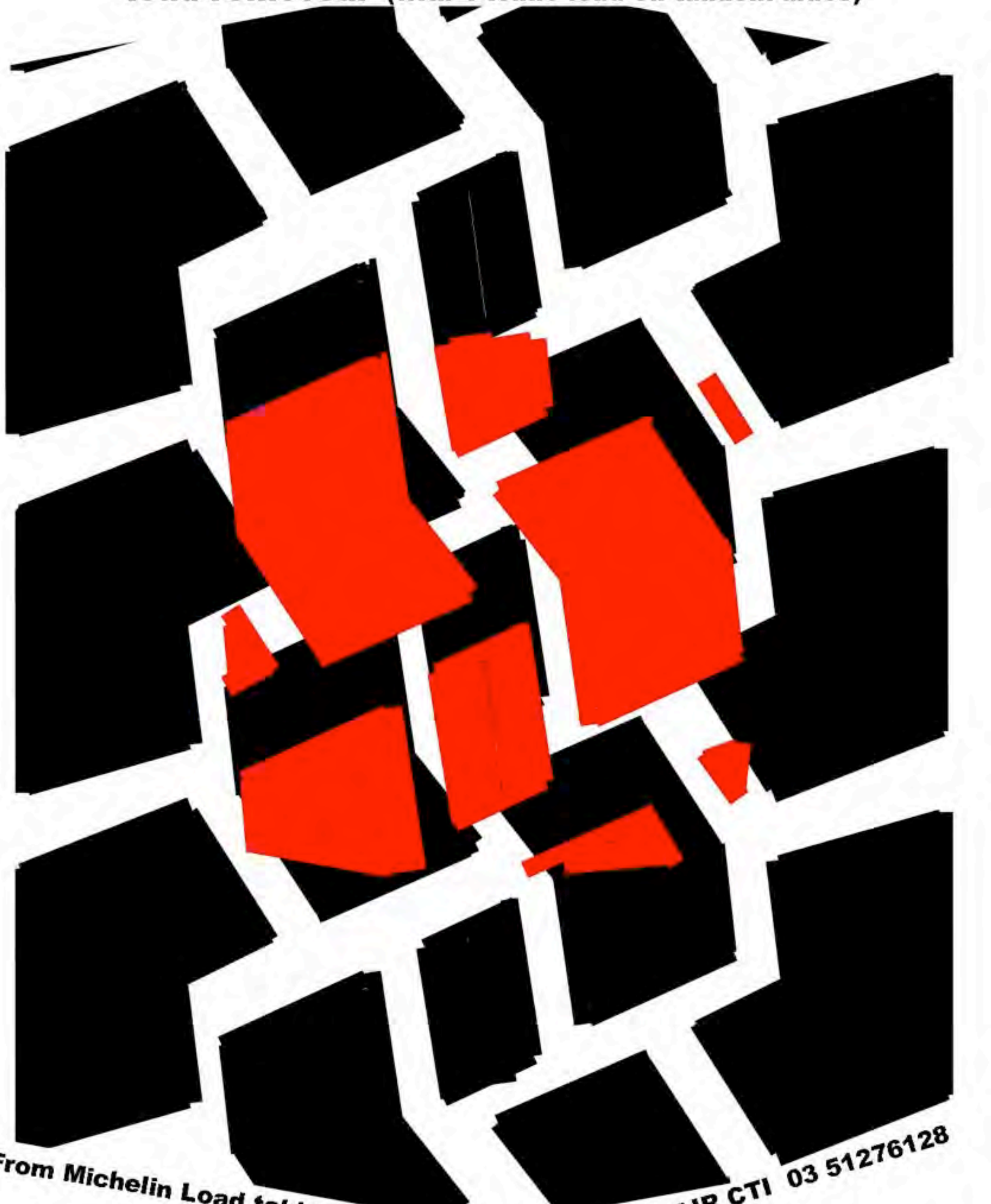
Chet Cline – AIR CTI

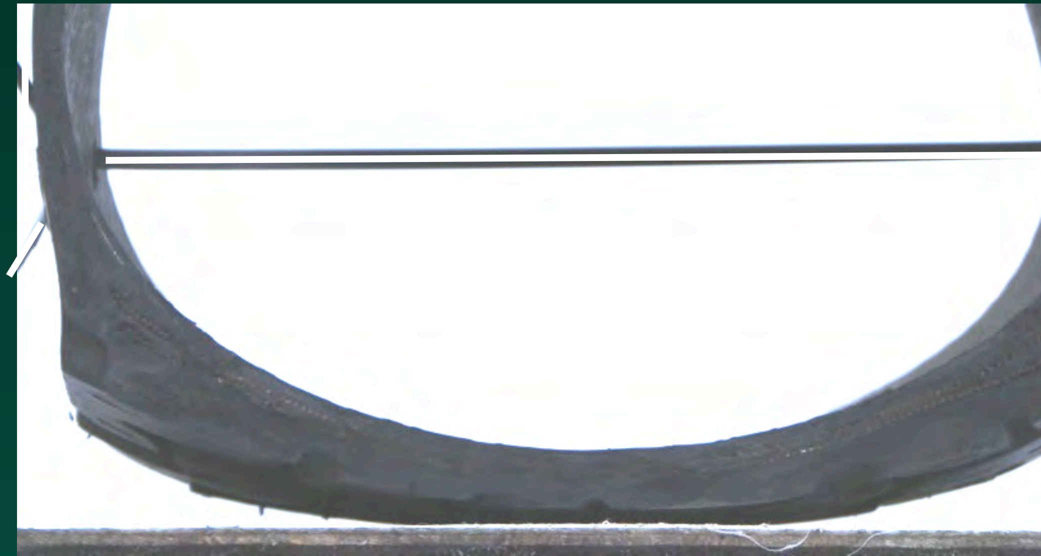
lmost ALL
uck Tyres are
ver Inflated,
or Under
Inflated

