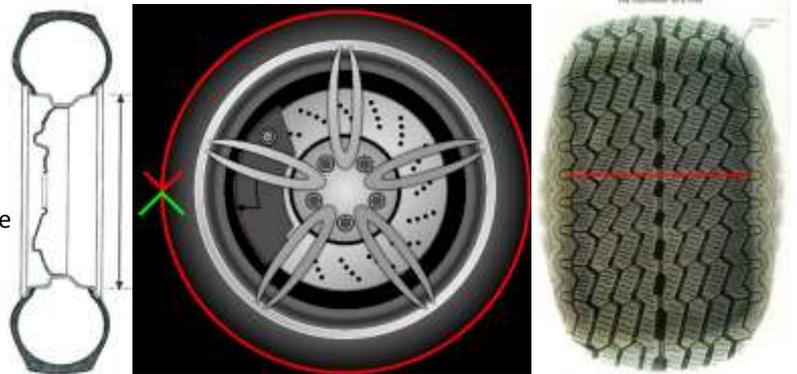


Countless queries have been raised on this top and likewise numerous claims have been repudiated by the insurer and reversed by the insurance ombudsman, where the insured has had a valid case, has prompted a review.

The combined issue of tyres, wheels, wheel alignment¹ and vehicle handling in general, is an almost endless subject where much has been written in many reputable books, and online forums². This article is not written to teach you all the finer details, however some issues are clarified. This article highlights the greater subject of the interrelated and far reaching effects that tyres in particular, however the inextricably linked issues, effect the decisions that are, or should be made on insurance claims.

Let's firstly clarify a few specifics regarding tyres so that we are all at the same page as to what specific sections of tyre we are referring to. The images alongside are a simple representation of the wheel rim and tyre from the various views. Where reference is made to the rolling circumference of the tyre, this means the total outside rolling circumference of the tyre, where this is graphically indicated alongside by the red and green arrow. The tread breadth is that of the tread breadth that would normally make contact with the road surface, this breadth is graphically indicated with the red arrow in the image alongside.



The circumference measurement of the tyre is unambiguous but breadth of the tread must be addressed as some “grey-area” is apparent. The issue of tread breadth as reference in the National Road Traffic ACT (NRTA) has been addressed and largely clarified in the judgement of *Swanepoel v Auto & General Insurance Company Limited* 2007 JDR 0004 (T), wherein the following notes are made:

“The word “breadth” used in Regulation 212(j)(i) does not mean the normal “breadth” of a tyre;”

“9.2 The word “breadth” means the areas of continuous contact between a tyre and the road;”

“The contact area which is relevant as far as the word “breadth” is concerned is the area where the tyre is in continuous contact with the road whilst travelling in its normal track;”

It is therefore important to note that if the issue of the tread breadth is to be considered, and it usually is, such as where the one side of the tread is well worn and contact patch breadth specifications of the particular tyre are called into question. On such occasions, all efforts must be made to obtain clarity by means of the comparative analysis of a brand new tyre of the exact same specification where accurate measurements are obtained from both specimens and that where possible the contact patch measurements be obtained from the manufacturer and or by analysis of the exemplar tyre on an exemplar vehicle. Despite this, the “breadth” of the contact patch of the tread can vary a few millimetres due to various factors, some of which are load and tyre pressure.

Tyre tread in general is one of those subjects that inevitably raises discussion and wide varying opinions, and is to some extent seen as a “grey area”, in fact, this is far from correct. It is a simple case of obeying the set parameters laid down by a combination of the National Road Traffic act and that of the manufacturer’s specification, if you do this correctly, you will not fall foul of the law and you’re insurance. Let’s deal with the issue chronologically and start with just what the law says. The specific act is NRTA 1996 Reg. 1999 Chapter VI, Part II (212), the following are the relevant items paraphrased:

(d) a vehicle which is equipped with a metal tyre unless the whole width of the tread of the tyre is at all times in direct contact with the surface of the road;

