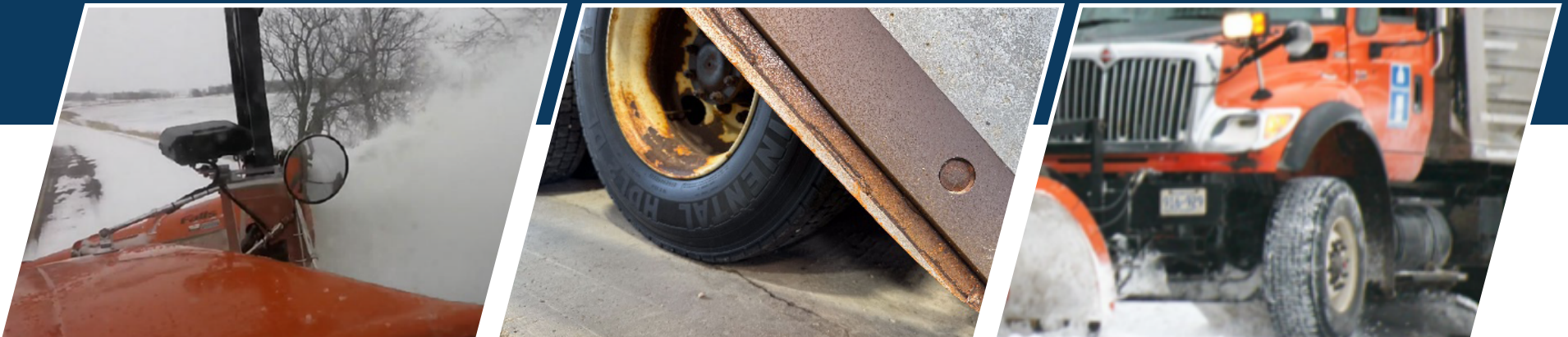




LOCAL ROAD RESEARCH BOARD



SMART SELECTION OF CUTTING EDGES

A Practical Guide for Minnesota's Cities and Counties

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Smart Selection of Cutting Edges

A Guide for Minnesota's Cities and Counties

Maintenance equipment continues to evolve and improve for both summer blading activities and winter snow and ice control. With all the options for cutting edges, agencies are inundated with a wide variety of options with varying cost ranges and functionality. Choosing the best cutting edge for your agency is a complex decision based on surface type, typical conditions, and desired durability.

A special thank you to all those that brave Minnesota's winter storms to remove snow and ice from city streets and county highways – especially those who volunteered their time and expertise to create a guide for selecting cutting edges:

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The guidance provided and knowledge shared by technical advisory panels continue to support all of Minnesota's cities and counties striving to improve every operation, every day in their service to the public. Thank you to all who have served the LRRB!





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Table of Contents

Cutting Edges for Minnesota's Local Agencies.....	1
Why Cutting Edge Selection Matters	1
Cutting Edge Material Choice -- Matching the Edge to the Surface Type	2
Procurement Guidance for Cutting Edge Selection	3
Emerging Trends and Local Examples.....	3
Key Takeaway	3
The Operator's Role in Maximizing Cutting Edges.....	4
Winter Operations (Snow Plowing)	4
Summer Operations (Gravel Road Maintenance)	4
Conclusion & Implementation Plan.....	5
Recommended Next Steps for Implementation.....	5

Cutting Edges for Minnesota's Local Agencies

This guide equips public agencies with considerations to select, use, and evaluate cutting edges that deliver the best return on investment. A cutting edge on a snowplow is the part of the blade that makes contact with the road surface, scraping away snow and ice. It is a strip of engineered material, often steel, carbide, or rubber, or a combination of materials in a single piece or section that is sacrificed to remove snow and ice from the traveled surface. Cutting edges are designed to withstand wear and tear while providing effective snow and ice removal while protecting the front plow, underbody plow or wing plow. In a similar fashion, motor graders also use cutting edges when deployed to maintain gravel roadways and shoulders.

Choosing the right cutting edge for snowplowing or blading gravel roadways is essential to maximize performance, reduce costs, and protect both roads and operators. The best blade depends on surface type, plowing/blading conditions, and desired durability.