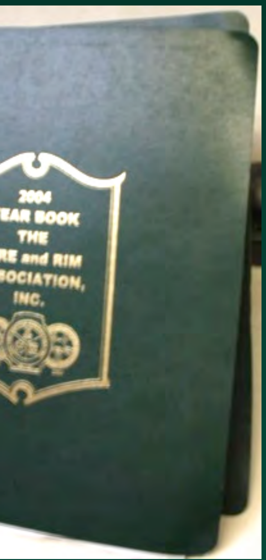


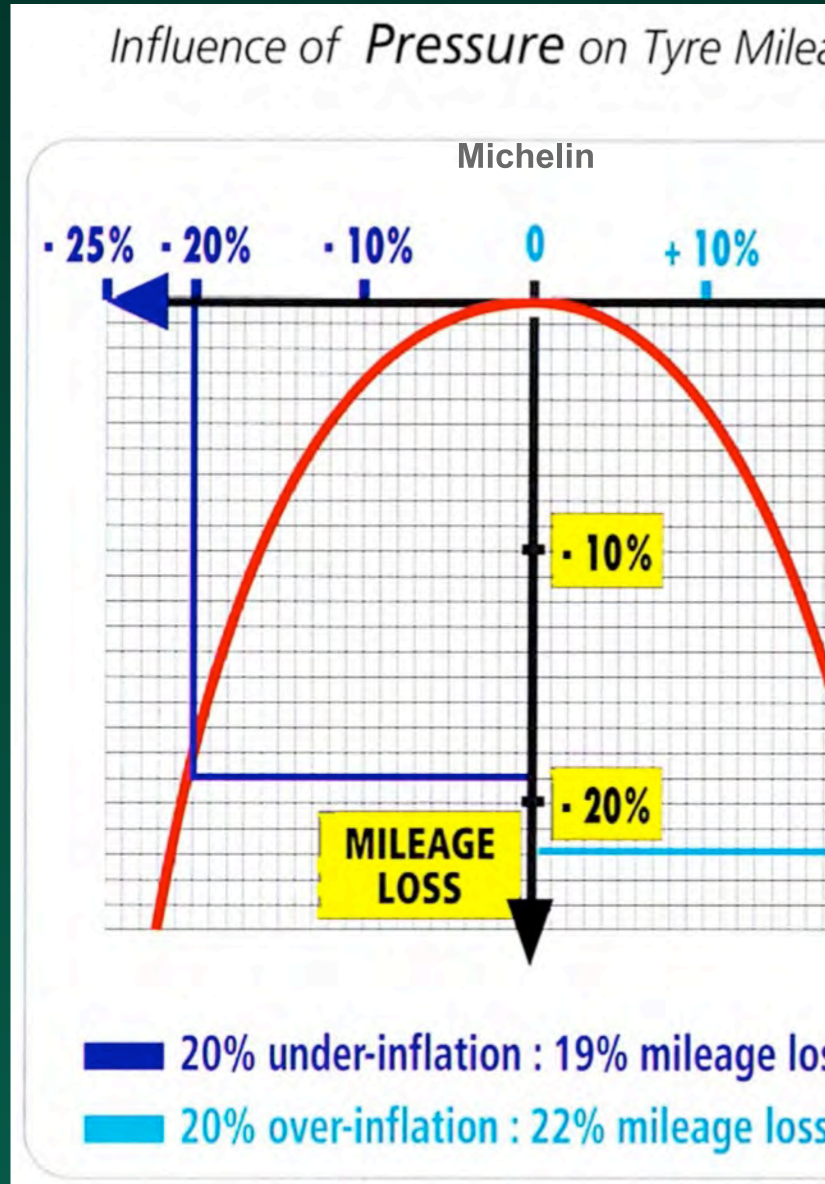
The black tread is the correct footprint size for a standard 11R 22.5. (16.5 tonne on tandem axles)

The Red footprint is the same tyre, with the legal load removed. (with 4 tonne load on tandem axles)









ODYEAR DUNLOP TIRES KELLY TIRES

Max Speed Rating (MPH)	Single (S) Dual (D)	Inflation Pressure - PSI 70	75	80	85	90	95	100	105	110	115	120
75	S	3370	3560	3730	3890	4080	4235	4390	**4540(F)**			
	D	3270	3410	3550	3690	3860	4005	4150	**4300(F)**			
65	S	4080	4280	4480	4675	4850	5025	**5205(F)**	5360	5515	**5675(G)**	
	D	3860	4045	4230	4410	4585	4760	**4940(F)**	5075	5210	**5355(G)**	
75	S	4530	4770	4990	5220	5510	5730	5950	**6175(G)**	6320	6465	**6610(H)**
	D	4380	4580	4760	4950	5205	5415	5625	**5840(G)**	5895	5950	**6005(H)**
75	S	4940	5200	5450	5690	6005	6205	6405	6610	6870	7130	**7390(H)**
	D	4780	4990	5190	5390	5675	5785	5895	6005	6265	6525	**6780(H)**
75	S	3470	3645	3860	3980	4140	4300	4455	4610	**4675(G)**		
	D	3260	3425	3640	3740	3890	4080	4190	4335	**4410(G)**		

