

2006-2021 COMBINED RESULTS

BLADES AND PLOWS

Air foil (Henderson)

<http://www.hendersonproducts.com/products.html>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
Minnesota	4	2009-10	4	4	3	4	5	4
Average rating			4 - helpful	4 - easy	3 - average	4 - maintained good condition	5 - extremely well	4 - satisfied

Comments

Minnesota DOT (2009-2010) • Overall rating: 4

Worked well. Since [then,] we have developed our own design and [built a] product that utilizes scrap traffic sign material, and that has performed as well.

BlockBuster blades - hammerhead carbide (Winter Equipment)

<https://winterequipment.com/blockbuster-hammerhead.html>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
Iowa	6 sets of 11' front blades	2015-2017	4	2	4	4	4	3
Average rating			4 - helpful	2 - not very easy	4 - helpful	4 - maintained good condition	4 - well	3 - average

Comments

Iowa DOT (2015-2017) • Overall rating: 3

Comments from the Operators:

- * Very heavy and tough to install.
- * Worked well on micro surface roads.
- * 2 trucks went the entire winter season without changing blades, when they would normally go through 2-3 sets of blades in a winter season.

BlockBuster blades (Winter Equipment)

<https://winterequipment.com/blades.html>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
Iowa	6	2016-18	3	3	4	4	3	3
Iowa	8	2014-15	3	2	4	3	3	3
Michigan	4	2014-15	n/a	4	n/a	3	n/a	3
Utah	13	2017-18	2	2	4	3	3	3
Utah	52	2012-14	5	4	5	5	5	5
Vermont	1	2013-15	4	3	5	4	4	4
Average rating			3.4 - average	3.0 - average	4.4 - helpful	3.7 - maintained good condition	3.6 - well	3.5 - satisfied

Comments

Iowa DOT (2016-2018) • Overall rating: 3

We have an ongoing research project with Iowa State through the 2018-2019 winter season to track blade performance. No results available yet.

Iowa DOT (2014-2015) • Overall rating: 3

Blades were very expensive, twice the cost of JOMA blades. Blades were very heavy and difficult to install. Operators commented that these blades were very noisy during operations. We did not see any benefit to using these blades over JOMA or Kueper

Utah DOT (2017-2018) • Overall rating: 3

Drivers report that this blade runs down about as quick as a regular single carbide, but costs 2.5 - 3 times as much.

Utah DOT (2012-2014) • Overall rating: 5

Test was conducted on 10 year old concrete pavement (8,000 PSI) using same driver in the same truck. The system far outlasted all other ten systems tested, including UDOT standard high performance segmented flexible carbide blades. Cost was high compared to other systems. We are going to test system more widely to determine comparative per-plow-hour and life cycle costs. The system shows little wear after two full plow seasons.

Vermont Agency of Transportation (2013-2015) • Overall rating: 4

Blades will wear for long time. Problem we had was it didn't clean down to pavement because of the wide base. Carbide fell on first set of blades and they replaced it. Takes a long time to get the blade to cut an edge in

Built Blades—Sabre heavy-duty blades (48" and 36")

<http://www.builtblades.com/sabre>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
South Dakota	NA	2020-2021	NA	4	4	2	2	2
Average rating			NA	4 - easy	4 - helpful	2 - not very durable	2 - not very well	2 - not very satisfied

Comments

South Dakota DOT (2020-2021) • Overall rating: 2

The testing was done mainly on quartzite chip seals without blade savers at first. This destroyed the blades rather quickly. Second test was done with blade savers and we were able to get through the entire route. The majority of our chip seals are quartzite; not sure if there is a blade that can handle it.

Evolution Edges - TXS blade (Chemung Supply Co.)

<https://www.evolutionedges.com/snow-plow-blades-and-cutting-edges-innovative/carbide-inserts-txs-snow-plow-blade>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
Utah	1	2016-17	3	2	4	5	4	4
Average rating			3 - average	2 - not very easy	4 - helpful	5 - maintained excellent condition	4 - well	4 - satisfied

Comments

Utah DOT (2016-2017) • Overall rating: 3

The single driver that tested this replacement Joma blade said that the Performance was an "A", but that the Ease Of Blade Change was a "C" on a scale of A-D.

Evolution Edges - VST cutting edge (Chemung Supply Co.)

