

Discussion paper

Advanced studded tire technology and road wear

Alaska State Legislature
Transport Committee
Hearing 23rd Feb, 2017.

Ref. Act relating to fees for the sale or installation of studded tires

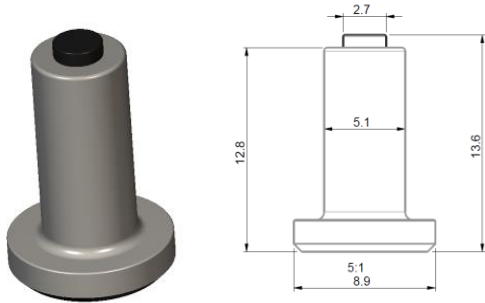
Summary

Nokian Tyres, Inc. wishes to bring to discussion some facts regarding the proposed "Act relating to fees for the sale or installation of studded tires." **Nokian Tyres supports the original version of the bill (SB0050A) but disagrees with the amendment (SB0050B). The amended version does not take into account the following issues:**

1. Modern studded tires can reduce road wear by 60–75 % compared to the most commonly used studded tires on Alaskan roads.
2. The amended version of the bill would effectively lead to a situation where consumers would not be able to buy studded tires in Alaska in the future.
3. In icy conditions, modern studded tires clearly perform better than non-studded winter tires. Also, the overall performance of studded tires has been consistently better over 25 years in independent magazine tests.

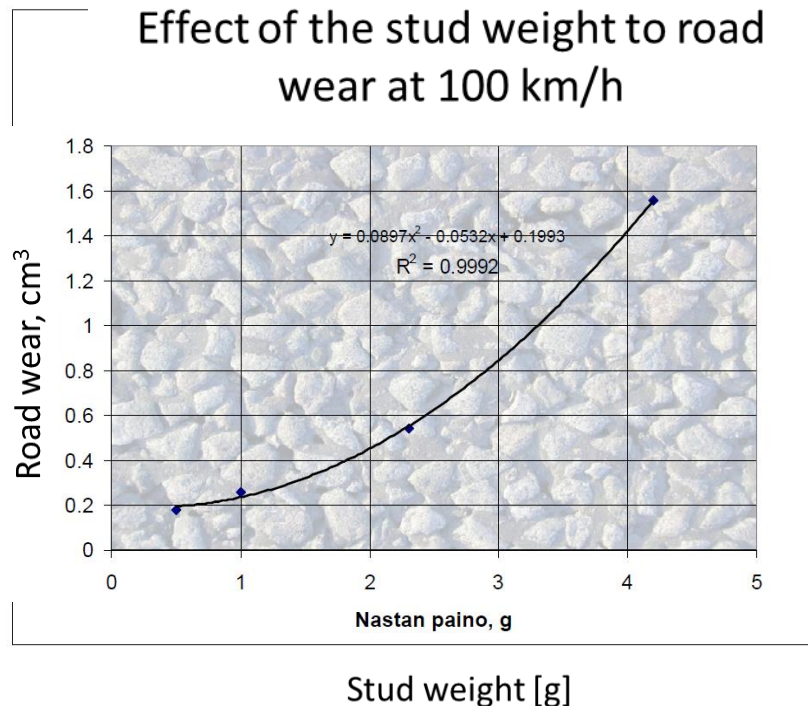
1. Possibilities to reduce road wear with modern studded tires

The studs commonly used in the Alaska region are conventional steel studs, pictured below. As an example a conventional TSMI #15 steel stud weighs 2.19 grams.ⁱ



Picture 1: Conventional steel stud TSMI #15 of total length of 13.6 mm

The weight of studs is an extremely important factor in road wear caused by studded tires. Road wear has been studied extensively in several countries, and the results demonstrate that road wear decreases in correlation with the stud weight. The first graph is from VTT Technical Research Centre of Finland.

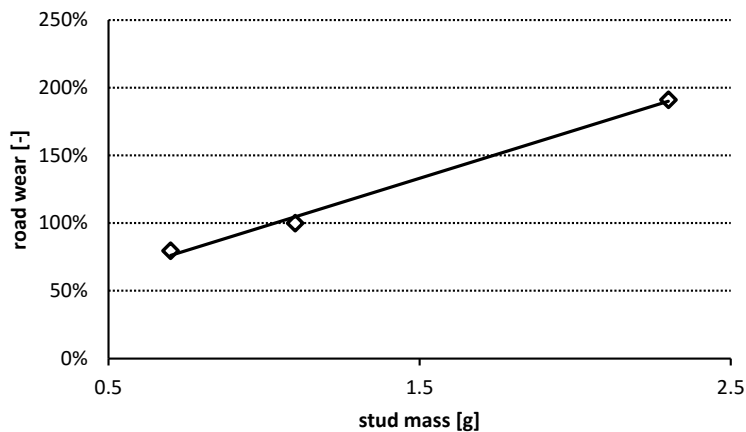


Graph 2: Road wear as a function of stud weight at 100 km/h (62.1 MPH)ⁱⁱ

As can be seen in the graph, the road wear caused by studs is significantly lower when the weight of the studs is 1.1 grams or below. In comparison to the conventional steel studs

