

Planned obsolescence is not inevitable

Environmental and social impacts related
to the general removal of tires at 3 mm
tread depth across the European Union

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Foreword



Éric Mugnier
EY Partner
*Sustainable Performance
& Transformation*

“The global economy is shifting rapidly. This evolution comes with new modes of use that must be reinforced with regulations that support innovation and sustainability.”

Companies need a regulatory framework tailored to these new development imperatives: sustainability and support to innovation. The European Union is a prominent player when it comes to implementing tomorrow's standards.

With this new report, we hope to contribute to the accompaniment of sustainable production and consumption modes through an even more circular economy. Based on impact assessment calculations, we show the necessity to maintain the current regulation while proposing a more comprehensive support to long-term performance.

This reflection is important because it anticipates what tomorrow's virtuous globalization might be: looking for virtuous innovation for the environment as well as improving performance at the service of the user.



Jean Todt
Chairman of the International
Automobile Federation

“The time for compromises has passed: the automotive sector must imperatively combine safety, economic efficiency and protection of the environment.”

Tires are a little-known but key example in terms of mobility: as the only point of contact between the road and the vehicle, they ensure safety and play a key role in the reduction of CO₂ emissions. Today, technologies enabling manufacturers to offer safe and efficient products throughout their lifetimes exist.

Fighting against the planned obsolescence of tires and offering long-term performance products represent a saving for motorists and a reduction in raw materials consumption. It is also a commitment towards a more sustainable and safe mobility. The present report highlights the cost of inaction: standing for more sustainable products, in the framework of a circular economy, is essential to ensure the future of the automotive industry.



SUMMARY

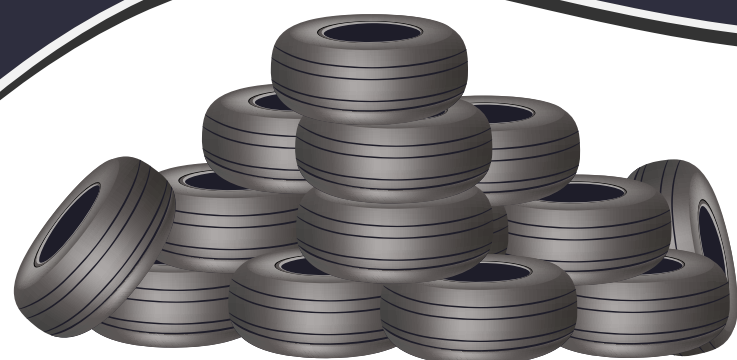
The road would be safer if tires were tested at the legal tread depth threshold...



"BUSINESS AS USUAL" SCENARIO

Continued encouragement of an anticipated tire removal ahead of the legal threshold

- ▶ Significant extra cost for society
- ▶ Reduced purchasing power for motorists
- ▶ Significant environmental impact
- ▶ Cause of planned obsolescence





“PERFORMANCE OVER TIME” SCENARIO

Testing of tires at their end of life to guarantee performance up to the regulatory threshold (1.6 mm) and to reassure motorists

- ▶ Reduction of the average vehicle braking distance
- ▶ Economic gain for society
- ▶ Increased purchasing power of motorists
- ▶ Environmental benefits
- ▶ Innovation boost towards long-term performance tires in line with a transition toward a circular economy



A WELL-ESTABLISHED REGULATION

Tire tread depth has been subject to a uniform regulation worldwide for a long time

Tire tread depth, a critical factor for grip performance

The first automobile tire was designed in 1895. Today more than one billion units are sold each year. A key player in mobility, at the road-vehicle interface, it is the only guarantee of adherence whatever the conditions encountered (road condition, speed, driving on wet ground, etc.).

Driving on wet ground in particular presents a risk of loss of grip and therefore of control of the vehicle depending on the speed and characteristics of the tires.

Tire design, tread pattern and rubber compounds are thus optimized to ensure the tire remains firmly in contact with the ground while evacuating the water and ensuring maximum grip.