The cutting edge's angle, down pressure, and material choice significantly impact snow removal effectiveness and vehicle control. The goal for a good cutting edge is to effectively remove snow and ice without damaging the underlying pavement structure.

Why Cutting Edge Selection Matters

Choosing the right cutting edge optimizes performance and is cost effective over the life of the cutting edge.

The cutting edge is the point of contact between your plow and the road. Choosing the wrong type can leave behind compacted snow, slush, or ice that can increase crash risk for the public. The right edge improves surface clearing on the first pass—enhancing public safety.

Choosing the right cutting edge optimizes performance *and* is cost effective over the life of the cutting edge. The selection of the best type of cutting edge option for your agency should consider operational efficiencies and downtime reduction as part of the life cycle value. With budgets tight, the right edge makes the difference between smooth operations and blown budgets.

- Road types (asphalt, concrete, gravel)
- Traffic volumes (e.g., Annual Average Daily Traffic - AADT ranges)
- Snow and ice patterns (frequency, type)
- Operator behaviors and plowing speed
- Equipment types (underbody plows, front blades, wings)

The selection of the best type of cutting edge option for your agency should consider operational efficiencies and downtime reduction as part of the life cycle value. Poor blade selection can lead to increased down time with frequent blade changes mid-storm which increases downtime and labor costs. The right edge keeps trucks on the road longer, allowing your crew to stay focused on route completion—not shop time. Reducing the number of times a blade needs to be changed also reduces risk for employee injury and optimizes mechanic time for emergency repairs. With budgets tight, the right edge makes the difference between smooth operations and blown budgets.



Cutting Edge Material Choice -- Matching the Edge to the Surface Type

Material Type	Best Use Cases	Pros	Cons	Initial Cost/Foot	Lifecycle Cost
Carbon Steel	Rural, gravel	Low cost	Fast wear	Low	Fair
Carbide Insert	High-volume roads	Long life	Higher upfront cost	Medium	Best
Rubber/Composite	Sensitive surfaces, freeze/thaw peaks	Non-damaging	Wears quickly	Medium	Fair
Ceramic/Tungsten	Ice removal, heavy use	Extreme durability	Expensive	High	Best

In a survey of Minnesota's cities and counties, most agencies reported that life expectancy and performance are the key factors in cutting edge selection with unit cost also heavily considered. Targeted use – by surface type or by typical conditions was not a primary factor. Most agencies reported the same experienced use by edge type regardless of the surface type: concrete, bituminous, or seal coat.

While life expectancy was notably most important, of the agencies reporting the range of life expectancy ranged from 6 events to 6 seasons for edges mounted on the underbody. Throughout the study, one thing was consistent – cutting edge use is very agency specific and varies even within an agency given differing routes and expectations.

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Image source: Nicollet County

Selection Process:

- Define road surface & plowing purpose
- Match edge to environment and need
- Consider speed, down pressure, road surface temperature along with operator input
- Review cost/lifecycle
- Pilot and evaluate

Procurement Guidance for Cutting Edge Selection

Most Minnesota cities and counties procure snowplow cutting edges using the State Bid's unit pricing, which provides ease and consistency. However, some local agencies have reported lower costs by requesting quotes directly from suppliers or through negotiated direct selection.

A recent survey of Minnesota local agencies (50% cities / 50% counties) provided insight into commonly used vendors and cutting edge types:

Vendor	Cutting Edge	Number of Minnesota Cities and Counties Using
Kris Engineering	JOMA	23
Winter Equipment	JOMA	2
H & L Mesabi	JOMA	9
H & L Mesabi	Bucyrus Blades Carbide Insert	14
H & L Mesabi	Bucyrus Blades Steel	11
H & L Mesabi	Bucyrus Blades Flame Hardened	10
H & L Mesabi	Kueper Tuca	9
H & L Mesabi	Kueper Carbide Premium	5

Additional cutting edges in trail by some agencies:

- Polar Flex
- Sno-Shock
- Sharq
- CAT 4Z
- Iron Hawk rubber-carbide hybrids

Emerging Trends and Local Examples

While carbide insert blades remain the most common, some agencies are moving toward rubber composite edges, which function like a squeegee in frequent freeze-thaw conditions. For example:

- Freeborn County uses JOMA rubber composite on the front plow and Kueper rubber composite on the underbody for added rigidity.
- Nicollet County evaluated Sno-Shock blades, which feature extra-large tungsten carbide inserts and cushioned shock absorbers. Despite an 18% higher upfront cost, their extended life (2–4 times longer) resulted in a nearly 50% cost savings over traditional carbide resulting in significant cost savings annually.