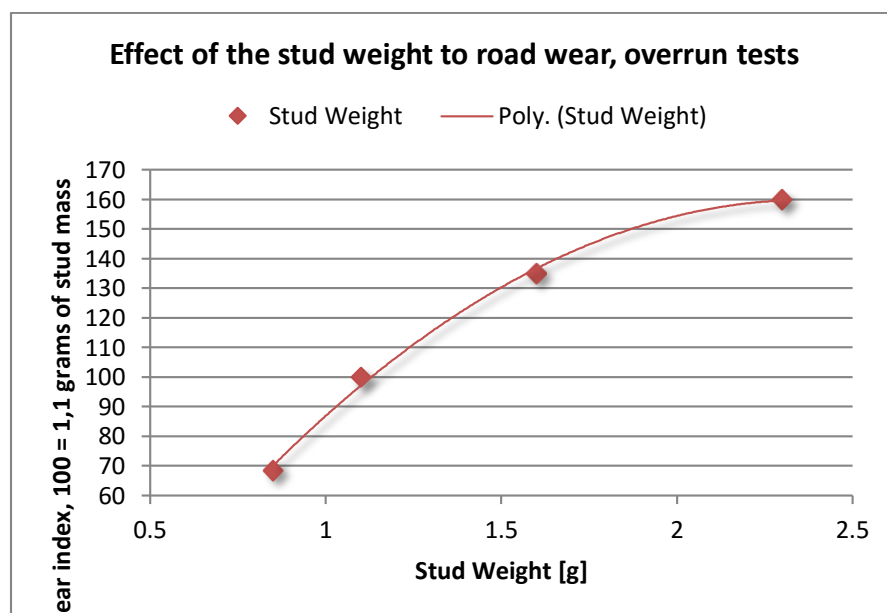
weighing 2.19 grams, the road wear can be reduced by 60–75 percent with the use of lightweight studs.

Karlsruhe Institute of Technology performed a similar test comparing studs of different masses. At their studies the effect of the stud mass on road wear was linear (Graph 2).



Graph 2: Effect of stud mass according KIT (Karlsruhe Institute of Technology) Studyⁱⁱⁱ

These tests, performed by independent research institutes, prove that lightweight studs cause significantly less road wear than the heavier types. Also, the tests performed by Nokian Tyres confirm the same findings (Graph 3).



Graph 3: The effect of the stud weight to the road wear according the measurements of Nokian Tyres plc.

The planned limit of 1.1 grams would bring the desired benefits of the bill, reducing road wear up to 75 percent. Reaching this limit would be technically possible with best available techniques.

To minimize road wear, other factors than studded tires should also be considered. For example, heavy trucks are known to have a significant impact on rutting roads particularly during spring thaw.

- ***Has the committee considered the impact of other factors that cause road wear, such as heavy trucks during spring thaw?***

2. Limit of 0.5 grams would effectively ban studded tires

As stated above, Nokian Tyres supports the original version of the bill (SB0050A), but disagrees with the amendment (SB0050B). Below is a quote from the amended version, with new text underlined and deleted text bracketed:

In addition to the fee imposed under (a) of this section, a fee of ~~\$50~~ [\$5] a tire is imposed on the retail sale in the state [ON OR AFTER JULY 1, 2004,] of tires for motor vehicles designed for use on a highway that are studded with metal studs or spikes weighing more than 0.5 [1.1] grams each embedded in the periphery of the tire surface and protruding beyond the tread surface of the tire, or on the installation in the state [ON OR AFTER JULY 1, 2004,] for a fee of metal studs or spikes weighing more than 0.5 [1.1] grams each on a tire for a motor vehicle designed for use on a highway.

Currently, it is technically impossible to manufacture studs that weigh less than 0.5 grams for use in passenger car and light truck tires. The fee would effectively push even the most modern studded tires with significantly lower effects on road wear out of the market, eliminating the potential fee collection. The original limit value of 1.1 grams would bring the benefits of decreased road wear without reducing traffic safety.