(e) a vehicle which is equipped with a tyre which is in such a state of disrepair or in such a condition that it may cause or is likely to cause damage to the road surface or may be or is likely to be a danger;

(f) a motor vehicle which is equipped with a pneumatic tyre of which the rubber covering is so worn or damaged that the fabric or cord used in the construction of such tyre is exposed;

(ji) which is fitted with a pneumatic tyre unless such tyre displays throughout, across its breadth and around its entire circumference, a pattern which is clearly visible, and has a tread of at least one millimetre in depth; or

¹ A general term covering the main alignment issues of Caster, Camber and Toe-in-Out and other factors

² See some of the references supplied

(Jii) which is fitted with a pneumatic tyre which contains a tyre tread depth indicator, if the tread is level with the tyre tread depth indicator

(I) a motor vehicle which is equipped with a pneumatic tyre which has a break in its fabric or which has a cut, measured in any direction on the outside of the tyre and of such depth that it reaches the cords used in the construction of such tyre, in excess of 25 millimetres or 10 per cent of the maximum width of the tyre, whichever is the greater; or

(m) a motor vehicle which is equipped with a pneumatic tyre which has a lump or bulge caused by the separation of or a partial break in its structure.

So what does this all mean in simple layman`s terms? Simply that at any given stage, the tyres of your vehicle must be in good condition, and cannot be at any level of disrepair worse than that set out by the law.

Reference is often made to the “1mm” minimum limit of tread depth, if we read “Ji” this minimum indication is clearly stipulated, and goes one step further to clarify that not only do we require a minimum of 1mm, but also that this must be a 1mm depth around its full circumference and across the tread breadth, as has been clarified above.

Note also that at “Jii” it must be noted that specific reference is made to the use of the manufacturers tread depth indicator, this therefore indicates that the manufacturer’s specification, by means of the indicator, takes precedent over the original 1mm indication as this is the specific design parameter of that tyre. However that the circumferential and across the tread breadth specification still apply. The images alongside show typical tread depth indicators on the tyre, and how tread depth is measured.

Jii also indicates that tyre tread levels may not be level with the tread depth indicator, the tread depth must be in-excess of this minimum level.

Let’s look at a few common examples. The images below show typical tyre wear to the outer and inner shoulders of the tyre. This wear is most commonly the result of incorrect wheel alignment settings, typically created where prolonged use has seen critical component wear result in improper alignment, or where impacts have caused alignment to be out. One of the more common tyre tread wear patterns that are seen, especially on modern high performance vehicles, is excessive wear of the inner shoulder as is visible in the image below.