$$$$$$

Health

Safety

AIR CTI Making Life Better

Aerodynamics

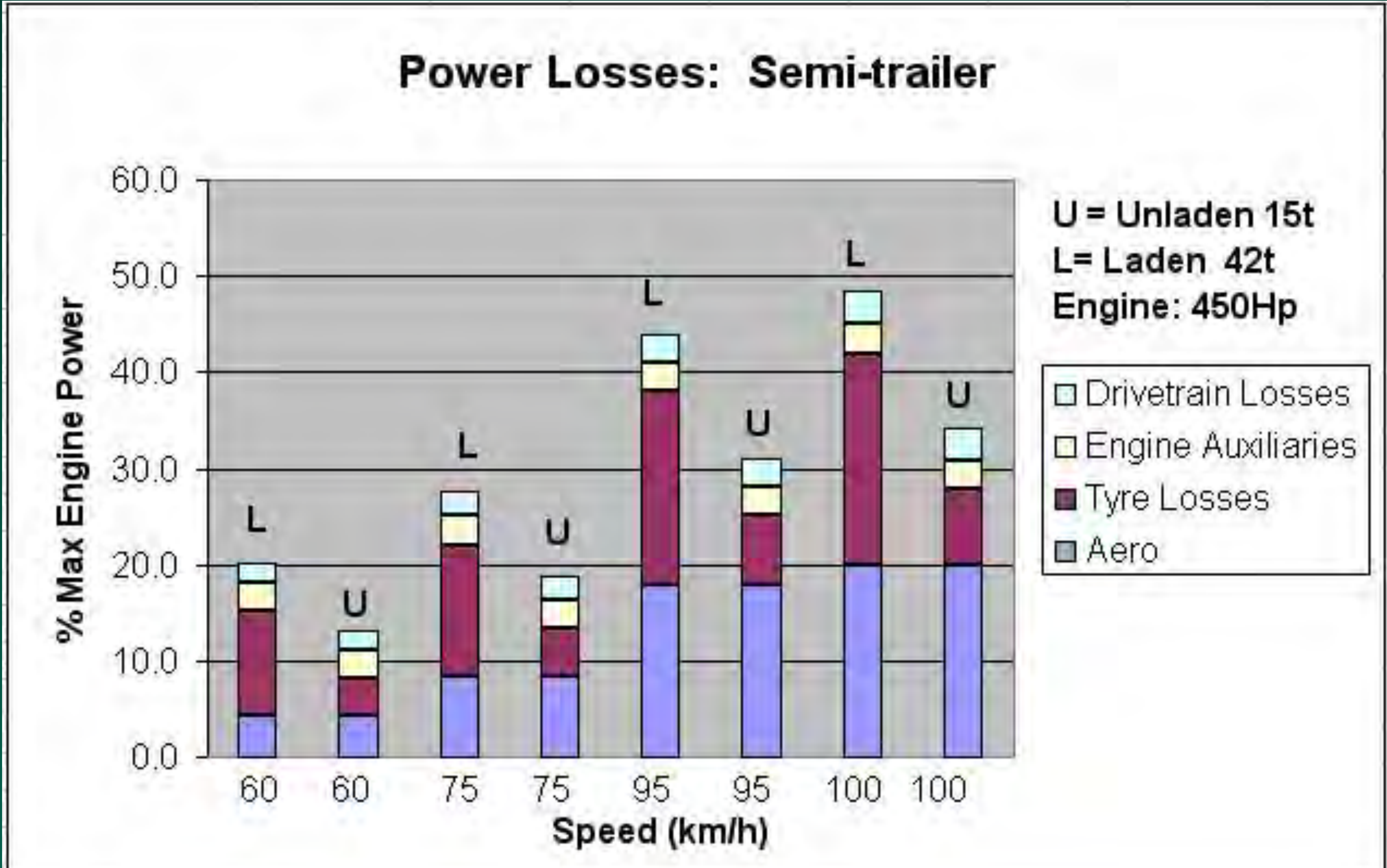
Colin White - Isuzu

Aerodynamics

•Why bother with aerodynamic improvements

- Aero losses are a major part of truck power requirements
- **Fuel economy**

Where Does My Fuel Go ?



Where Does My Fuel Go ?

