

Surface Contacting Tools Used in Removing Ice and Snow Pack

This article reviews five mechanical surface contacting tools used to reduce, and sometimes break, the bond of an ice pack.

The five surface contacting tools discussed are:

1. Standard cutting edge
2. Serrated cutting edge
3. GraderBit/Stinger cutting edges
4. Grader-mounted scarifier
5. IceBuster grader attachment

Standard Cutting Edge

The standard cutting edge, generally composed of standard carbon steel or some type of through-hardened cutting edge on a motor grader moldboard, is still widely used.

Compared to motor graders, underbody plows are not capable of applying as much down pressure and they move slower. Underbodies use cutting edges with carbide inserts backed by a set of conventional edges. An advantage of underbody plows is that they can be used for maintaining gravel roads.

When snow and ice buildup is particularly thick, the motor graders and underbody plows should continue to break up the ice pack, even if it appears to be ineffective. The down pressure of the blade will rough up the surface of the packed snow and ice so that control materials, such as treated sand, can get through.

Serrated Cutting Edge

Serrated cutting edges can be a productive method of removing ice and snow buildup, but if used carelessly they can cause road surface damage. The greatest damage can be caused to seal coats or asphalt surfaces. With hard use, and an inexperienced operator, these edges can last as little as 24 hours.

The primary use of serrated edges is when buildup occurs on residential streets where a mix

of only 12 percent salt is added to the sand, and only hills, curves and approaches to stop signs are treated.

A great benefit of the dozer with a serrated edge is that it does the cutting up in front of the grader and the operator can clean up the loose snow with the grader's moldboard. Usually this is done in one pass. During other seasons the dozer is used for back filling and removing washboard on gravel roads.

GraderBit/Stinger Cutting Edges

Although these cutting edges are primarily designed to penetrate the road surface, the manufacturers do recommend them for ice and snow pack removal. Their function is to reduce the snow and ice pack, or to improve traction, and not necessarily to reach the bond where damage to the road surface may occur.

The GraderBit system works well for cutting ice and snow pack. This is a very aggressive machine, and care must be taken to not damage the road surface when operating.

The cutting bits are square with different widths of bits available. The larger-size square bits can be set up to make a solid cutting edge. GraderBits are recommended to be used with only a 10-degree angle on the moldboard, which can be a problem.

The Stingers can be used at more of an angle, but the bits have to be lubricated so they can turn in the mounting plate holes.

In the summer a gravel maintenance grader can be equipped with a set of Stingers on the moldboard and used on gravel streets.

Grader-Mounted Scarifier

The Grader-mounted scarifier is perhaps the best known tool and one that has been around for a long time (*see Figure 1*). However, it can be one of

the most damaging to road ways when removing snow and ice buildup.

During construction season they become very valuable in penetrating up to 10 inches into material such as thin asphalt-surfaced roads and hard-packed base.

In certain cases, it can be a valuable tool for breaking thick snow and ice pack in valley gutters and drainage ditches. Generally, its use is very limited in winter operations.



Figure 1: A grader-mounted scarifier is generally a poor tool for breaking snowpack due to great potential for road surface damage.

IceBuster Grader Attachment

The IceBuster grader attachment is a fairly new approach to removing ice and snow pack (see Figure 2). It can be attached to the front of a motorgrader on a quick hitch, on a front-end loader and on a scarifier mount behind the front wheels of a motor grader. In addition, smaller models are available for skid loaders. The IceBuster is designed solely for ice and snow pack removal and causes very little



Figure 2: An IceBuster mounted on a grader.

pavement damage (see Figure 3).

However, the machine requires operator skill and responsibility in its maintenance and operation. Greasing of the machine is very important. The hydraulic lift on the attachment has enough down pressure to pick up the front of a grader. However, there is a variable down pressure adjustment, and 500 psi seems to work best.

Operating speed should not exceed 10 mph. When working on residential streets with a front-mounted IceBuster, the grader's moldboard can be used to clean up in one pass. Although the purpose of the IceBuster is to break ice and snow pack, it can also be used to loosen recycled concrete and to pulverize asphalt chunks from thin pavement that has been broken up by scarifying.

Summary

This article is intended to give you an overview of the use of surface contacting tools for winter road operations. Winter buildup of ice and snow is treated in many ways. The driving force in the decision of what tool to use usually comes from policies, type of equipment available, permitted hours of operation, funding, traffic volume and reasonable safety for the driving public.

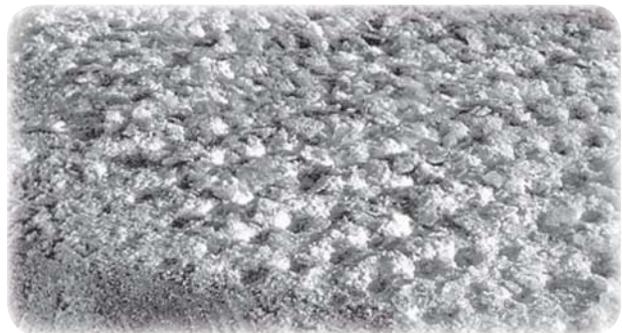


Figure 3: Broken snowpack after using an IceBuster. The IceBuster works very aggressively but does little damage to the road surface.

This article was reprinted with permission from NV LTAP Winter 2007 StreetWise newsletter. Original article was published by SD LTAP, Special Bulletin #40.