

WINTER DRIVING

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- » Studded Tires
- [Overview of Studded and Studless Tire Traction and Safety](#) (pdf, 546kb)
- Call ahead for mountain pass conditions, Toll-free statewide at (1-800-695-7623).
- Carry chains at all times and be sure your tires meet requirements for approved traction devices.
- Before you leave, check your car battery, windshield-washer fluid, anti-freeze, motor oil and gasoline. Clear the windows, mirrors and lights of ice and snow. Check all signal lights.
- Check your chains to be sure you have a complete set, in good condition. If you have never used chains, practice putting them on your tires.
- Never use cruise control on icy roads.

Studded tire use in Washington State

Until 1969, studded tires were prohibited in the State of Washington. By 1972, three winter seasons after they were allowed, data collected on Washington highways indicated that roadway surface wear was increasing at a considerable rate. The evidence prompted a study on studded tires on a Washington State University test track. The results of the study provided the data that persuaded the legislature to restrict the use of studded tires to the period from November 1st to March 31st.

Since then the problem of studded tires has continued to generate much debate. Motorist choose studded tires because they seek better traction on glare ice and hard-packed snow roadways, but highway agencies, including the Federal Highway Administration, support efforts to ban or limit the use of studded tires due to the excessive wear and damage imposed on roadway surfaces. In our state, legislation continues to be introduced to limit and discourage the use of studded tires in an attempt to reduce pavement wear on the highway system.

In efforts to substantially lower the yearly pavement rehabilitation costs attributed to studded tire usage, WSDOT has been working to recommend appropriate standards and alternatives to studded tires use in Washington.

What's the matter with the studded tire?

The issues surrounding the use of studded tires in Washington State are basically threefold. First is the issue of safety. On untreated icy roads at or near freezing (32°F) studded tires do provide some

- Vehicles equipped with studded tires require a longer stopping distance on wet or dry pavement than do vehicles equipped with standard tires.
- Water collects in pavement ruts caused by studded tires and creates dangerous driving conditions like hydroplaning and increased splash and spray.
- Studded tires are banned in at least 4 states with severe driving conditions including Minnesota, and Michigan.
- In dry or wet conditions studded tires increase roadway noise levels creating a problem for people living near heavily traveled roads particularly in urban areas.
- Studded tires also wear out paint stripes and raised pavement markers.
- Stud weight has been directly related to costly pavement wear and tear in numerous studies conducted both in the United States and Europe.
- The Federal Highway Administration (FHWA) supports efforts to ban

measure of improved stopping ability, but on a statewide average these (glare ice) road conditions occur less than 1% of the time in Washington. It is anticipated that the frequency of these events will continue to decrease as WSDOT continues to implement proactive snow and ice control practices.

However, under wet driving conditions the stopping ability of vehicles equipped with studded tires is actually reduced. Tire studs reduce the full contact between a tire's rubber compound and the pavement. Research on studded tires, some dating back to the 1970's, consistently shows that vehicles equipped with studded tires require a longer stopping distance on wet or dry pavement than do vehicles equipped with standard tires.

WSDOT is particularly concerned about the use of studded tires in areas where motorists are exposed to more wet conditions than icy or glazed road conditions. WSDOT wants to make sure motorists are alert to the safety issues regarding studded tire performance in wet condition.

The second issue for WSDOT is the accelerated pavement damage done to roadways by studded tires. The abrasion on pavement surfaces caused by studded tires wears down pavement at a much greater rate than do other types of tires.

According to WSDOT estimates, studded tires 'scratch-away' at roadway surfaces, decreasing the life average cycle of a pavement surface by about 4 years. The resulting added levels of annual pavement rehabilitation cost are estimated at \$10 million dollars per year. Most damage is in the form of rutting. Rutting can lead to hydroplaning, reduced visibility, and loss of directional control.

The third major issue surrounding studded tires is based on studded tire usage – when are the tires used and where. The legislature has had a long and difficult debate over the use of studded tires in our state. Decision makers find it difficult to determine a statewide standard for studded tire use since weather conditions, travel patterns, and

or limit the use of studded tires.

- A minimum of \$10 million dollars per year in pavement rehabilitation costs is attributed to studded tires.
- Studded tires are legal in Washington from November 1st to March 31st.
- A typical 30,000-mile studded tire will destroy between one-half and three-quarters of a ton of asphalt during its useful life.
- Lightweight studs are the same size as a standard stud yet 15% lighter.
- A reduction in stud weight would potentially reduce wear by about 30 %.
- Oregon Department of Transportation estimates that \$11 million is spent each year repairing state highways damaged by studded tires.
- Studded tires are also banned in Ontario, Belgium, Germany, and Japan.

consumer trends, vary between motorists in different regions of the state.

A survey conducted by WSDOT during the winter of 1996-1997 revealed that, on average, 10 percent of passenger vehicles use studded tires in Western Washington and 32 percent of the vehicles use them in Eastern Washington. Of these locations, the survey indicated highest stud usage was observed in Spokane (56 percent), the lowest in Puyallup (6 percent).

Even though the number of studded tire users in Western Washington is approximately one third that of Eastern Washington, the higher traffic volumes create a much greater rutting problem on major western Washington routes.

Ultimately, WSDOT has the responsibility to address the damage caused by studded tire usage and will continue to look into recommendations and alternatives for lawmakers and the public on using studded tires.

What developments in Washington State have recently occurred?

In the winter of 1998, WSDOT proposed legislation to amend the Revised Code of Washington (RCW) with respect to studded tires. The intent of the bill was to reduce pavement wear on Washington State's highway system caused by older-type studded tires without losing any of the safety benefits that tire studs might be thought to provide. In 1999, Washington banned the use of older type standard studs in favor of a 15% lighter weight studs (2.0 grams or less) that are estimated to cause about fifteen percent less pavement wear than older studs.