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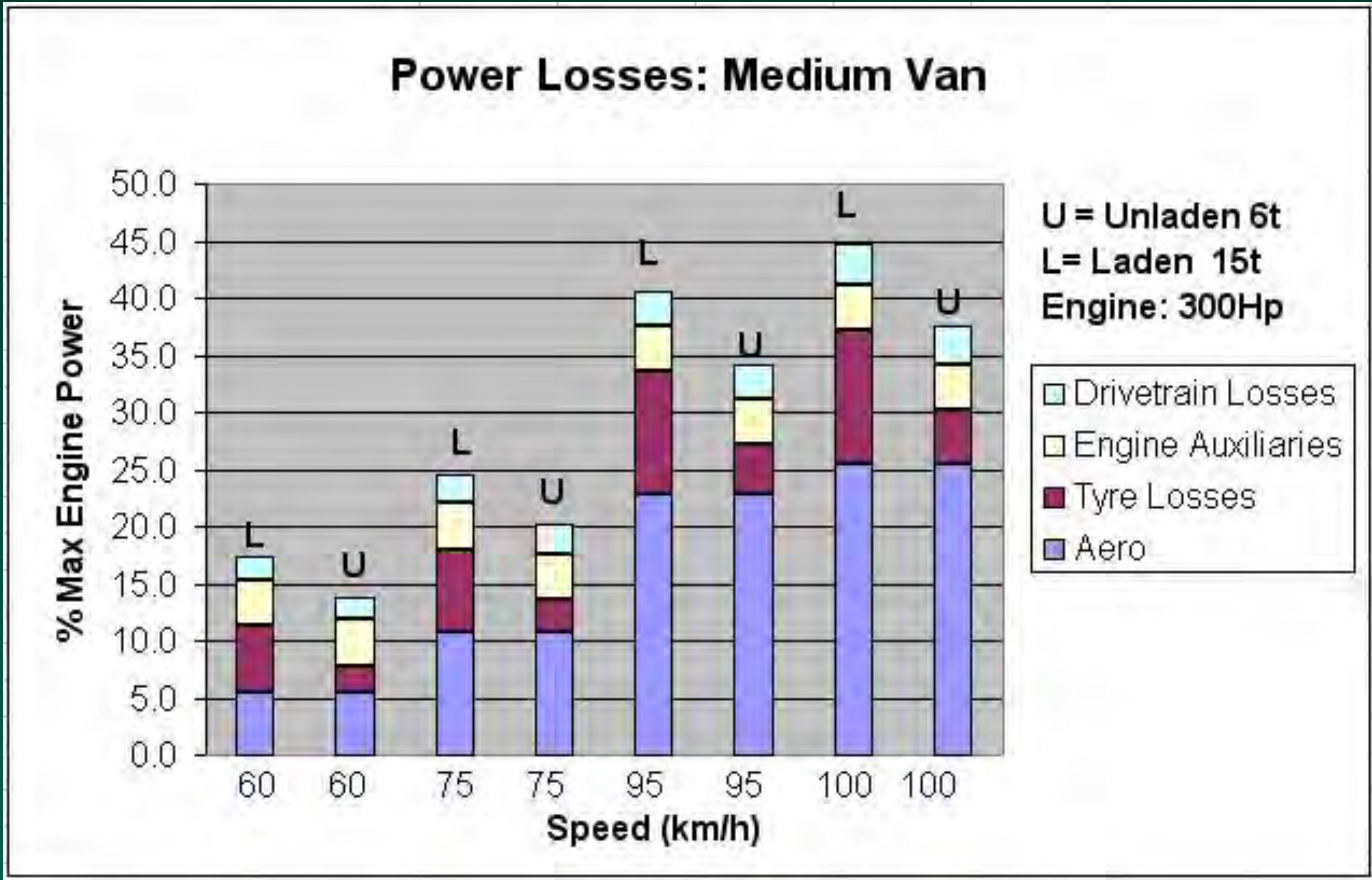
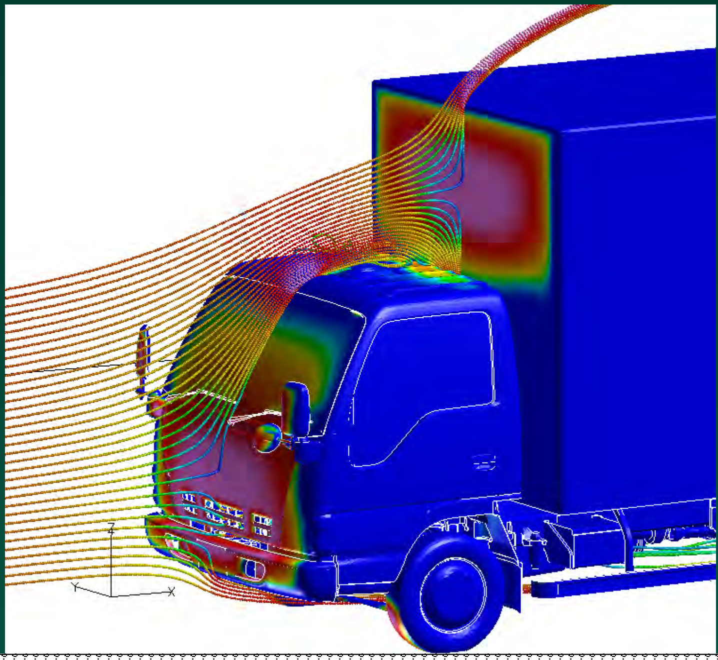


Aerodynamic Effects



- Manufacturers always strive f
  more efficiency

- New cabin shape improves fu
  consumption by reducing dra
  co-efficient.