Treads need a minimal depth to properly play this "drainage" role. For this reason, several States have adopted binding regulations requiring vehicles in use to be equipped with tires with a tread depth of at least 1.6 mm.

Minimum tire tread depth is therefore regulated.

This regulation has been homogeneous worldwide at 1.6 mm or less for decades



A European directive of 1989 requires Member States to ensure that the tires of vehicles have a tread depth of at least 1.6 mm¹.



42 states have adopted a 1.6 mm regulation. Two states have a less stringent regulation, the remaining six having none.



Japan, Canada, China, India, Indonesia, Thailand and Brazil have also adopted a 1.6 mm regulation.



BUT A PREMATURE REMOVAL IS PROMOTED

In practice, European drivers are encouraged by some stakeholders of the tire industry to remove their tires before the legal threshold

Drivers do not have all the necessary information

In the absence of a guarantee on the performance of tires all throughout their lifetime, motorists are faced with two unsatisfactory choices: waiting for the tread depth to reach 1.6 mm with the risk that their performance is not satisfactory or preventively removing tires before 1.6 mm with the risk of spending more and generating considerable environmental impacts.

This allows some players of the tire industry to encourage early replacement

Some players of the tire sector (distributors, manufacturers and trade associations) indeed encourage motorists to remove their tires at 3 mm tread depth well before the legal limit.

Within the European Union, half of the tires are replaced at 3 mm

A study published in 2014 in the peer-reviewed journal *Tire Science and Technology* reveals that the average and median tread depths of tires in European landfills are 3.1 and 3 mm respectively².

Extrapolating results of this study to all European landfills, it means that **one removed tire out of two in the European Union has a tread depth of more than 3 mm.**

SEEN IN THE PRESS

« [redacted] recommends a minimum tyre tread depth of 3 mm. Not sure about your tread depths? We can check them for FREE! »

« The legal wear limit has to be increased urgently. Changing the four tires as soon as there is only 3 mm of tread depth left - or if it is more than 4 years old - will not please our wallet. But the verdict is final. When the width exceeds 205 mm, it is a question of safety on wet road. And the ESP (braking system), which can only be effective if the tires are, will not save you.»

« For your safety, [redacted] recommends you replace any tire having a tread depth of 3mm or less. »



WITHOUT CONCLUSIVE EVIDENCE OF REDUCED ACCIDENTOLOGY

Accident data does not conclusively support a regulatory change from 1.6 to 3 mm

This practice could even prove to be counter-productive in terms of accidentology

The prospect of a more frequent tire renewal is likely to encourage motorists who have opted for high quality, long-term performance tires to choose lower-priced tires of lower quality and whose performance rapidly deteriorates over time.

Yet, tires of lesser quality at 3 mm might have a longer braking distance than high quality tires at 1.6 mm.

The average braking distance of the European vehicle fleet would then deteriorate.

Results on accidentology have so far not isolated the effect of an increase in tread depth with a change in accidentology².

In addition, analyses which were based in particular on statistical correlations between change in tread depth and accidentology concluded not to recommend a change of regulation from 1.6 to 3 mm on the ground that advantages of such a change would be more than offset by their costs.

Rather, cost-benefit analyses favour the deployment of awareness campaigns on the existing regulation^{ibid}.

Generalized removal at 3 mm

Possible scenario

More frequent replacement of tires



The share of low quality tires rises at the expense of high quality ones



Purchased tires are less performing over time



Average braking distance deteriorates



“The accident data used in the current study however indicates no benefit in terms of reducing the number of accidents by increasing the minimum tread depth [...] The results of the study suggest that 1.6 mm could be a suitable level based on existing national legislation in member states.”

TNO Report for the European Commission, Study on Some Safety-Related Aspects of Tyre Use, 2014

“In case of an increase of the minimum tread depth, tires have to be replaced more often. The resulting **increase in costs** can lead vehicle owners to not invest in tires with a long-term performance due to budget constraints. If tires with a short-term performance are preferred due to cost considerations this **will negatively impact driving and traffic safety.**”

Quotation from Prof. Dr. Lars Hannawald, VUFO, newsletter from February 16th, 2017, translated from German.