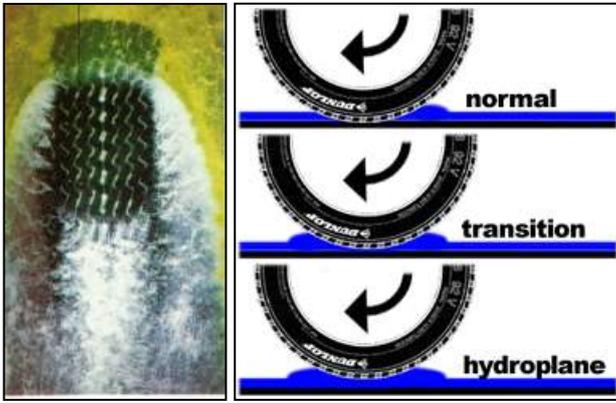


Let’s clarify why tyres need tread and why there is the 1 millimeter limit. In racing situations, “slick” tyres give the most grip, however we also see that in race situations “grooved” tyres are sometimes used. These grooves (tread patterns) are specifically designed, among other factors, to disperse water from the path of the tyre, this dispersal of water can be seen in the high speed “underside” image below. If a tyre can no longer disperse the water, the tyre begins to hydroplaning as can be seen in the images below. For similar reasons, tyre tread depth is crucial to situations of sand and gravel on the road, or during off road excursions. Whilst tread pattern and appropriate depth do not necessarily create a dispersal of the sand and gravel since these elements are not liquid, they do however assist in “digging through” the soft or loose upper surface and engaging the hard surface below, we see this in off road rally vehicles and even off-road motorcycles. Unlike racing situations, a normal road user cannot simply pit and change tyres to suit changed conditions. Racing tracks are specifically designed to be smooth and obstruction free. Tyre manufacturers find a compromise between the need for dry tyres, wet tyres and strength of tyre, resulting in the tread pattern we find on our tyres.

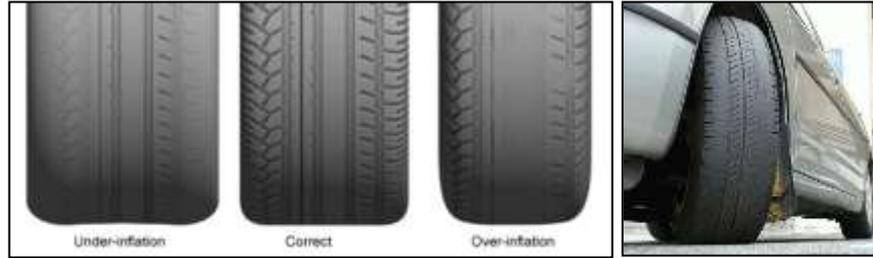
So what other factors may affect tyres? Tyre pressure (inflation) is perhaps the most common and easily detectable fault found on vehicles, and like alignment, can also lead to different types of tyre wear and can create tyre



Wear that is illegal. Although tyre pressure is not specifically addressed in the NRTA, the act requires that the Manufacturers specifications are complied with, therefore the appropriate tyre pressures need to be maintained to ensure suitable safety standards. All vehicles list the appropriate tyre pressures in the supplied specifications book, and/or usually at some position on the vehicle, as is depicted alongside.

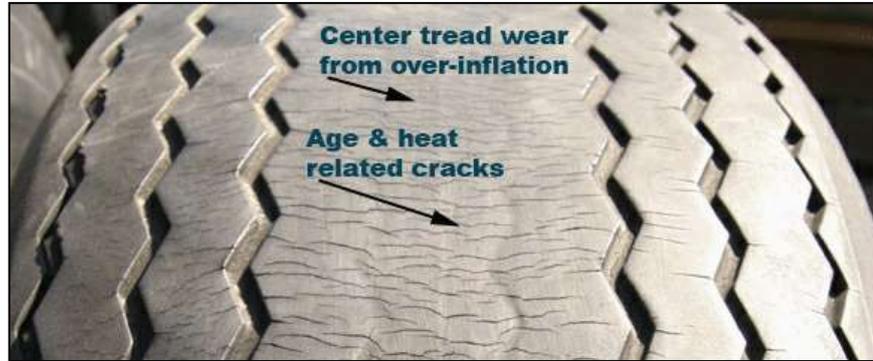


As with alignment, inappropriate tyre pressures lead to different wear patterns on Tyres. The most common of these are the under inflation and over inflation wear patterns, these are seen in the following image compared against a correctly inflated tyre.



So are all these tyres that we see in the various examples illegal?, Yes!, Why?. Well, by reviewing the set requirements of the NRTA and the associated requirements of the manufacturers as we have briefly done, it is clear that the tyres most definitely fall outside of these permissible limits.