Aerodynamics and You

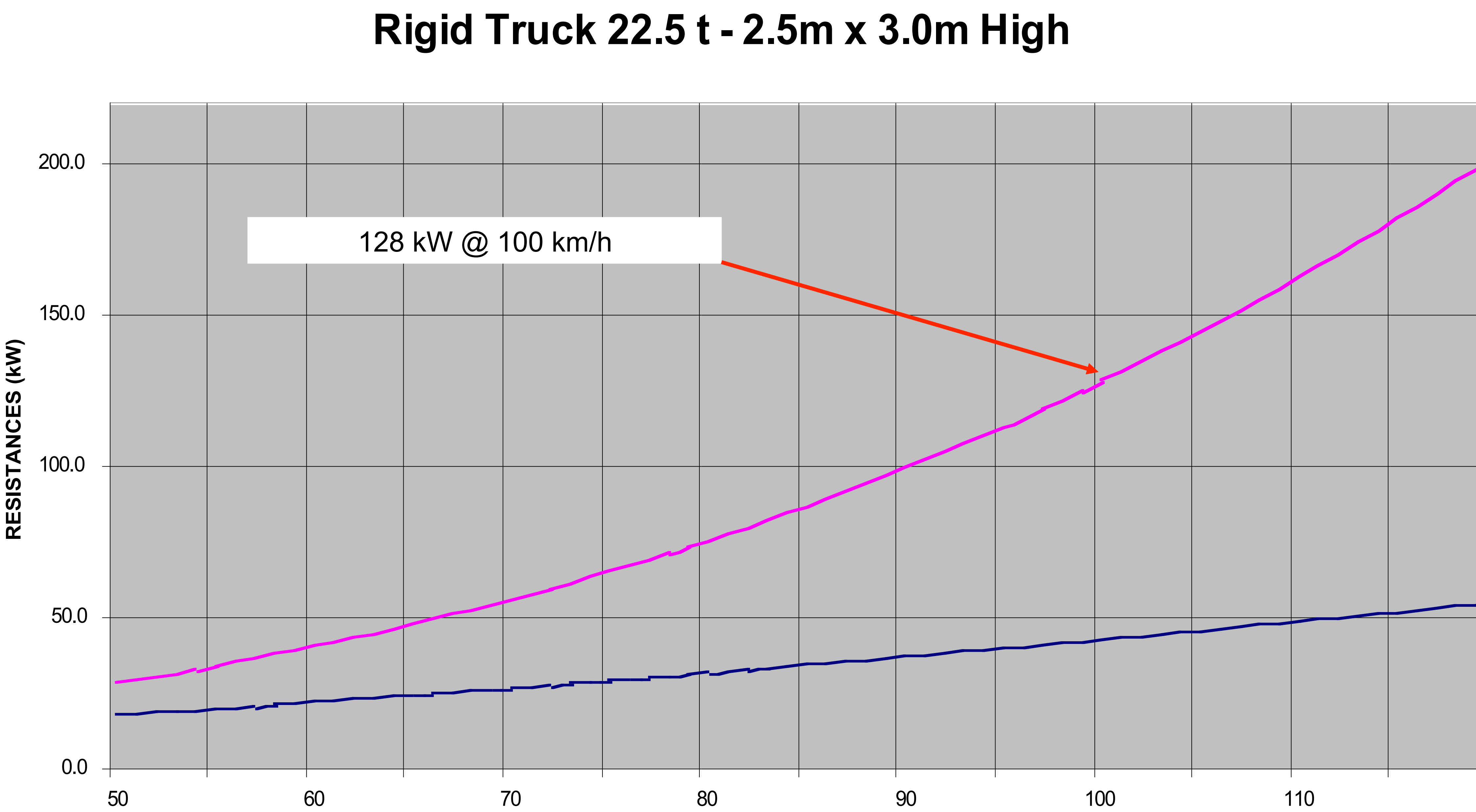
- What can the operator control?

  - **Body Type and Size**
  - **Operating speeds**
  - **Aerodynamic configuration**