VUFO is a Research Institute on Traffic Accidents, specialist in road accidents for more than 13 years.

SIGNIFICANT IMPACTS ON THE ENVIRONMENT

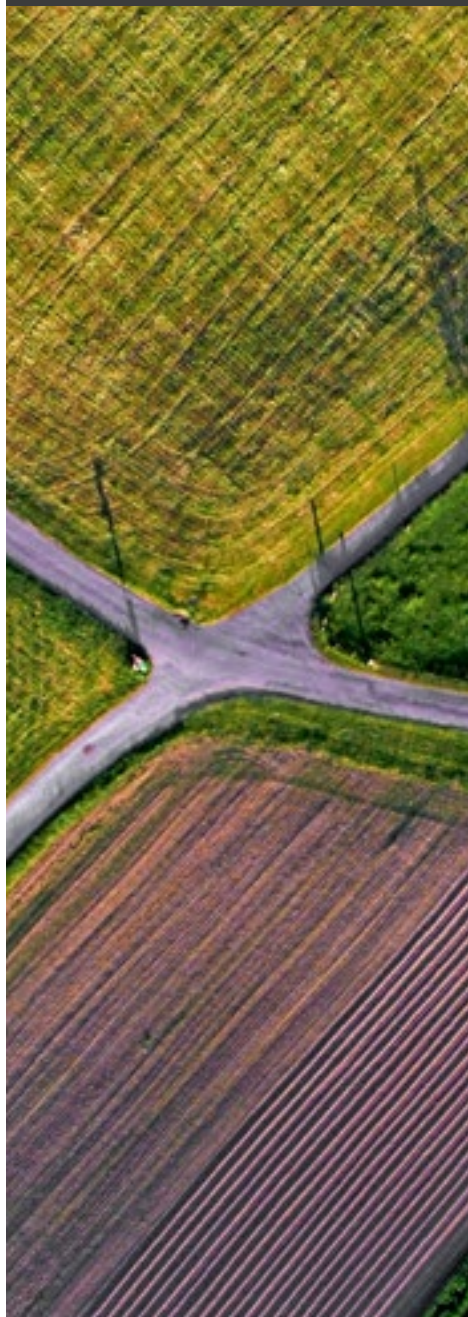
Impacts of the generalization of the removal of passenger car tires before the legal threshold across the European Union would be significant from an environmental point of view

Removing tires at 3 mm instead of 1.6 would have a significant impact on the environment going against the current collective awareness to respond to the urgency of both the global climate situation and depletion of non-renewable resources.

Related environmental impacts would be of two types:

- ▶ Direct impacts (related to the manufacturing of tires): depletion of non-renewable resources, exploitation of renewable resources, production of waste and greenhouse gas emissions
- ▶ Indirect impacts (related to the fuel consumption of the vehicle): greenhouse gas emissions

The following results are the comparison between tire removal at 1.6 mm and tire removal at 3 mm on the whole of the European Union car fleet over a year



+ 35% waste generation and raw material consumption



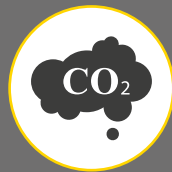
Shifting to a generalized removal at 3 mm would involve a more frequent turnover of tires which would result in a 35% increase in raw material consumption and waste generation associated with tire manufacturing in Europe over one year.

This is equivalent to an annual overconsumption of raw material and an annual overproduction of waste of more than 1 million tons, which is equivalent to the weight of 100 Eiffel Towers.



- 5,700 hectares

The impact on deforestation would result in the destruction of 5,700 hectares of primary forest per year, a surface equivalent to more than 7,800 football fields.



+ 6,600,000 tCO₂ eq

This is equivalent to the emissions of a European country such as Latvia. These greenhouse gas emissions come on the one hand from emissions generated by the extraction of raw materials and the manufacture of tires and on the other hand from the fuel overconsumption of vehicles. Indeed, the work of the tire

when in contact with the road causes a dissipation of energy and thus requires an increased fuel consumption of the vehicle to compensate for it. This rolling resistance of the tire however decreases with its wear therefore reducing the associated fuel consumption.