Although thorough and specific local research appear to be lacking, the extensive international research from various other countries remains applicable to tyres universally. Local research that has been undertaken by Bridgestone SA revealed the following data for two separate test sessions undertaken in 2011:



(1) *“Bridgestone’s ongoing Tyre Safety campaign, now in its fourth year, and was conducted in the parking area of Pick n Pay’s North Cape Mall in Kimberley on June 4. Bridgestone tyre specialists checked 504 tyres over a five hour period. The pressure of each tyre was checked, and its size and any defects found were noted on a data form. Six percent of the tyres inspected were below the minimum legal tread depth of 1.6mm, compared to last year’s (2010) national average of four percent. The pressure checks revealed that only 83 percent of tyres were correctly inflated, compared to last year’s national figure of 86 percent, of the incorrectly-inflated tyres, 10 percent fell into the ‘dangerous’ category of 1.5 – 1.7 Bar. This was an increase over the seven percent of 2010. However, only seven percent of tyres fell into the ‘extremely dangerous’ category of below 1.5 Bar or above 2.9 Bar. The inspection team reported that numerous vehicles had tyres of differing sizes, manufacturers and tread patterns mixed on the same axle. One vehicle was found to have tyres of three different sizes fitted. Tyres should always be fitted to an axle in identical pairs to ensure correct road-holding and stability under braking.”*

(2) *“The survey was held on July 23rd in the parking lot of Pick n Pay’s Lambton Square Center in Germiston, Gauteng, checking the tyres of at least 100 vehicles. 1700 tyres on 425 vehicles were checked during the Germiston survey. 87 percent of the tyres surveyed found to be in good condition and correctly inflated, an improvement of one percent over last year’s (2010) national figure of 86 percent. Of the incorrectly-inflated tyres, five percent fell into the ‘dangerous’ category of being between 1.5 – 1.7 Bar, with eight percent of tyres falling into the ‘extremely dangerous’ category of below 1.5 Bar or above 2.9 Bar, higher than 2010’s result. Six percent of the tyres surveyed in Germiston were worn beyond the legal limit of 1.6mm, or were unsafe in other ways, the same as the national percentage for 2010. Having tyres of differing sizes or tread patterns can affect roadholding and braking, especially when tyres are mixed on the same axle. Feedback from the Kimberley survey indicated that this concern needed further investigation, and Lovell reported that 132 of the vehicles surveyed in Germiston (31 percent) had one or more tyres with differing tread patterns fitted”.*

Key comments and findings referenced in a comprehensive research paper undertaken by Road Safety Solutions, New South Wales, Australia, entitled *“The role of tyre pressure in vehicle safety, injury and environment”* prepared for the *“Heads of compulsory third party insurance in Australia and New Zealand - 2007”* notes:

- (6.6) *“Both over and under-inflated tyres can greatly reduce the life of a tyre and will contribute to uneven tyre wear”.*
- (10.0) *“As indicated at the outset of this report, maintaining correct inflation pressure in tyres helps keep vehicle handling and braking at its best, as well as improving fuel efficiency and tyre life. In addition it can prevent such events as tread separations and tyre blowouts which may cause loss of control of a vehicle and severe crashes such as rollovers”*

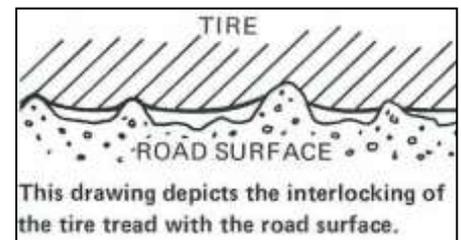
Comments from the research paper *Phenomena of Pneumatic tire Hydroplaning* compiled by Walter B Horne and Robert C Dreher of the National Aeronautics and space administration U.S.A. are as follows:

“The ground vehicle operator should reduce his speed appropriately below the vehicles hydroplaning speed on a flooded road, especially when rounding a curve or driving in traffic. The use of excessively worn patterned tread tires or smooth tread tires on air our ground vehicles on wet pavements should be avoided”

Although we have shown some common examples of tread wear, and their two main causes (alignment / pressure), it must be stressed that there are many different types and likewise reasons for general tread wear. Beyond the basic indications that different tyre designs and tyre materials may wear quicker or differently to others, incorrect wear patterns and excessive tyre wear are a direct result of two main factors, namely improper wheel alignment and tyre pressures, this is in essence improper vehicle maintenance.