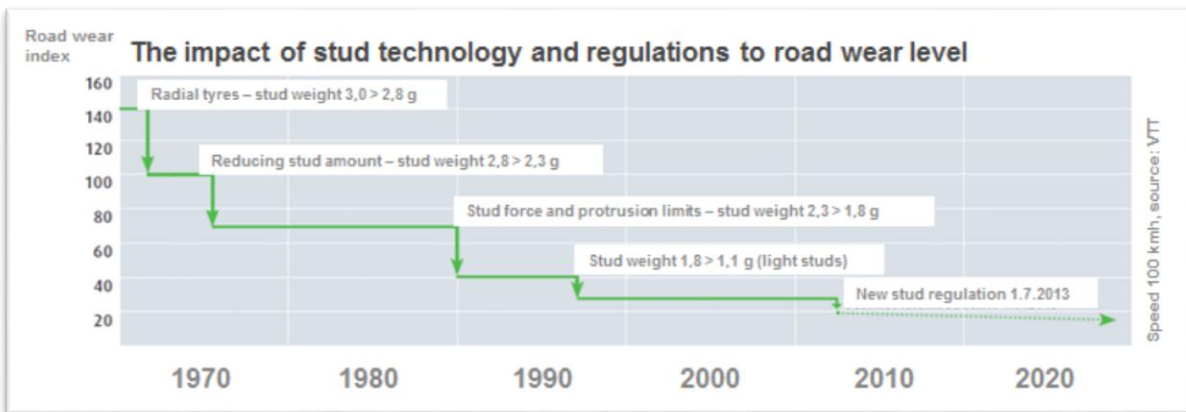
- ***Will increasing the studded tire fee so drastically effectively eliminate studded tires in the market, thus reducing funding to repair roads as the changes intend?***
- ***Have any studies been done to accurately measure ratio of consumers currently using studded tires on Alaskan roads?***

3. R&D continuously improves both studded and non-studded tires, but studded tires have clear advantages

In the media discussion about the bill, it has been said that “consumers can choose studded tires or the new technology tires.”^{iv} In fact, Nokian Tyres constantly invests in Research &

Development to develop both of these winter tire categories to become safer and more environmentally friendly.

In Scandinavia, the road wear effect of studded tires has steadily decreased since the 1970s. The improvement is due to tightened stud and winter tire regulations, which have given strong impetus to tire manufacturers' R&D departments to design studded winter tires that cause minimal road wear. The road wear effect has been decreased by reducing the weight of stud, reshaping the stud, inserting stud cushions and reconsidering where to place the studs on a tire.

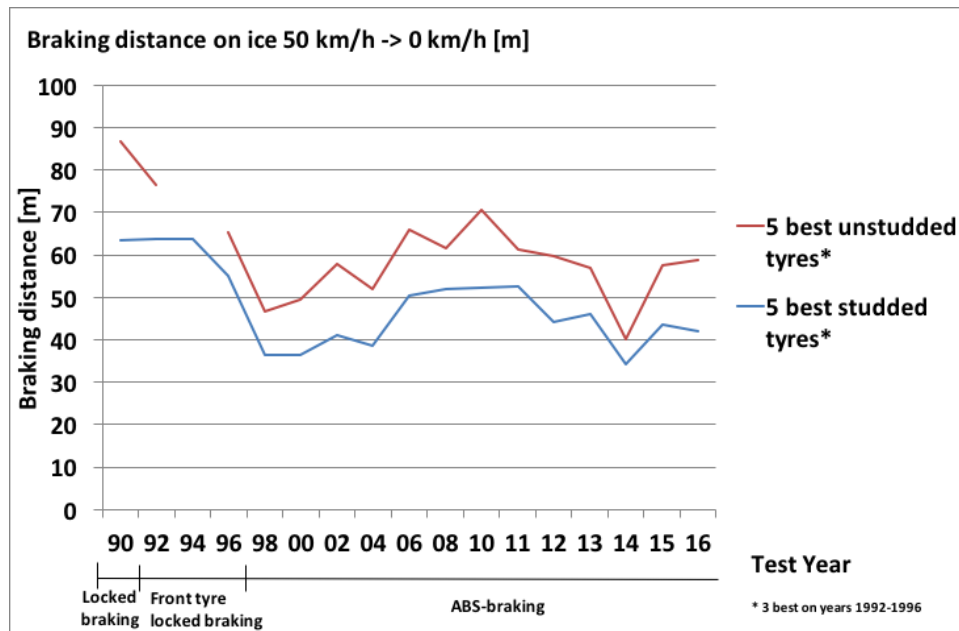


Graph 4: The impact of stud technology and regulations on road wear level in Finland

The impact of stud technology and regulations on road wear level in Finland can be seen in Graph 4. At the moment, the most commonly used studs in Alaska are the same as those used in Scandinavia in the 1980s.