+ 32,800 GWh

The amount of primary energy consumed for the overproduction of tires for the entire European fleet would be equivalent to the annual production of more than two third-generation nuclear reactors (EPR).



For society



€289M
due to an
overconsumption
of raw materials



€178M
due to additional
greenhouse gas
emissions



€164M
due to the additional
generation of waste



€4M
due to the
overconsumption
of energy

A SIGNIFICANT ADDITIONAL COST FOR SOCIETY

Global extra cost would amount to €636m

Monetization allows - by means of economic science techniques - to establish the cost of certain negative externalities caused throughout the life cycle of the tire.

The monetization of direct and indirect environmental impacts shows an overall increase for society of **€636 million every year**.

This global cost is equivalent to more than twice the annual budget of the European Environment and Climate Program (the LIFE+ program has a €300m allocation per annum).

This budget constitutes one of the main tools of the European political action to improve environmental management and to protect and restore biodiversity. Thanks to this annual budget of €300m, the LIFE+ program supports, for example, a series of actions to improve the information of European citizens in support of sustainable development.

Administrations of Member States, local authorities, universities, non-governmental organizations, associations and international organizations work closely together in this program.

It is important to note that these calculations are conservative insofar as only a part of the negative externalities has been considered.

Finally, a collateral effect of a generalized removal of tires at 3 mm would be to favour cheaper and less efficient tires, most often produced outside the European Union, thus deteriorating:

- ▶ The trade balance of the European Union
- ▶ The competitiveness of the European tire industry, which depends to a large extent on the sales of long-term performance tires

Moreover, this would lead to an increase in the European Union's dependence on imports of finished products.



Every year, the cost would amount to **€800 million** for motorists of the European Union because of fuel over-consumption (itself linked to less wear of the tires and therefore to a higher rolling resistance) and **€6.1 billion** for the additional cost of purchasing more tires, equivalent to the cost of building 100 km of highway with interchanges and bridges.

A REDUCED PURCHASING POWER FOR MOTORISTS



The surcharge for drivers would amount to €6.9bn

Beyond the economic impact for the European Union in the broad sense, removing tires at 3 mm would also result in an increase in the share of constrained expenditure in the household budget.

This would mean purchasing two additional new tires per vehicle every five years.

In other words, this would be equivalent to a 40% increase in the tire budget for the same distance travelled and the same tire range. Indeed, early removal leads to a more frequent purchase for equal use.

For motorists

-  **Increased fuel consumption**
-  **Increase in tire consumption**



FIGHTING AGAINST PLANNED OBSOLESCENCE, ACTING FOR A CIRCULAR ECONOMY

Fighting against the planned obsolescence of tires is part of the on-going transition of the mobility sector towards a circular and the “product as a service” economy

Planned obsolescence is a key element of the “disposable culture” which encourages consumers to replace their products with new ones even though they are still functional.

In contrast to this model, the circular economy postulates “the lengthening of the life cycle of products” (which is even included in the French Environmental Code) and incorporates the principle according to which “products and materials shall retain their value for as long as possible”.

In December 2015, the European Commission adopted the Circular Economy package, which aims to make the European economy a resource-efficient one.