So just what effect does tyre wear pattern and tread depth have on a vehicle, and how severe is it? Well, it must immediately be noted that it is extremely difficult to quantify exactly how much effect this has, but all research papers by both tyre manufacturers and impartial entities are unequivocal in their indication and acceptance, that improper tyre wear and tread depth has a negative effect on road holding.

As can be seen in the image alongside, the tyre and road interface is crucial to the appropriate control of a vehicle. Where a tyre is not making proper contact with the road surface, such as where the wheel alignment is not correct, and abnormal tyre wear is evident; or that improper tyre pressure is maintained and has resulted in improper tyre wear, these lead to the tyre not making proper contact with the road surface, and therefore improper control of the vehicle.



It is safe to say that during normal day to day driving, and in certain scenarios, even a very poorly set alignment and poorly worn tyre, and even extremely deflated tyre may not cause any undue situation with driving, however, it is when an extreme situation suddenly arises, such as a sudden downpour, a patch of loose sand or an animal running across the road that necessitates a sudden steering input, especially at speed, or even sudden and harsh braking, that these factors can, and often do result in catastrophic and even fatal results. This brings us to the two key factors that are related to the greater issue of tyre tread and tyre tread condition, namely the issues of appropriate **vehicle maintenance** and **drivers responsibility**.

As was alluded to in the foregoing text, although these issues are not always specifically dealt with in the NRTA, it is seen that by reading the minimum requirements of the NRTA and manufacturers specifications³, it is necessary that the required and appropriate maintenance must be undertaken in order to see that, at all times, the vehicle maintains the appropriate specifications as set out by these standards. It is further seen that *vehicle maintenance* and *drivers responsibility* are absolute conditions to maintain the vehicles level of roadworthiness and thereby reduce the risk of failure and/or accident.

Various references are made in decided case to the reasonable requirement of maintenance of a vehicle so as to avoid unnecessary dangers; of particular interest are the following comments set out at page 111, 5.2.4 Mechanical Defects – Isaacs and Leveson – The Law Of Collisions in South Africa – H B Kloppers:

“A driver cannot rely on sudden emergency if he was aware of the mechanical defect in his motor vehicle, which gave rise to the occurrence of the emergency. If a sudden emergency arises as a result of a sudden mechanical defect or failure and the driver new of the defect or could reasonably have had knowledge thereof by the exercise of reasonable care, he/she will be found to be negligent...”

Further, the following quoted from Cooper, pg 80 (3) Roadworthiness of vehicles:

“A driver is under a duty to maintain his vehicle in a roadworthy condition and, if need be, inspect the vehicle operated by him.”

This raises many questions, perhaps the most pertinent of all is the issue of a poorly worn tyre. Let’s assume a tyres tread depth is measured and found to be below the legal tread depth on the inner shoulder as we see at the “inner shoulder” and “outer shoulder” images above, does this constitute being a “mechanical defect”?, as referred to in Kloppers, or and oversight in a drivers duty to inspect, as indicated in Cooper. In the writer’s opinion, “absolutely!”. Surely any reasonable assessment must assume the same where It is common knowledge that the entire system of control of a vehicle is reliant on the appropriate tyre to road surface interface, namely the extremely small contact patch, like the patch we see in the image alongside, typically around the size of one’s flat hand.



The current vehicle driver training system is that of the K53⁴, and includes the “around vehicle check”. This in itself serves as confirmation of the wise indications of both Kloppers and Coopers. In reality it is neither reasonable nor always possible for a driver to check a vehicle every time one leaves or enters the vehicle.

³ This includes the South African National Standards (<https://www.sabs.co.za/index.php?page=standards>) and others

⁴ See references – in particular (K53 pre-trip inspection – exterior)

However, it is reasonable to expect that a driver does the simple vehicle check, which includes tyre observation, each day before leaving for the first time, or as a minimum a once a week thorough check. Comments from the Goodyear Product Manager⁵, Mr Robert Harris bears testimony:

“Drivers often forget that only correctly inflated tyres can do their job properly, delivering the right level of handling performance. Our comprehensive tyre tests show that under- and also over-inflation can have a significant impact on the car’s overall driving behaviour and its stopping distance.”

