

How TPMS Supports Successful Retreading of OTR Tires

Introduction

For operators of Industrial and Off-the-Road (OTR) vehicles, tire costs remain one of the largest ongoing operating expenses. In sectors such as mining, construction, ports, quarrying and earthmoving, a single large OTR tire can represent a very significant investment. Because of this, many operators look to maximise tire life through retreading.

When carried out correctly, retreading offers important financial and environmental benefits. However, the success of any retreading programme depends heavily on one critical factor — the condition of the tire casing, or carcass.

If the carcass has been damaged during operation, the tire may no longer be suitable for retreading, regardless of how much tread remains. This is where a reliable Tire Pressure Monitoring System (TPMS) can play a major role in protecting tire assets and improving retread success rates.

As many fleet operators are now discovering, TPMS is not simply a safety system. It is also a valuable tool for preserving tire condition and extending total tire life.

1. What is retreading?

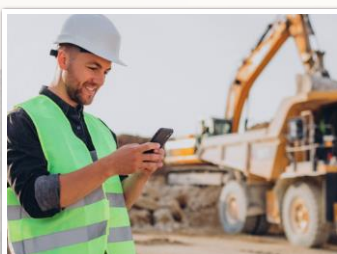
Retreading is the process of replacing the worn tread on a used tire while reusing the original casing. The worn tread is removed, the casing is inspected and repaired where appropriate, and then a new tread layer is bonded onto the tire.

In many OTR applications, the original carcass is the most valuable part of the tire. If it remains structurally sound, the tire may be retreaded multiple times depending on the application and operating conditions.

For industrial fleets, the benefits of retreading can include:

- Reduced tire replacement costs
- Reduced environmental impact
- Lower consumption of raw materials
- Improved sustainability reporting

However, retreading is only possible if the casing remains in an acceptable condition throughout its first life.



2. Why Tire Carcass damage occurs on OTR Tires

The majority of casing damage occurs long before the tire is removed from service. In many cases, the damage is internal and cannot be seen externally during routine inspections.

The most common causes include:

- Running with low tire pressure
- Excessive heat build-up
- Overloading
- High-speed operation
- Poor maintenance practices
- Impact damage

Of these, under-inflation and overheating are two of the most significant contributors to irreversible casing damage.

When a tire operates below its recommended pressure, excessive sidewall flexing occurs. This repeated flexing generates heat within the structure of the tire. Over time, this heat can weaken the bonding between components inside the casing. In severe cases, thermal separation can occur.

Once this type of internal structural damage develops, the casing may fail inspection for retreading even if the external appearance looks acceptable.

This means a potentially valuable carcass is lost permanently.

3. The link between TPMS and retreading success

A quality TPMS continuously monitors tire pressure and temperature in real time, allowing operators and fleet managers to identify issues before serious damage occurs.

Rather than relying on periodic manual pressure checks, a TPMS monitors the tire throughout the working day — precisely when problems are most likely to develop.

This is particularly important in demanding OTR applications where tires operate under heavy loads in harsh terrain conditions and with significant temperature variation.

By identifying under-inflation or abnormal temperature increases early, corrective action can be taken before permanent carcass damage occurs.

This may include:

- Re-inflating the tire to the correct pressure
- Removing the vehicle from operation temporarily
- Reducing load or speed
- Inspecting for punctures or slow leaks
- Investigating operational practices contributing to overheating

These early interventions can significantly improve the likelihood that the casing remains suitable for future retreading.

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4. Why temperature monitoring matters

Pressure monitoring alone is valuable, but accurate temperature monitoring provides an additional level of protection.

Excessive heat is one of the main enemies of tire casings. Even relatively small pressure losses can generate damaging internal temperatures if left undetected for long periods.

This is why many industrial applications benefit from using Internal Sensors rather than simple valve-mounted external sensors. Internal Sensors measure the actual air temperature inside the tire, providing a much more accurate indication of operating conditions compared to external sensors.

In sectors such as mining and earthmoving, where tires are heavily loaded and often operate continuously, temperature trends can provide early warning signs of developing problems long before visible damage occurs.

Monitoring temperature also allows fleet managers to identify operational practices that place unnecessary stress on tires, helping improve both tire longevity and overall fleet efficiency.

5. Data logging and tire management

One of the less obvious advantages of a modern TPMS is the collection of historical tire data.

With reliable data logging, fleet managers can review how a tire has been operating throughout its working life. This information can be extremely valuable when assessing tire condition and identifying recurring causes of damage.

The data may also help with:

- Predictive maintenance planning
- Identifying vehicles with recurring tire issues
- Improving operator training
- Reviewing site operating conditions
- Supporting discussions with tire suppliers
- Analysing retread performance over time

Importantly, having credible operational data can also support sustainability reporting by demonstrating improved tire life and reduced waste generation.

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6. Sustainability benefits

Extending the usable life of an OTR tire through successful retreading has a direct environmental benefit.

Manufacturing large OTR tires consumes considerable quantities of raw materials and energy. By preserving the casing and extending the total operational life of the tire, fewer new tires are required over time.

This reduction in waste and resource consumption supports wider sustainability targets across industrial operations.

As highlighted in previous TMS® Technical Bulletins, TPMS helps ensure tires are operated within their recommended parameters so that successful retreading can take place.

Conclusion

For operators of OTR vehicles, retreading is an important strategy for controlling costs and improving sustainability. However, the ability to retread a tire depends entirely on preserving the integrity of the carcass throughout its operational life.

Under-inflation, overheating and excessive tire stress can all cause irreversible internal damage long before the tire is removed from service.

A reliable TPMS helps protect against these issues by continuously monitoring tire pressure and temperature, providing early warning of developing problems and allowing timely corrective action.

In this way, TPMS not only improves safety and reduces downtime, but also helps maximise the long-term value of every tire by increasing the likelihood of successful retreading.

[Click here](#) if you would like further information or if you are interested in a free trial of the TMS® Tire Pressure Monitoring System for your industry.

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