<https://www.evolutionedges.com/snow-plow-blades-and-cutting-edges-innovative/poly-carbide-vst-cutting-edge>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
Utah	3	2017-2018	4	5	4	4	3	3
Average rating			4 - helpful	5 - extremely easy	4 - helpful	4 - durable	3 - average	3 - average

Comments

Utah DOT (2017-2018) • Overall rating: 3

Some drivers reported that there are still a ton of vibrations even though this product is billed as a Vibration Suppression Technology. Shoes are used.

Evolution Edges - unspecified blade type (Chemung Supply Co.)

<https://www.evolutionedges.com/>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
South Dakota	NA	2018-19	NA	NA	NA	NA	NA	NA
Average rating			NA	NA	NA	NA	NA	NA

Comments

South Dakota DOT (2018-2019) • Overall rating: NA

This season we used Evolution Edges blades, Joma and Kueper, with Joma and Kueper outperforming Chemung 3 to 1. The Chemung blades are very brittle and wear too quickly. We had some sets that were doubled up that lasted 50 miles.

Henderson Snow Foe RSP Flex: Reversible Snow Plow

<http://www.hendersonproducts.com/rsp-series-plows.html>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
North Dakota	90	2015-16	4	2	3	3	3	3
Average rating			4 - easy	2 - not very easy	3 - average	3 - average	3 - average	3 - average

Comments on Henderson Snow Foe RSP Flex

North Dakota DOT (2015-2016) • Overall rating: 3

It worked fairly well. Required specialized hydraulics on the truck. Standard practice is to reduce the use of front plows and use more underbody plows in order to reduce snow fog so flexible plow is becoming more limited. Experienced micro cracking of the poly moldboard and needed replacement. After manufacturer replacement, unit works fine.

Ice-O-Force blades (Ironhawk)

<https://ironhawkindustrial.com/products/blade-systems/>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
Utah	1	2016-17	4	3	3	4	4	4
Average rating			4 - helpful	3 - average	3 - average	4 - maintained good condition	4 - well	4 - satisfied

Comments

Utah DOT (2017-2018) • Overall rating: 4

Not much interest in this brand of blade among the Maintenance Station Supervisors since we only had 1 blade tested.

Ice-O-Force underbody blades (Ironhawk)

<https://ironhawkindustrial.com/products/blade-systems/ice-o-force-underbody-blade-system/>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
Iowa	2 sets of 11' underbody	2016-17	4	4	4	4	4	4
North Dakota	5 sets + 2 replacements	2018-19	3	2	2	1	2	1
Average rating			3.5 - helpful	3 - average	3 - average	2.5 - average	3 - average	2.5 - average

Comments

Iowa DOT (2016-2017) • Overall rating: 4

Operator comments:

- * Install was very easy.
- * Seemed to wear very good on all surfaces and was very quiet.
- * Worked well on packed snow.

North Dakota DOT (2018-2019) • Overall rating: 1

Operator comments:

- We tried 2 sets of these edges on underbodies. One set lasted 3 days on our truck that uses U/B for 95% of its work and were worn out and didn't cut the ice. Second set was put on in an outlying unit and used 15 hours on and off and were worn out and did not cut the ice. Other comments were they were hard to put on so not worth the effort to continue using.
- I tried these edges and the results were similar. I got 25 hrs of use at 250 – 275 lbs. of pressure. I have been using the Joma edges for a few years. They work much better than the Ice O Force blades. I usually use 1 set of Joma edges per winter.
- One of the of Ice O Force underbelly blade sets was done in 18 days, 87 hours to be exact. The guys also stated that the blades are very heavy; they needed 3 guys to install them.

