



Alan Sutton and Tom Ruessman Goodyear Dunlop Tyres Australia

A Tyres Life







Tyre Construction Animation



Tyre Selection

- Tyre Selection should take into account
 - Load Capacity (at maximum Aust. operating pressure of 825kPa / 120psi!)
 - Maximum Vehicle Speed
 - Wheel Size
 - Vehicle Position and Application

MUNICIPAL / URBAN

Constant stop / start Curb scuffing Low speeds Frequent cornering





MIXED SERVICE On and Off road Low Traction Prone to Damage

REGIONAL HAUL

Short -> Medium Trip Distances Mix of Highway / Suburban roads & speeds Varying road quality Some stop / start Some tight cornering



LINE HAUL

Long Trip Distances Freeway / Highway Sustained high speed





Storage / Handling

- Storage location :
 - Cool, Dry and Dark
 - Heat and light (particularly UV) promote oxidation in rubber
 - Free of Ozone generating equipment
 - AVOID: HV Electrical Equip, Elect. Motors / Generators and welders.
 - No contact with oil, grease or volatile solvents
- Stored Tyres:
 - Store tyres vertically, on the tread-face.
 If horizontal (barrel stacked), don't distort the bottom tyre.
- Handling:
 - Dropping tyres from a height (ie. mezzanine) is a OHS risk for those below and can kink tyre beads.
 - Forklift blades can damage tyre sidewalls and beads.



Wheel Maintenance

- Wheels don't last forever!
 - Inspect wheels for corrosion and cracking
 - Check stud holes for damage
 - Use gauges to measure flange or hub bore wear
 - Overheated alloy wheels are a safety hazard.
 - Distorted / weakened alloy can allow tyres to separate from wheels with explosive force.
 - Alloy wheels can be are overheated by:
 - tyres which have been run-flat
 - radiant heat from brake faults
 - Alcoa's Wheel Service Manual is an excellent source for wheel service recommendations.



Wheel Security

- Refer to "Commercial Vehicle Wheel Security", an Advisory Procedure which the Australian Trucking Association's Industry Technical Council has published
 - Key Points
 - Use matching wheel / nut / hub combinations
 - Tension wheel nuts to the correct torque using a tension wrench
 - Recheck wheel nut torque after 50-100km
- Wheel Nut retention devices
 - Positive Retaining Devices
 - Wheel Nut Indicators



Improving Uniformity and Minimising Vibration

- Mounting Tyre to Wheel Tips
 - Ensure wheel and tyre are compatible sizes
 - Lubricate the bead with an approved lube
 - Line-up red dot on tyre with low point of wheel
 - Once inflated check tyre Guide Groove Ring is concentric with wheel
- Balance
 - Dynamic Balancing off-vehicle with wheel weights results in a balanced assembly.
 - Balancing powders usually do not directly affect tyre warranty, but Goodyear and Dunlop recommend balancing with weights.



Improving Uniformity and Minimising Vibration

- Mounting Assembly on Vehicle
 - Steer Axle / Non-Dual Wheels
 - Mount on vehicle with red dot on tyre at 12 o'clock This improves on-vehicle assembly run-out
 - Dual Wheels
 - Mount red dots 'opposing'
 - If no red dots, use yellow dots



Inflation Pressure

- IS THE #1 Influence on a Tyre's Performance
 - Inflation Pressure should be set relative to Tyre Load.
 - Consult Load/Inflation tables or Tyre Manufacturer
 - Valve caps are the primary valve seal.
 - Must be fitted to all valves.
 - Inner tyres of duals are often neglected
 - Fit valve extensions, ensure they are accessible
 - Inflation Media
 - Air vs Nitrogen?
 - Pure Nitrogen will 'leak' out of tyres slower than air (Air is 80% Nitrogen / 20% Oxygen)
 - Of Primary importance is the medium is DRY, free of moisture and oil.



Inflation Pressure – What else can we do?



1. An internal regulator senses when the tire inflation pressure has dropped below the prespecified psi. The regulator then opens to allow air flow into the pumping tube.

2. As the tire rolls, the deformation of the tire flattens the tube, pushing the air through the tire to the inlet valve.

3. The air flows into the tire cavity, resulting in optimized tire pressure.



Monitoring In-Service Tyres

- Check for damage
 - Road Hazards / Impacts.
 - Exposed belts or body ply (any steel!)
 - Brake Lock-ups
 - Have damage assessed and repaired if possible
- Irregular Wear
 - Identify any unusual wear early and take corrective action
- 'Run-Flat' Tyres / Zipper Ruptures
 - Tyres which have been overloaded / underinflated may be weakened
 - Weakened tyre sidewalls can rupture when reinflated.
 - Any tyre operated at lower than 80% should be deemed a 'zipper' risk.



Maintenance - Rotation

- All vehicle positions wear differently due to many factors ie.
 - Steer Axle:
 - Steering component play differs left vs right tyre.
 - Road and axle camber
 - On a typical B-Double; 2 tyres steering the 32 trailing tyres.
 - Drive Axles:
 - Applying torque generates different wear to free rolling tyres.
 - Torque and Load Distribution is rarely equal
 - Rear tyre scrub on tandem axles.
 - Trailer Axles:
 - Tyre Scrub results in wear 30 70% faster on front and rear axles vs centre 'pivoting' axle.
 - Light brake lock ups initiate skipping and diagonal wear.
- Rotate tyres to even-up wear rates, minimise irregular wear and wear out 'sets' of tyres.



What are the odds?

- Flood affected Tyres
 - Physically damaged tyres must be scrapped
 - Undamaged tyres should be cleaned (with veg. based soap) and re-inspected
- Lightning strike or HV Powerline Contact
 - The current earths through a vehicle's tyres.
 - Heat from electric current can initiate internal tyre fires. These can smoulder for hours before igniting, resulting in explosion.
 - Specific guidelines exist, including:
 - Isolate vehicle for 24 hours
 - Some damage isn't visible, all tyres should be scrapped (including spares)
- Exposure to Fire
 - Exposure to heat rapidly deteriorates tyres internally
 - All tyres exposed to heat from a fire should be scrapped.



When is a tyre worn out?

- A fleet's removal policy should consider the roadworthy requirements as well as the tyre casing value / future use.
- To be roadworthy a tyre must:
 - Exhibit no apparent defects.
 - Have a minimum of 1.5mm of tread depth across 75% of its width.
 - Be repaired or retreaded in accordance with Aust. Standards.
- Tread designs result in patterns changing as the tyre wears.
 - Some designs can appear worn out before they actually are
 - Always use treadwear indicators to determine when tyres are worn out



Retread / Regroove

- Premium tyres are designed for more than one tread life.
 - Tyres marked 'Regroovable' can be regrooved, adding approx. 2-3mm of usable tread.
 - may increase risk of casing damage.
 - Quality casings can be retreaded, often multiple times.
 - Get maximum value from your investment; maintain your casing with the intent of using it again and again



Tyre Disposal

- Although scrap tyres have several uses;
 scrap tyres significantly outnumber the demand for them.
- An End of Life Tyre Stewardship Scheme will be introduced in 2014.
 - Developed by majority of Major tyre companies, Recyclers, and the Motor Industry
 - Approved by the ACCC and supported by all State and Federal governments
 - A tyre levy charge of ~\$1/tyre will go towards
 - R & D into new recycling technology
 - Education in sustainable tyre end-of life practices