In November of 2000, the Blue Ribbon Commission on Transportation (BRCT) recommended that state, counties and cities phase out studded tires or establish a surcharge to recognize the cost of studded tire damage to the roadway.

By the end of the 2001 Third Special Legislative Session, three bills on studded tires had been introduced in Olympia. None came out of committee. One bill, House Bill 1894 would have shortened the time allowed for studded tire use to December through February for vehicles registered west of the Cascade Mountains.

Two other bills, Senate Bill 5747 and House Bill 1670, proposed a \$15 fee to be levied on any studded tire sold in Washington State after July 1, 2001. The proceeds for the fee would have been used to pay for the cost of material replacement due to studded tire pavement wear.

What are the national developments on studded tires?

Much of the research on studded tires comes from Finland and Sweden

where studded tire use is heavy in the winter months. U.S. studies concentrate on states like Alaska, where lightweight studs have been advocated, and Minnesota and Michigan where all studs have been banned since the early 1970's. These studies all agree on one finding: pavement wear and rutting due to studded tire use is substantial and costly.

Nationwide, twenty-four states allow studded tire use for at least part of the year. Other states, most notably the snowy climate states of Minnesota and Michigan, have banned studded tires since 1972 and 1974 respectively. Both states banned studded tires due to pavement wear. Neither state has allowed the reintroduction of studded tires.

What alternatives are available to motorists?

Various alternatives are available to motorists for improving traction on winter driving surfaces.

All-Season Tires

Studless winter tires (Q-rated with a snowflake symbol) are now available to motorists as a substitute for studded tires. These tires, sold under a variety of brand names, have tire tread composed of special rubber compounds and tread designs that enhance their performance in snow and ice conditions. According to a study by TranSafety, Inc, an independent source for publications and information on road transportation and safety, "the State of Alaska tested Bridgestone's Blizzak tire and found it offers an acceptable substitute to the pavement-destroying studded tire." Broad selections of all-weather winter tires are also available from major tire manufacturers, such as Dunlop, Michelin, Pirelli, and others.

Innovative tires

European manufacturers have also released a new alternative to the studded tire. The Green Diamond Tyre Company of Iceland has developed a revolutionary alternative to the studded tire in which hard granules are distributed evenly on all the wear-surface of the tire. These granules provide better traction in slippery conditions without the road wear and noise emission of studded tires. Introduction has already started in Canada where several thousand of these tires have been on test scattered around the east coast during the 1999-2000 winter season. Increased volume is anticipated in North America.

Tire chains

Tire chains have always been a functional alternative to motorists needing traction on compact snow. Operated at relatively low speeds tire chains offer reliable performance benefits for motorists including traction on icy or snow packed roads and other special use conditions where 'snow bottom' roadways are present. On the other hand, as the driving condition changes, WSDOT recommends immediately removing

tire chains since they are capable of imposing major damage to bare, wet, and even sanded roadways. Tire chains are often the only alternative for motorist in areas where heavy winter driving conditions are the norm.

Lightweight studs

In addition to the studless winter tires, motorist can still use lightweight studs for their traction needs. Since July 1, 2001, Washington retailers can only install lightweight studs in tires that meet new legal requirements established under Title 46 RCW 'Motor Vehicle,' Chapter 46.04. Your local tire retailer has information on fitting your vehicle with the appropriate lightweight tire studs based on your vehicle's tire size.

Manufacturers claim that lightweight studs do 15% less damage than regular steel studs. Lightweight studs wear and operate equally as well as regular steel studs and will not compromise safety on icy roads. Further studies show that the use of lightweight studs could cut the yearly damage proportionately without compromising any performance characteristics. Lightweight studs are now being used successfully in the State of Oregon and have the support of the Northwest Tire Dealers Association.

What's the big picture on tire studs?

Ultimately, WSDOT would like to see the use of tire studs phased out to improve safety and reduce pavement maintenance and preservation costs. Meanwhile, WSDOT hopes that the trend will at least move to the introduction of new, even lighter weighted studs. If motorist use studs weighing no more than 1.1 gram – the stud of choice in Scandinavian countries – the potential to reduce pavement wear in Washington would further decrease by 36 percent compared to current legal lightweight studs.

Unfortunately, most states have yet to adopt the use of lighter weighted studs leaving out incentives for companies to 're-tool' manufacturing & installation equipment to accommodate the new demand. Currently, the typical tire stud for approximately 85 to 90 percent of passenger cars in the United State weighs about 1.7 to 1.9 grams.

WSDOT supports and is hopeful that the introduction of lighter weighted studs could potentially provide a win-win situation for motorist, manufacturers, and taxpayers in terms of safety needs, increased sales and reduced rehabilitation costs for maintaining Washington highways.

What's next?

The winter season is here and some drivers are starting to think about when to put on their traction tires and carry chains in their trunk. Motorist in Washington may use studded tires on their vehicles from Nov. 1 to March 31. But WSDOT encourages drivers to consider other strategies for the tire traction demands of winter driving.

WSDOT will continue to provide information on developments surrounding the studded tire issue. The Washington State Patrol will continue to monitor and enforce the legal time allowed for studded tires use. WSDOT crews will also continue their efforts to provide the best snow and ice control services like snow plowing and sanding, especially for those areas encumbered by severe winter conditions.

Remember the three key elements to driving safely in winter – stay alert, slow down and stay in control.

Please share with us your ideas, comments, and concerns on studded tires by contacting the WSDOT Maintenance and Operations staff at (360) 705-7863.

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