Joma plow blades

<http://www.blackcatwears.com/products/snow-plow/>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
Delaware	n/a	2014-2017	n/a	5	5	4	4	5
Illinois	3+ sets	2009-2016	4	4	4	4	4	4
Illinois	3 sets	2008-12	5	5	5	5	5	5
Illinois	3 sets	2008-11	4	5	5	5	5	5
Illinois	1 set	2008-09	3	4	3	5	4	4
Iowa	12 front plow blades	2016-2018	4	4	4	4	4	4
Kansas	6	2015-2016	n/a	3	3	4	3	3
Maine	2 sets	2009-11	n/a	4	5	5	5	5
Minnesota	2 sets	2008-09	4	4	4	5	5	5
Minnesota	6 districts	2008-09	n/a	5	n/a	5	5	5
Minnesota	3 sets	2007-08	n/a	4	4	5	4	4
Missouri	n/a	2015-2017	4	5	5	5	4	4
Missouri	6 sets	2008-10	4	5	5	5	5	5
Missouri	n/a	2008-09	n/a	3	n/a	4	4	4
Missouri	n/a	2007-08	5	4	4	4	4	4
Montana	10 sets	2014-15	4	3	4	4	4	4
North Dakota	4 sets	2010-11	5	3	4	4	4	4
North Dakota	4 sets	2010-11	n/a	5	n/a	5	5	5
Ohio	40+ sets	2007-08	4	5	4	5	5	5
Ohio	16 trucks	2007-08	5	5	5	5	5	5
Pennsylvania	n/a	2014-2017	3	4	3	5	4	4
Utah	2 sets	2006-07	4	5	4	5	5	5
Utah	6	2016-18	4	4	5	5	5	5
Wisconsin - Columbia County	50 plus	2006-11	4	5	4	5	4	4
Wisconsin - Dane County	8 plows	2008-11	4	4	5	5	4	5
Wisconsin - Monroe Cty.	60-plus pieces	2006-11	4	5	4	4	5	5
Average rating			4.1 - helpful	4.3 - easy	4.3 - helpful	4.7 - maintained excellent condition	4.4 - well	4.5 - extremely satisfied

Comments

Delaware DOT (2014-2017) • Overall rating: 5

Black Cat Joma blades performed very well during plowing operation. Very minor damage was observed to the cutting edges and plow trucks stayed on their routes much longer than with traditional carbide blades.

Illinois DOT (2009-2016) • Overall rating: 4

Joma blades have proven to be a great product. We have had sets of Joma blades that have lasted 5 years. Joma blades have cut down on blade changes, thus reducing the number of injuries. It cleans the road better and causes less vibration to the truck/plow. Some issues we have had is with maintenance. We had an issue where the bolts made the rubber bushings oval shaped, which has led to damaging the blade sections causing inserts to break or sections to have more play / hang lower than others. Also, replacement parts are expensive. Overall, the product is good and worth the cost.

Comments on Joma plow blades (continued)

Illinois DOT (2008-2012) • Overall rating: 5

Performance as well as increased life have been noted with this system. It works well in areas where raised pavement markers caused damage to standard carbide blades.

Illinois DOT (2008-2011) • Overall rating: 5

The districts that have used the Joma Blades felt they perform well. They have been very durable.

Iowa DOT (2016-2018) • Overall rating: 4

We have been using JOMA blades for many years with very good results. We have an ongoing research project with Iowa State to track blade performance and cost on various road surface types. No results available yet.

Illinois DOT (2008-2009) • Overall rating: 4

Blade outlasted 2 sets of carbide blades on the control plow. Drivers did notice that Joma Blade cleaned the pavement better as well as being quieter than the control blade. Cost is an issue as Joma Blade costs 2.5 to 3 times as much as the standard carbide blades.

Kansas DOT (2015-2016) • Overall rating: 3

We did not do a formal test. Results were mixed. Crews like the reduction of noise and vibration, but the life of the blade was variable.

Maine DOT (2009-2011) • Overall rating: 5

We were hoping that the price may come down to make them a great value.

Minnesota DOT (2008-2009) • Overall rating: 5

Did seem to outlast steel blades and to perform better given the imperfections on the road surface. However, given that it's our (Maintenance Research) goal and duty to provide new technologies to MnDOT's districts to help streamline their daily duties and find replacement equipment with a lower impact on the cost of operation, hours of availability, and down time for maintenance personnel, there has been concern about the cost of the JOMA blades and some areas of the state may have to discontinue use and go back to the regular carbide cutting edges or switch to these alternative blades that we are currently testing, if deemed successful. JOMA blades are on the implementation list.