If an inappropriate wear pattern is evident, as is seen in the examples referenced above, it is clear that the ideal braking and steering control of the vehicle has to be compromised; let’s put all of the above in perspective;

- 1 Both the National road traffic act, and manufacturer’s specification give clear indication of the minimum requirements of maintenance levels of vehicles, and in specific tyres
- 2 It is clear that the driver and or owner must both monitor and maintain his vehicle in order to ensure the requirements of the act are maintained.
- 3 Although the short term effect of improper tire pressure and alignment on simple daily driving may not be evident or take effect; the long term neglect that is often prevalent creates a circumstance that, when faced with a sudden situation, can and often does lead to disastrous and even fatal results.

The requirements of an insured by their insurance company are set out in their insurance policy; so just what does the insurance policy say and require? Policies are typically worded generically, to date I have never seen a policy that deals with any vehicle maintenance issues in specific form. The following are examples of the generic wording, gleaned from actual policy documents:

(1) *“Exclusions: ... and/or violation of any other road traffic laws the insured vehicle will be properly serviced and maintained according to the manufacturers specifications by an appropriate qualified and accredited repairer....tyres of the insured vehicle will be immediately replaced when the tread is worn below the legal minimum the policyholder acknowledges that failure to honour the above warranties will result in immediate cessation of accidental write-off cover in terms of this policy does not cover any claim arising whilst consciously acting in violation of any south African law.*

(2) *“ We do not indemnify you for:*

Vehicle not roadworthy

When the vehicle or the caravan or trailer that it tows is involved in an accident, and when it is not in a roadworthy condition as is defined in the legislation relating to roadworthiness, or when the law or traffic regulations do not allow towing.”

A typical argument raised by the insured is that the tyre wear has been caused by the poor condition of the roads, and especially potholes. Although this may well have been a contributing factor, this does not excuse the main cause of the tyre wearing being lack of **vehicle maintenance** and as has been highlighted, that this is the **driver’s responsibility**. Making use of poor condition roads, and especially where a driver sees that there are potholes, and may even be aware that they have struck a pothole, simply highlights the responsibility of the driver to monitor and/or maintain.

Interestingly, I have come across some policies that do not stipulate at all, that your vehicle needs to be kept roadworthy, or in appropriate condition. Although this could be construed as being “in the insured’s favour” and perhaps an oversight by the insurer, it must also be remembered that it is likely that a court will generally accept that there is an inherent and logical requirement of the owner and operator of a vehicle to maintain a vehicle to appropriate standards, as has been indicated by Cooper.

So what does this conclude? In reality, and as has been suggested by the findings of the local Bridgestone studies, and likewise international findings, lack or maintenance on vehicles, and here we are specifically referring to wheel alignment and tyre pressure, can and does lead to un-roadworthy tyres and therefore by implication, the vehicle as a whole. Although the specific quantification of the level of danger this poses is proportional to certain interrelated factors; vehicle control is most definitely compromised.

Insurers and likewise the Ombudsman, need to be far more stringent in their analysis of “tyre tread condition” matters, remembering that the condition of the tyre does not simply suggest that “the tyre is worn but still driveable”, but also that the vehicle handling, braking and even risk of tyre failure is unequivocally effected. Where the insurer or the Ombudsman is uncertain, especially as this issue can be of quite technical nature, consultation with a specialist must be undertaken.

⁵ 15 December 2010 press release – Goodyear / online article 29April 2011

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www.acts.co.za (National Road Traffic Act)

This article peer reviewed by: Mr Rob Fletcher (B.Sc (Mech. Eng / MBL), Mr Charles Levy