

# SUMMARY: *REVIEW OF STUDED TIRES IN OREGON*

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**Abstract** – This study provides an update on the Oregon Department of Transportation study conducted in 2000 on studded tires. The focus of this research paper was to quantify current use of studded tires and the wear and caused by use. Some results include a decline in studded tire use from about 16 percent of registered vehicles in 1995 to about 4 percent in the 2013-2014 winter season. The study found a wear rate for PCC (Portland Cement Concrete) of about 0.0091 inches per 100,000 studded tire passes, while the wear rate of asphalt pavement is about 0.0295 inches per 100,000 studded tire passes.

Three different cost categories of studded tire damage mitigation were identified. The three scenarios are included in this study, but the base case scenario for these estimates predicts an annual average expenditure of about \$4 million from the year 2012 up to the year 2022. These estimates are only for the State Highway System and exclusive of any amounts to be spent by the cities and counties on their road systems.

**Conclusions** – The Survey Research Lab at Portland State University assisted the Oregon Department of Transportation Research Unit in implementing a random household phone survey of Oregon residents. The purpose of the survey was to document studded and non-studded winter tires and winter travel behaviors of motorists driving in Oregon. The survey lasted 29 days, surveying a total of 1,944 people.

1. Research shows that non-studded winter tires perform as well or better than studded tires in almost all winter driving conditions.
2. The use of studded tires in Oregon has declined since the previous survey in 1995.
3. In 1995, many people only put studded tires on one axle, today most people put studded tires on both.
4. Wide ranges of wear rates were found for various sections of PCC and asphalt pavements. This reflects the many factors that contribute to

pavement rutting susceptibility. 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 0.0091 inches per 100,000 studded tire passes, while the wear rate of asphalt pavement is about 0.0295 inches per 100,000 studded tire passes.

5. An estimate of the total pavement damage – damage sufficient to reduce the useful pavement life – indicates that mitigating damage caused by 2012 studded tire traffic will cost over \$8.5 million for the state highway system. This is the base pavement life case scenario among three different estimates ranging from \$5.8 million on the low side to a maximum of \$11.3 million.
6. Expenditures for repairing studded tire damage for 11 years were projected to total around \$44.2 million by 2022. This estimate represents the base pavement design life. The three scenarios of short, base, and long pavement life range from \$26.8 million up to a high of \$64.4 million. All estimates are for the state highway system alone.
7. Considering studded tire alternatives and popularity of all-wheel and four-wheel drive vehicles, studded tire use and the resulting damage of the pavements is expected to continue to decline while pavement life is expected to remain constant. Going forward, it seems that the most plausible scenario for the 11-year expenditure will be the base scenario of \$44.2 million.