Minnesota DOT (2007-2008) • Overall rating: 4

The test procedure I used was to place an hour meter in line to record the hours the cutting edges were being used. This eliminated the operator from recording how much time that the cutting edges were lowered and in use. The Milaca truck 93206 right hand on the TP3NR522 (T.H. 169 S.) route had the best results of 108 hr. of usage before replacement. Their route consists of 14 miles of seal coat, 10 miles of micro-surfacing, 5 miles of nova-chip 5 miles of bituminous. The other Milaca truck 200057 on the TP3NR521 (T.H. 169 N.) route had good results with 85.5 hr. before replacement. This route consists of 18 miles of seal coat, 25 miles of bituminous, 7 miles of concrete and 9 miles of micro-surfacing. Both of these routes the drivers recommended using these cutting edges because of longevity, less vibration and quiet operation. One route didn't have to replace the cutting edges all season and was very impressed by the saving of time and safety of not having to change cutting edges 2 or 3 times a season. The Elk River truck 99045 on the TP3NR512 (T.H.10 W.) route had quite different results of 40 hr. before replacement. The biggest difference they had was 45 miles of very poor concrete with many poor cross cracks and potholes. Another possible problem could be plowing habits and excessive speed which are hard to record. The operators said that it seems to be catching on the concrete causing the plow to trip more frequently than the standard cutting edges.

Missouri DOT (2015-2017) • Overall rating: 4

We are very satisfied with the Joma blades.

Missouri DOT (2008-2010) • Overall rating: 5

We have used these blades in all types of weather they have done very well. I would not go back to carbide blades.

Missouri DOT (2007-2008) • Overall rating: 4

A good blade that lasts a lot longer and does a better job than the carbide blades

Montana DOT (2014-2015) • Overall rating: 4

Approximately 4 times as long as our standard carbide edges.

Comments on Joma plow blades (continued)

North Dakota DOT (2010-2011) • Overall ratings: 4, 5

- Very quiet, cleaned better than conventional carbide blades, plows tripped more often (concern).
- The only drawback is Joma blades currently cost us about three times as much as standard blades per plow. This is offset by the fact that we have had reports of Jomas lasting 3 times as long as standard. We have also noticed many benefits from an operational standpoint. Operators report a large decrease in cab noise and vibration. The Jomas were also reported to remove snow better than standard carbide blades. Dickinson plans to start installing Joma blades on all new truck orders. More information: http://www.dot.nd.gov/divisions/materials/research_project/mr201003final.pdf

Ohio DOT (2007-2008) • Overall rating: 5

The Joma blades in Lake County average nearly 6000 plowing miles with some of the trucks running the whole season on only one blade! Joma plow blades have no metal to metal contact with the snowplow which decreases the shock on the plows, the road surface, and most importantly the drivers. A reduction of noise and vibration lead to a reduction of operator and equipment fatigue. Joma plow blades conform to the pavement surface much better than the steel blades which can lead to a reduction in the amount of deicing material needed to treat a roadway. No BWC claims due to lifting plow blades since the switch from steel blades. New technology that has the support of the Lake County staff. Even 25+ yr veterans, who are the hardest to get to buy into a new idea, believe in the Joma plow blades. -There are many hidden cost savings with these rubber blades too. Less vibration leads to less fatigue on front end parts of plow trucks, RPMs are not ripped out of the pavement, and the ability to replace sections of damaged blades with sections from a used blade. Lane striping and crack sealing material isn't "peeled" from the road like with the steel blades. This reduces the need for road repairs. The Joma blades outlast steel blades 4:1. The truck's front end doesn't vibrate as it does when using steel blades. Joma blades are lighter in weight. Less wear on the pavement lane lines.

Pennsylvania DOT (2014-2017) • Overall rating: 4

Blades last longer and reduce noise

Utah DOT (2017-2018) • Overall rating: 5

This is the most used blade in our inventory.

Utah DOT (2006-2007) • Overall rating: 5

Our traditional blades wore out after 21 hours service on the plow (average). The two sets of JOMA blades lasted 124 (Tooele) and 108 hours (Strawberry). Operators reported cleaner roads and much less vibration in the cab. One driver stated that he had to raise and lower the plow to determine if the plow was down because he could not hear the scraping noise. Very positive test results

Wisconsin DOT -- Columbia County (2006-2011) • Overall rating: 4

very costly

Wisconsin DOT -- Monroe County (2006-2011) • Overall rating: 5

We are very happy with the performance of the product, from less driver noise, to ease of installation, along with good wearability.

