

Why Do We Need Spring Weight Restrictions?

Spring weight restrictions are necessary to help protect highways from damage which can cause untimely and expensive delays for the transportation industry, and the public who rely on the road network. Weight restrictions also help to avoid higher road maintenance costs as well as vehicle wear and tear. In order to minimize damage to road surfaces, axle weights must be reduced during the spring thaw period. Damaged road surfaces cause delays and extra costs for highway maintenance and vehicle wear and tear.

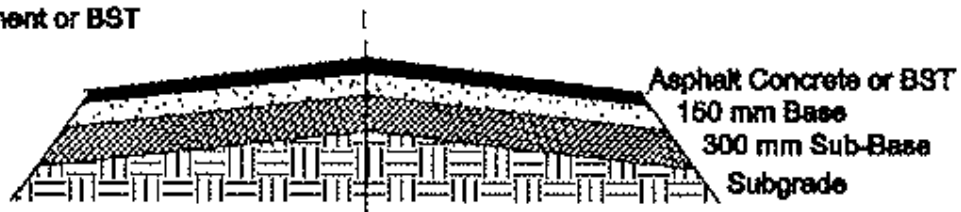
How Our Roads Are Constructed

How a road performs under truck traffic is a function of the way that the road was built and the materials used. Roads are built by preparing and shaping a subgrade from the locally available soil and adding base layers of high-strength granular material such as sand or gravel. Typically, local soils often contain a high proportion of silt, which results in lower strength.

Nowadays, major roads are constructed with a substantial thickness of high strength granular material in the road's base layers. These roads have a greater ability to support the wheel loads imposed by trucks. However, many of our older roads were constructed on soils containing high amounts of silt, which when wet, is much weaker than gravel or sand. These roads contain little or no granular base material and as a result, are more susceptible to damage during the spring period.

Structural Roads

Pavement or BST

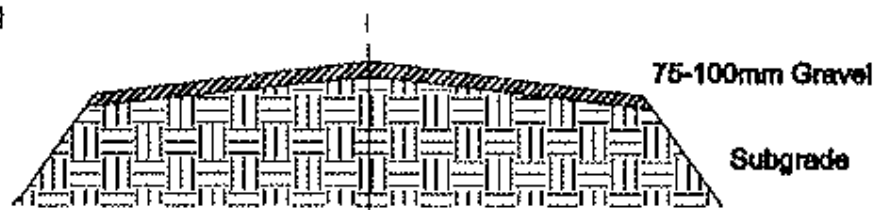


Non-Structural Roads

BST



Gravel



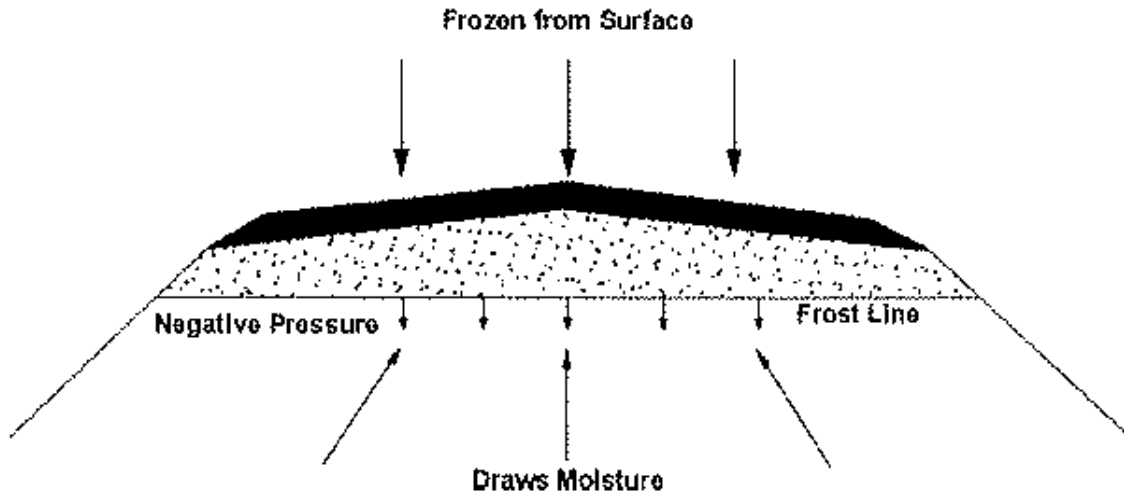
Note: BST stands for Bituminous Surface Treatment

What Happens to the Road?

Under freezing conditions silty soils attract water. The resulting high water content can cause the road to lose 50% to 70% of its strength during spring thaw and consequently the road surface is more likely to be damaged by heavy traffic. When freezing temperatures occur, a number of events take place beneath the road surface, and the basic structure of the soil changes.

Freezing

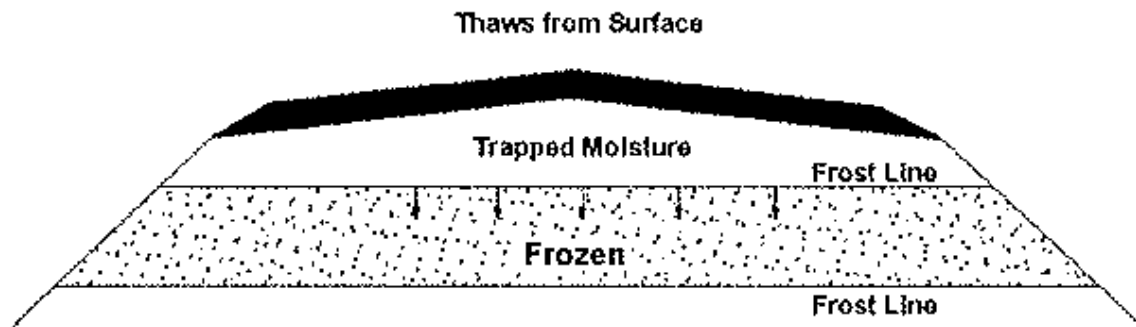
As fall approaches, the road freezes from the surface downwards. A negative pressure develops at the advancing frost line. This draws water up from below, increasing the moisture content of the soil.



Thawing

During spring, as temperatures warm, the road thaws from the surface first, moving downwards. As the frost line moves downward, the moisture is left behind, trapped directly below the road surface.

This trapped moisture has no place to move since it cannot escape through the frozen soil or the sealed road surface.



The relatively rigid road surface on top of soil containing trapped moisture has been compared to a sheet of glass on a waterbed, due to the high potential for damage from heavy traffic loads. In fact, it has been observed that under certain conditions, a single truck can completely destroy a portion of road surface.

After the Thaw

As the frost line moves further downward, the trapped water is finally able to escape, and the microscopic structure of the soil reverts to its original state and the soil strength increases.

