



Local Operational Research Assistance (OPERA) Program

Trail Plow Cutting Edges

The City of Eagan, Minnesota, Public Works Department maintains 130 miles of trails and sidewalks. But standard steel cutting edges on trail plowing equipment typically need to be replaced annually and, often, multiple times per winter snow season. The cost for parts and labor can really add up over five years.

Tungsten carbide vs. standard steel cutting edges

Eagan maintenance staff found tungsten carbide cutting-edge sections performed well on roadway snowplows, so they decided to explore the feasibility of also using the blade edges on trail plows. They wanted to determine if the quality of snow removal would be adequate and cost-effective when installed on trail plows.

Eagan received a \$5,000 grant through the Local OPERA Program to compare the effectiveness of tungsten carbide cutting edges to those of standard steel on trail plows.

Tungsten carbide proves more cost-effective

City staff estimated the potential cost-savings of using the tungsten carbide plow cutting edges would be \$5,700 over five years. Hardened steel edges, when replaced annually, cost \$1,480 per plow. Tungsten carbide blade edges, which last at least five years, cost \$1,700 each.

A project team studied three pieces of trail plowing equipment, all equipped with V-plows. The standard steel cutting edge remained installed on one plow, while the other two were equipped with the tungsten carbide wear edges: one with standard 12-inch-wide cutting-edge sections, the other with the standard sections cut in half to 6 inches. The team also monitored the quality of snow removal by comparing three locations with similar pavement conditions on each trail plow route. Plow performance and cutting-edge wear were monitored over approximately 30 plowing events.

Project Leader

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Agency

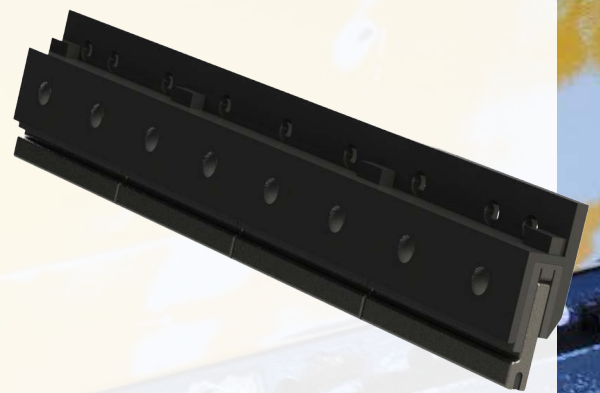
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OPERA Funding

\$5,000



The project team used segmented and flexible PolarFlex tungsten carbide plow cutting edges from Valley Blades.



In a comparison of trail plow cutting edges, both tungsten carbide and standard steel each left minimal snow on the trail surface and significant portions of the trail surface were scraped clean.

Eagan chooses tungsten carbide cutting edges for all trail plows

The team found each style of cutting edge provided acceptable finished results, with minimal snow left on the trail surface and significant portions of the trail surface scraped clean. Moreover, the team found no noticeable difference in the snow removal performance between plows with the 12-inch segments and 6-inch tungsten carbide segments. In addition, they had no issues with rocks or debris becoming lodged in joints of the tungsten carbide wear edges.

As a result of this study, the City of Eagan intends to use segmented 12-inch tungsten carbide cutting edges on all trail plowing equipment beginning with the 2021-2022 winter season. The project team also feels that other agencies may benefit from this research, too, because using tungsten carbide cutting edges on trail plows could provide a net reduction in replacement costs over the life cycle of the cutting edge while maintaining the quality of snow removal.

Findings

- Tungsten carbide plow cutting edges perform as well as hardened steel cutting edges on trail plows.
- Tungsten carbide plow cutting edges are more cost-effective than hardened steel cutting edges, saving at least \$5,700 per trail plow over five years.

About OPERA

The Local OPERA Program encourages maintenance employees from all cities and counties to get involved in operational, “hands-on” research. OPERA helps to develop innovations in the construction and maintenance operations of local government transportation organizations and share those ideas statewide.

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