Aerodynamics and You

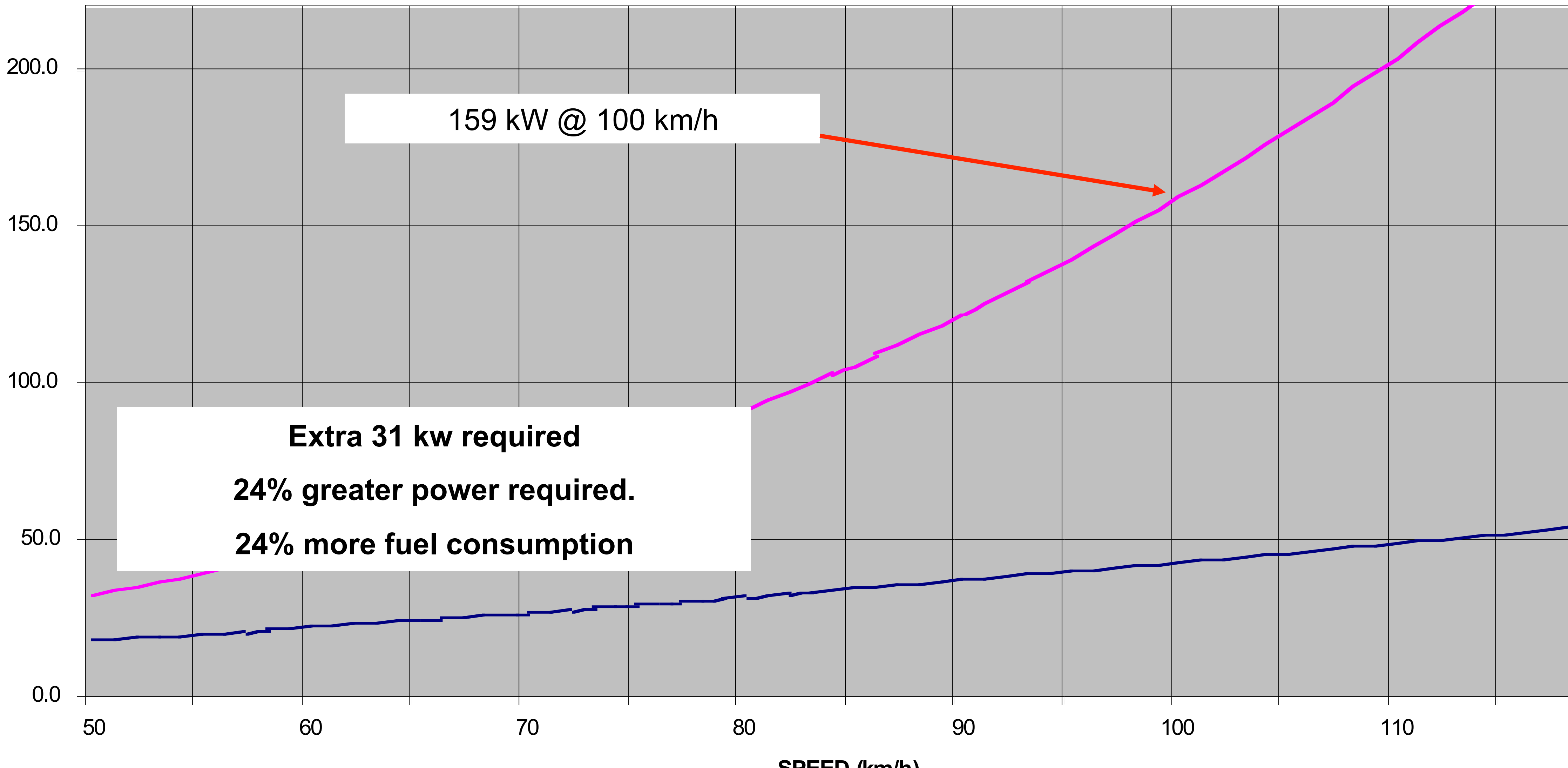
- Body Type and Location
  - What size body do you need?
  - Frontal Area has direct first order relationship to fuel consumption
- Example of same spec truck with 33% greater frontal area:

Body Size Impact



Body Size Impact

Rigid Truck 22.5 t - 2.5m x 4.0m High



Body Size Impact

- **Body Type and Location**
  - What size body do you need?
  - Frontal Area has direct first order relationship to fuel consumption
- Example of same spec truck with 33% greater frontal area:
  - 24% greater fuel consumption
- Make sure the body is no bigger than you need
  - Do you need a full height body?
  - Do you need a full width (2.5m) body?