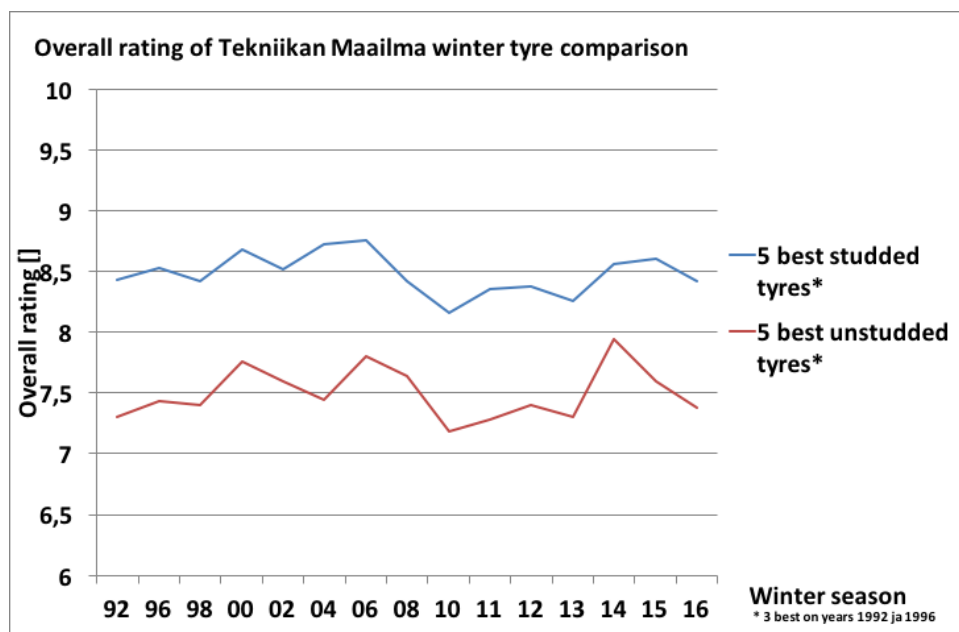
It has also been argued that non-studded tires have a better grip on ice than studded winter tires. In fact, modern studded tires clearly outperform non-studded winter tires on ice. This has been proven by numerous independent magazine tests over the years.

For example, a Finnish magazine *Tekniikan Maailma* (*The World of Technology*) has published winter tire comparisons and measured braking distances on ice for more than 25 years. During this period, the difference between the best studded and non-studded winter tires has remained constant. From Graph 5, it can be noted that studded tires have better grip on ice than non-studded winter tires.



Graph 5: Braking distances of five best studded and non-studded winter tires on ice 1990–2016

Also, the overall rating of studded tires has been consistently better over a 25-year period. The performance gap proves that even though non-studded tires have improved, studded tires are the safest choice in Northern roads.



Graph 6: Overall rating of Tekniikan Maaailma winter tire comparison in 1992–2016

Conclusion

To reduce road wear, Nokian Tyres supports the original version of Senate Bill 50 with the limit of 1.1 grams for the weight of the stud as a threshold for imposing the fee. The planned limit of 1.1 grams would bring the desired benefits of the bill, reducing road wear of studded tires up to 75 percent. Reaching this limit would be technically possible with the best available techniques.

Nokian Tyres regards the proposed amendment of 0.5 grams for the weight of the stud to be unrealistic as currently there are no technological possibilities to fulfil the requirement. With the amendment, the freedom of choice for consumers would be heavily restricted and studded tires completely pushed out of the market.

ⁱ <http://www.brunowessel.com/catalog/index.asp?display=item&itemid=15>

ⁱⁱ Nastojen ja nastarenkaiden hyväksymisvaatimusten muutostarpeet, (Changes needed at studs and studded tires approval requirements) Ministry of Transportation and Communications and VTT, Finland 2008

ⁱⁱⁱ Dipl.-Ing. Johannes Gültlinger – Investigations of road wear caused by studded tires, Trafi - EDEN expert meeting, Helsinki, November 27, 2014, Karlsruhe Institute of Technology

^{iv} Alaska Public Media, 17 February 2017: New fee would sharply hike state fees for studded tires
<http://www.alaskapublic.org/2017/02/14/new-fee-would-sharply-hike-state-fees-for-studded-tires/>