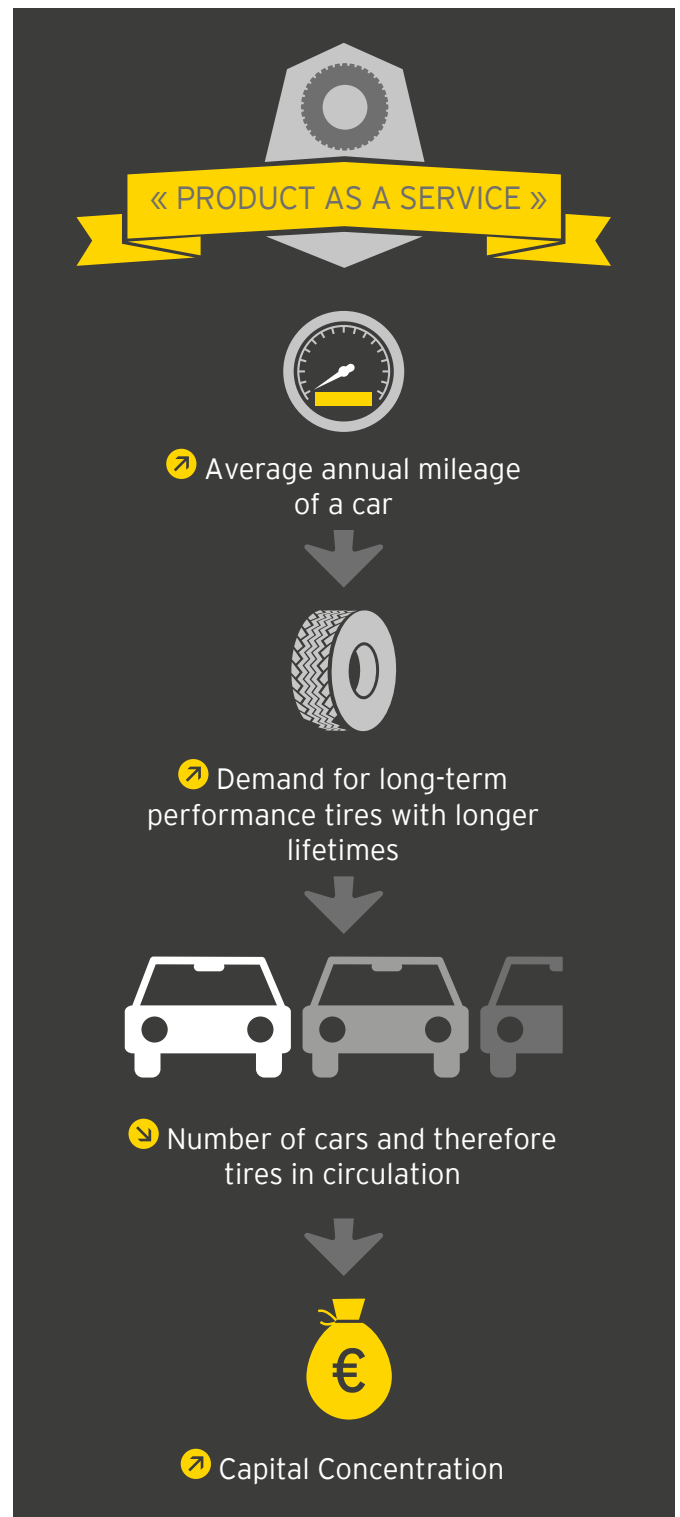
Applied to tires, this concept is reflected in particular in the use, during the design phase, of technologies allowing a high level of performance throughout the lifetime of the tire, up to the legal threshold of wear.

Thanks to the development of R&D in the tire industry, several technologies are now available; numerous examples of tires on the market prove it. This is why, while technologies have never been as advanced as they are today, recommending a premature removal of tires, even if they haven't reached the limit of wear defined by the regulation and still perform adequately, is akin to a form of planned obsolescence.

This practice is also the opposite of current trends to support the transition to a circular economy based on functionality

The new technologies currently being developed and deployed coupled with the evolution of business models focused on the consumption of a use rather than a product support a profound mutation of the mobility sector: autonomous vehicles, shared mobility, connected objects, etc.

These profound changes encourage companies to switch to business models in which they remain owners of the good, selling only its use, and having therefore an interest in increasing its performance rather than the frequency of its renewal.



Planned obsolescence is recognized as an offense in France

“I- Planned obsolescence is defined as all the techniques by which a marketer aims deliberately to reduce the lifetime of a product in order to increase the replacement rate.