Impact of Speed

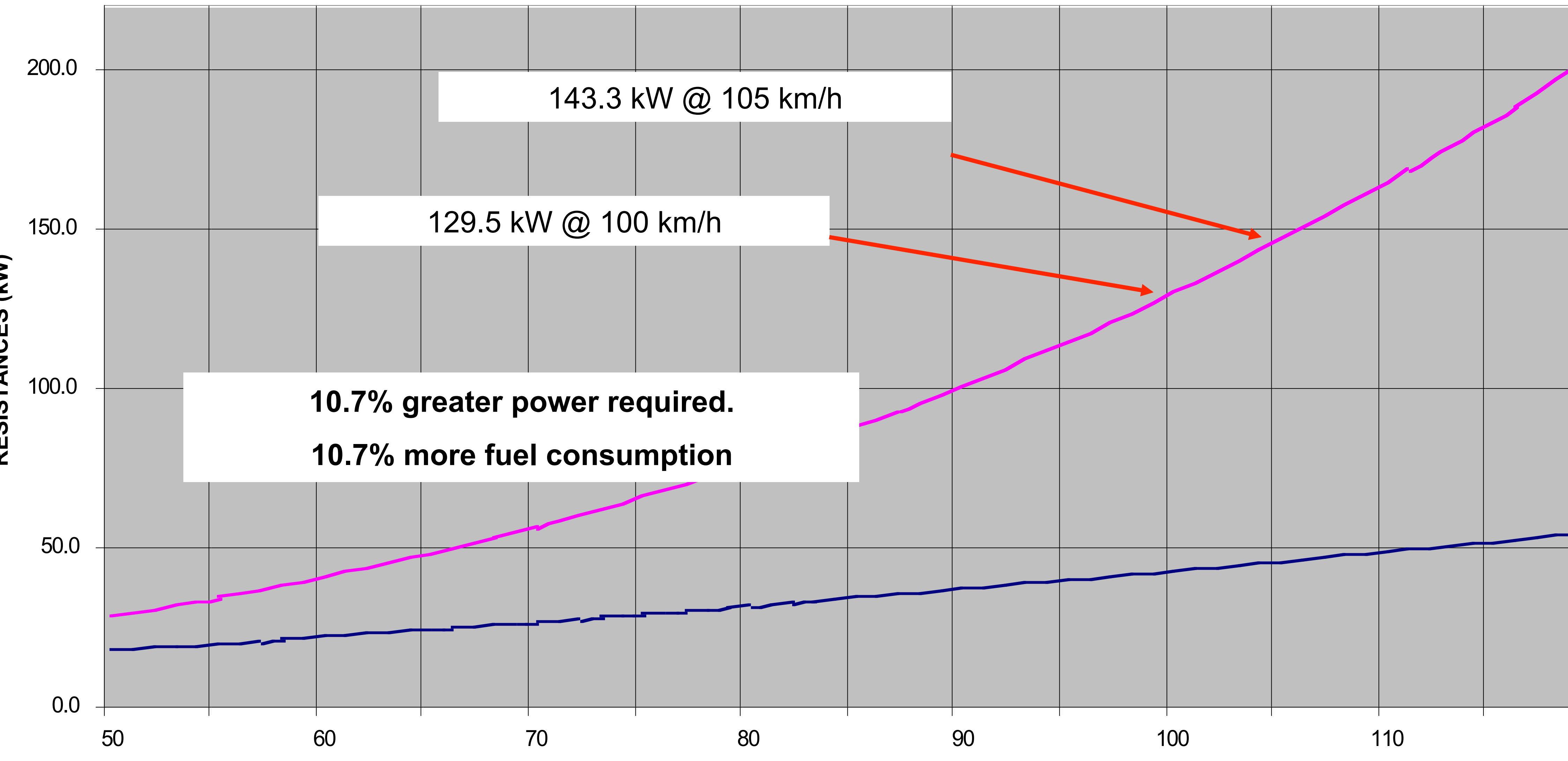
- **Operating Speeds**

Aero drag increases in proportion to speed cubed.

Drag = Cd x km/h^3

Impact of Speed

Rigid Truck 22.5 t - 2.5m x 4.0m High



Aero Efficiency

Aerodynamic Configuration
Roof Fairing and side Extenders

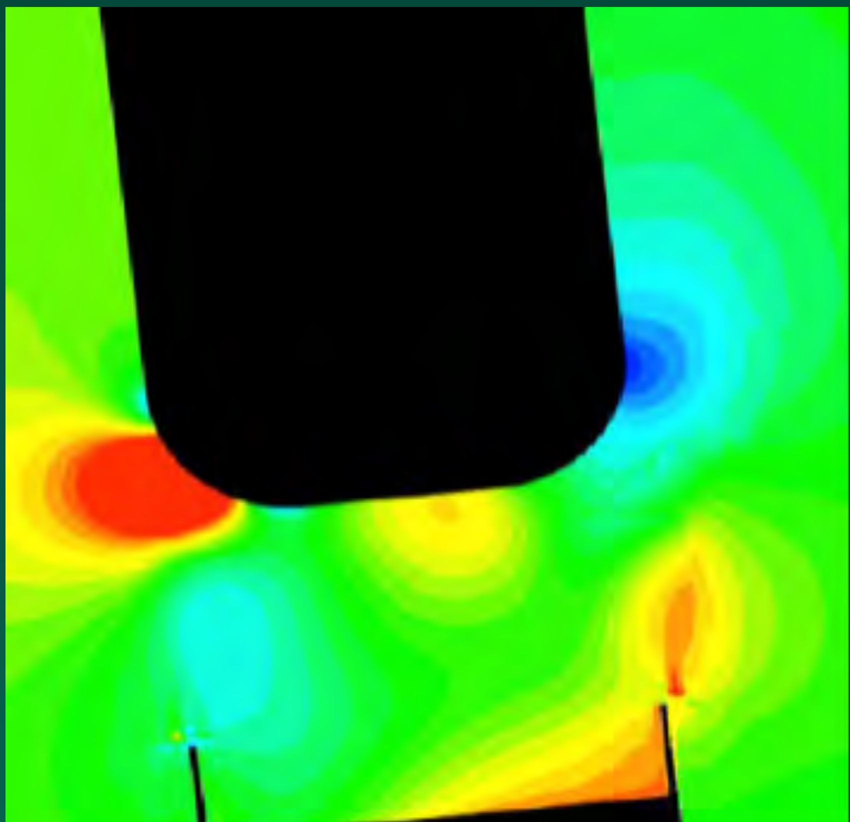
- 10 - 15% Drag Reduction

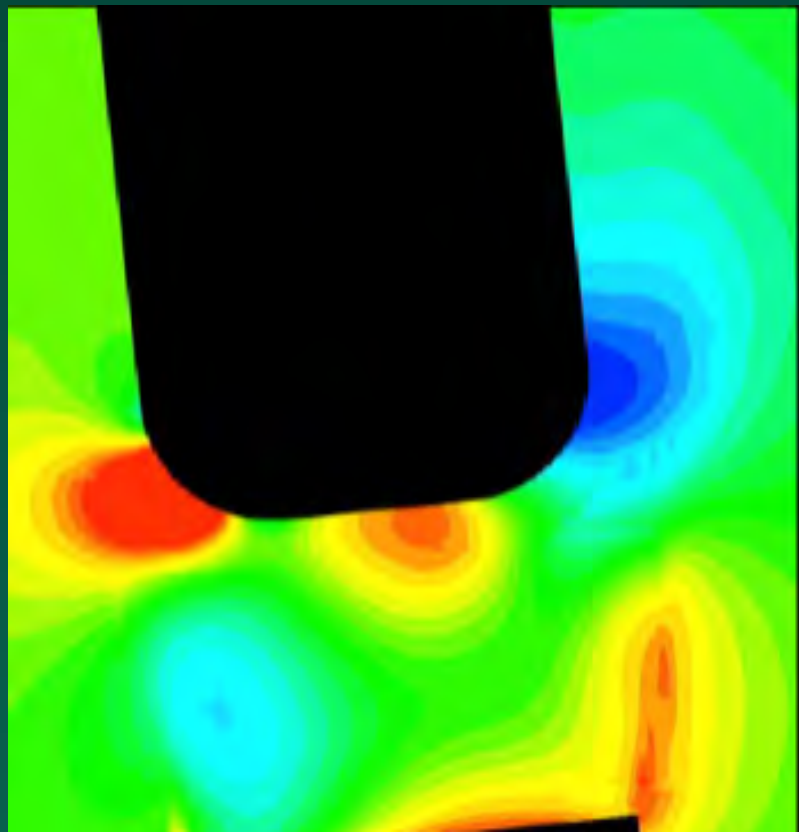
Make sure aero devices configured for trailer /body