Key Takeaway

Each agency has unique needs based on plowing conditions, equipment, and operational strategy. Evaluating cutting edge options should be treated as a strategic decision—balancing initial cost, durability, and performance to optimize long-term value.



The Operator's Role in Maximizing Cutting Edges

Operators have a major impact on how long cutting edges last. Smart, careful operation—tailored to the season—can significantly reduce wear while still getting the job done right.

Winter Operations (Snow Plowing)

- Use only the pressure needed – Too much down pressure wears the blade faster.
- Let the blade float when possible – This helps avoid unnecessary contact with the road.
- Avoid hitting raised surfaces at high speeds – Impacts can chip or crack the blade.
- Adjust angle and pitch for conditions – This improves snow removal while reducing drag and wear.
 - » Typical snow removal is most effective at speeds around 30 mph with a flatter attack angle.
 - » Hard pack/ice removal is most effective at slower speeds (15 mph to 20 mph) with sharper attack angles.

Summer Operations (Gravel Road Maintenance)

- Preserve the road crown – Avoid flattening the surface too much, which can increase blade wear.
- Use moderate, steady speed – Sudden movements or high speeds increase wear.
- Limit aggressive cutting – Take light passes to reshape the surface without grinding through it.
- Match blade angle to material – A slight angle helps spread gravel and extend blade life.

Get operators actively engaged in tracking the wear on their edges per mile or per storm or at the very least, per season. Mechanics/shop foreman can play a role in your tracking strategy with an example list like the following:

- unit number
- type of edge (brand/model)
- placement (front, wing, underbody)
- rotation (reusing cutting edge sections from front/underbody to the wing)
- date of installation/rotation
- unit hours or miles – to determine cost per hour or cost per mile
 - » *(note at end of season when dropping plow equipment)*
- route type (high or low traffic – surface changes like new seal coats)
- pavement condition after use
- operator feedback



At season end, operators and managers can produce a summary and make recommendations for adjusting procurement for next season.

Veteran operators can ‘feel’ when a blade performs well. Ask them about vibration and bounce. Ask them about effectiveness. Engage with those in the field as part of continuously improving performance. Including operators as part of the assessment leads to better buy in to the successful solutions.

In both seasons, experienced operators who understand their equipment and surface conditions make a big difference—not just in edge life, but in road quality and maintenance efficiency.

Conclusion & Implementation Plan

Cutting edges are more than consumable parts—they’re essential tools for performance, safety, and cost control. The right edge helps maximize mechanical snow and ice removal, minimize reliance on chlorides, protect road surfaces, and keep operators safe. When chosen and managed strategically, cutting edges contribute directly to operational efficiency and environmental stewardship.

Every agency operates under unique conditions—road types, traffic volumes, operator techniques, and climate challenges. There is no one-size-fits-all solution. Agencies that treat cutting edge selection as a strategic investment—rather than a routine purchase—see better results, longer edge life, and lower total costs.

Recommended Next Steps for Implementation

1. **Document current usage and performance.** Track edge life, conditions of use, and operator feedback across seasons and routes.
2. **Engage operators and maintenance staff.** Tap into their firsthand knowledge to understand edge performance in real conditions.
3. **Test and evaluate.** Pilot alternative materials or edge configurations in targeted areas to compare cost per mile/event.
4. **Review lifecycle costs—not just unit price.** Factor in downtime, labor, material wear, and operator safety.
5. **Refine procurement strategy.** Consider options beyond the State Bid when appropriate—quotes, direct negotiations, or vendor pilots.
6. **Make it part of your annual review.** Summarize cutting edge use at the end of each season to inform next year’s procurement.

Your cutting edge is the last thing to touch the road—but often the first thing to impact safety, budget, and performance. Make it count.