II- Planned obsolescence is punishable by two years imprisonment and a fine of €300,000. “

Extract from article L.213-4-1 of the Consumer Code in France



MEANS EXIST TO FIGHT AGAINST PLANNED OBSOLESCENCE

To achieve it, these operational recommendations could be followed

If a premature removal of tires at 3 mm is favourable to stakeholders of the linear economy, based on the culture of disposability, it is less so for manufacturers investing in research and innovation who develop services offerings inscribing performance over time as an end, in line with the challenges of our time. The following measures would encourage these manufacturers.

1. No longer testing the wet grip at the beginning of the tire lifetime, as is currently the case, but at the tire minimum legal tread depth: 1.6 mm.

The performance of some tires drops quickly while others maintain performance through their various stages of wear so that a 1.6 mm tire can brake more effectively than a tire at 3 mm.

Measuring the wet grip of tires at the beginning of their lifetime does not guarantee a performance over time. Doing so at the end of life would, however, guarantee a performance over time.

2. Implementing an eco-modulation tax scheme via the Extended Producer Responsibility (EPR) framework

Within certain national regulations, certain sectors are subject to the obligation to set up an eco-modulation tax scheme. For example, part of the tax paid in France on WEEE (Waste Electrical and Electronic Equipment) is modulated according to the characteristics of these products. This incentive is not yet in place for tires. It would however prompt manufacturers to innovate for sustainability and would draw consumer attention to the challenges of resource management.



METHODOLOGICAL NOTE

Main assumptions used for calculating environmental and economic impacts

Scope of the study

The “Europe” scope covers the European Union (28 members states) and includes commercial vehicles and light commercial vehicles. Calculations are based on data collected for the year 2015, with exceptions.

Modelling of environmental impacts

The quantification of the various environmental impacts presented in this report (contribution to climate change, consumption of resources and energy) is based on LCA calculations (“Life Cycle Analysis”) carried out by Michelin in 2015.

The characteristics of the standard tire considered in the study are based on a number of recognized European and global sources, including the IEA Mobility Model (MoMo) for tire rolling resistance or ETRMA reports for the tire lifetime.

The contribution to climate change has been modelled using emission factors of the Ecoinvent database for the raw material extraction and tire manufacturing steps and of the CONCAWE database (European Commission) for fuel consumption.

Impacts on deforestation have been estimated from the rubber industry in Thailand, the main producer of natural rubber, accounting for 37% of global production in 2015. It is estimated that 12% of natural rubber produced in Thailand is cultivated in deforested areas. Deforestation for the use of tires was therefore calculated by applying this ratio of 12% to the carbon deficit per hectare associated with the production of a tire.

Dust generation due to tire wear during use phase was not considered in this study as the replacement of a worn tire with a brand-new one does not affect the amount of dust produced.

Modelling of economic impacts

The additional cost incurred for the driver was calculated on the basis of an average price estimated on the basis of Michelin’s 2015 sales data in Europe and on the basis of an average fuel price derived from the European Energy Agency. The additional cost incurred for the society at large was obtained through the monetization of environmental impacts.

The economic impact of over-consumption of resources (including energy) and negative externalities generated by increased waste production was calculated using the Ecocosts^{3,4,5} methodology, developed by the Delft University of Technology.

In the specific case of energy over-consumption, the Ecocosts of coal was considered for the whole of fossil energy consumption, which places the study in a conservative approach, given that the cost of coal is significantly lower than that of other fossil fuels.

The economic impact of climate change was calculated on the basis of a price per tonne of CO₂ fixed at €27, consistent with the “social cost of carbon” defined by the US Environmental Protection Agency (EPA) which reflects the damage caused in the future by the emission of one tonne of CO₂ today.

Limits

Emissions of air pollutants other than greenhouse gases - nitrogen and sulphur oxides, dust generated by abrasion of tires during use, etc. - have not been evaluated and therefore monetized.

Tax revenues from an increase in tire sales were also not considered.

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Contacts



Éric Mugnier

EY Partner

eric.mugnier@fr.ey.com

+33 1 46 93 78 15



Olivier Baboulet

Manager, Expert in measuring socio-economic and environmental impacts

olivier.baboulet@fr.ey.com

+33 7 78 84 28 65