Aero Efficiency

Additional Aerodynamic Devices

- Cab Side Extenders or Gap Seals
- Improve Cd by up to 0.03





Aero Efficiency

Body Location has same effect as trailer gap

ADR 80/00
with Vertical
Exhaust

Currrent
ADR80/03
with
Horizontal
Exhaust

Can you do more?

- ditional Aerodynamic Devices
  - Trailer or Body Skirts
  - Improve Cd by up to 0.05

Can you do more?

Additional Aerodynamic Devices

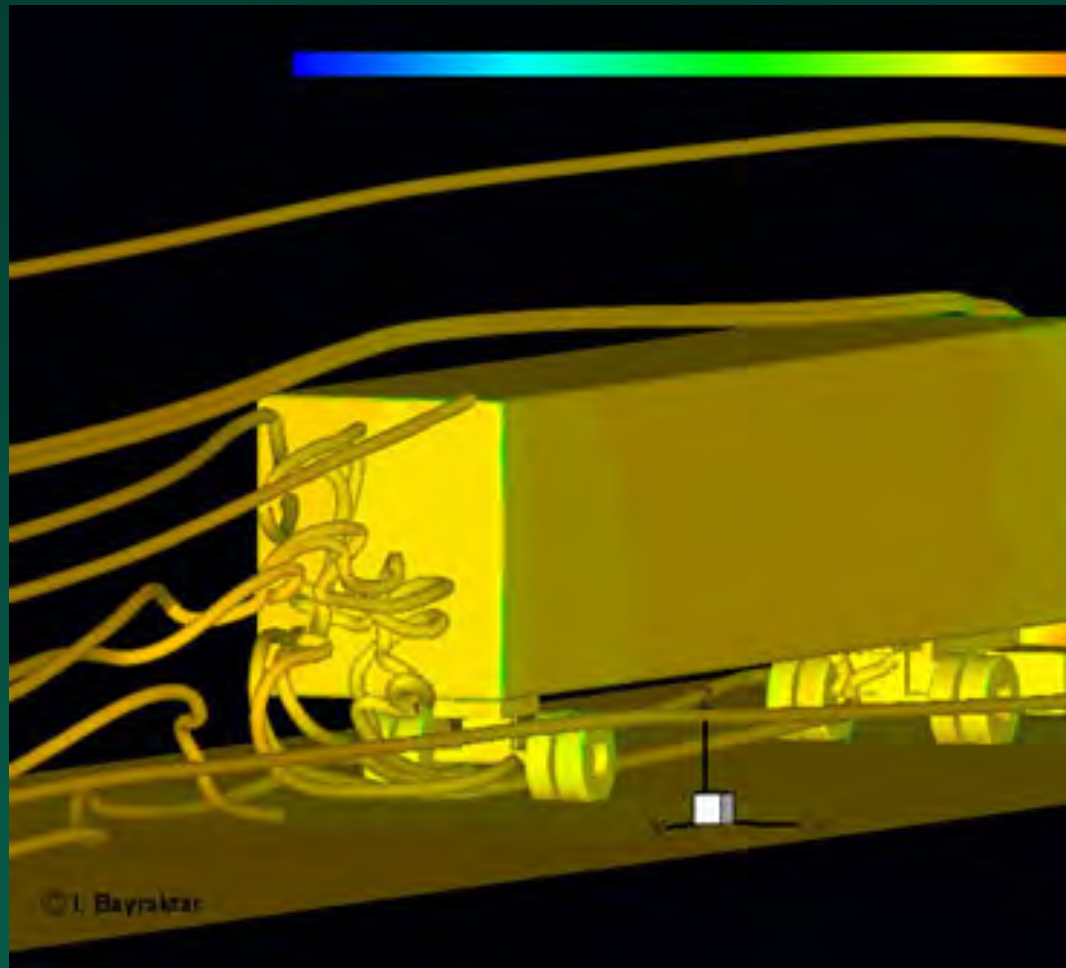
- Truck Cd is around 0.6 to 0.65
- Cd improvements of by up to 0.05 + 0.03 improves Cd by 13%
- Implies fuel consumption improvements of up to 6 – 9%

Future Developments

uture Aerodynamic Devices

Rear of trailer or body is the major source of pressure drag

Watch for developments in this area



Conclusion

- Proper aerodynamic design offers significant fuel economy improvements/
- Gains are measurable
- Gains are not affected by driver behaviour.