SUMMARY: *STUDDED TIRES IN OREGON – AN ANALYSIS OF PAVEMENT WEAR AND COST OF MITIGATION*

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Abstract – This study examines the effects of studded tires on Oregon highways and quantifies the degree by which studded tires cause pavement damage. In addition to the rate of rutting, this study examines several categories of costs that result from studded tire use.

Wide ranges of pavement wear rates were found for various sections of PCC (Portland Cement Concrete) and asphalt pavements. PCC is more resistant to rutting than asphalt. Within the asphalt pavements, there was no obvious advantage of open-graded mixes over dense-graded mixes. The PCC wear rate is about 0.0093 inches per 100,000 studded tire passes, while the wear rate of asphalt pavement is about 0.0386 inches per 100,000 studded tire passes.

From 1995 to 2005, the expenditure projection for mitigating studded tire damage was $7 million annually. It is also useful to keep in mind Oregon primarily uses PCC rather than asphalt.

Conclusions -

1. Studded tires improve the braking, traction and cornering performance of vehicles on icy surfaces. The improved handling can be offset by a slight increase in driving speed. Researchers tend to find conflicting results regarding the net safety effects of studded tires.
2. Wide ranges of wear rates were found for various sections of PCC and asphalt pavements. The reflects the many factors that contribute to pavement rutting susceptibility. PCC is more resistant to rutting than asphalt. There was no obvious advantage of open-graded mixes over dense-graded mixes regarding asphalt pavements.
3. An estimate of the total pavement damage caused by studded tires in 1995 indicates a mitigation cost of about $30 million for the state highway system and $20 million for county and city roads. This $50.2 million estimate is the base case between a low of $30.7 and a high of $69.8 million.

4. Expenditures for repairing studded tire damage for 11 years were projected to total around $103 million by 2005. Estimates are for Oregon's state highway system alone.
5. An increased use of lightweight studs may reduce annual expenditures by as much as ½ and as little as 1/3.

The main conclusion of this study is that studded tire use, regardless of its other benefits, inflicts certain amounts of damage to Oregon road systems.

Steps taken to reduce the effects of studded tire damages include require the studs sold in Oregon to be of the lightweight varieties. This change was said to spare Oregon between 43% and 29% of the costs of repairing studded tire damage. In addition, shorting the studded tire season will further reduce damage. Finally, the inclusion of the new soft-rubber tires in the traction tires class will also reduce damage.

Another strategy recommended is implementing a studded tire tax, or user fee. The paper states that if taxes are too high it might stimulate the sales of tires to out of state suppliers who do not have to comply with the proposed taxes. This would leave mitigation costs unpaid for, while the damage persists unaffected.

A third alternative is to establish a program of studded tire permits. Enforcement and logistical details need to be explored further.

The fourth alternative is a "do nothing" approach. Mandating lightweight studs and shortening the stud season have already contributed to reduce the damage. Further innovations will solve the problem.