Kuper Kombi

<http://www.kueperblades.com/>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
Iowa	12 sets of front blades	2016-2018	4	4	4	3	3	3
Iowa	25 sets of front blades (Kombi H ceramic insert)	2015-2017	4	3	4	3	3	3
Average rating			4 - helpful	3.5 - easy	4 - helpful	3 - average	3 - average	3 - satisfied

Comments on Kuper Kombi

Iowa DOT (2016-2018) • Overall rating: 3

We have an ongoing blade research project with Iowa State to determine performance and cost on various road surface types. No results available yet.

Iowa DOT (2015-2017) • Overall rating: 3

Overall comments from Operators were mixed:

- * We had a combination of the older and newer style of the Kombi H. The newer style performed much better and seemed to be more durable.
- * Most operators liked the ease of installation and they were impressed with how quiet they were
- * Some operators thought the performance of this blade was equal to JOMA blades.

Kuper premium carbide inserts by Betek

<http://www.kueperblades.com/>

info@kueperblades.com

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
North Dakota	N/A	2016-2017	3	4	4	5	5	5
Average rating			3 - average	4 - easy	4 - helpful	5 - maintained excellent condition	5 - extremely well	5 - extremely satisfied

Comments

North Dakota DOT (2016-2017) • Overall rating: 5

The Kuper Betek Premium cutting edges lasted much longer than ordinary carbide insert edges. The Betek used high quality materials and brazing process to ensure long lasting tungsten carbide insert wear.

Kuper Tuca SX carbide plow blades

<http://kueperblades.com/tuca-sx-wave-high-quality-flexible-carbide-snowplow-blades/>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
Connecticut	6 sets	2014-15	4	4	4	5	5	5
Iowa	6 sets	2014-15	4	4	5	4	4	4
Maine	1 set	2012-13	5	5	5	4	5	5
Maine	6 sets	2012-13	4	4	5	4	4	4
Maine	1 set	2012-13	n/a	4	n/a	5	4	4
Maine	1 set	2012-13	n/a	3	5	5	4	4
Maine	2 sets	2012-13	3	4	4	3	3	3
Massachusetts	2 sets	2013-14	4	4	5	5	4	5
Minnesota	7 sets	2013-14	4	4	5	2	3	2
Rhode Island	3 sets	2017-18	2	3	5	3	1	2
Utah	2	2017-18	3	4	3	5	4	4
Average rating			3.7 - helpful	3.9 - easy	4.6 - extremely helpful	4.1 - maintained good condition	3.7 - well	3.8 - satisfied

Comments on Kuper Tuca SX carbide plow blades

Iowa DOT (2014-15) • Overall rating: 4

We compared the Kueper Ceramic blades to JOMA and regular carbide blades. In our short testing it appears we were getting longer blade life from the Kueper ceramic blades versus JOMA on micro-surface roads.

Maine DOT (2012-13) • Overall ratings: 5, 4, 3

- I rated a 4 on question 1 only because the drivers side end doesn't handle contact with curbing well. Installing a device on the ends to cushion impact with curbing would be helpful. Other than that it is a great product, and it will most likely last another season!!!!!!
- The Tuca Blades lasted 2 to 3 times longer than conventional blades depending on the road condition it was used on.
- I believe we would need to do a few more trials to make sure the cost is effective.
- One set worked well that was on the Interstate, the other set was on back roads and wore out quickly

Massachusetts DOT (2013-14) • Overall rating: 5

We have enough life left in these blades for another year. Will be doing the cost analysis upon the completion of the trial.

Minnesota DOT (2013-14) • Overall rating: 2

Short life of blades experienced. It was thought that dry snow caused this issue. Only 1 district out of 8 liked the blades due to the possibility of too dry of snow.

Rhode Island DOT (2017-2018) • Overall rating: 2

We used Kueper Blades on highway road surfaces that our standard blades would rapidly wear on (i.e. chip seal). The Kueper Tuca SX blades are good blades but did not show much difference in wear life on our highway surfaces designed with chip seal. Kueper does make other blades that we utilize in different areas but for this specific test they did not hold up as well as we expected.

Utah DOT (2017-18) • Overall rating: 4

Even though there were only 2 of these tested, the drivers that did test them thought that they worked great.

Kuper GK5 ceramic-insert blades

<http://kueperblades.com/gk5-2/>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
North Dakota	N/A	N/A	4	4	4 - helpful	1	1	1
Average rating			4 - helpful	4 - easy	4 - helpful	1 - Noticeable deterioration	1 - Not at all well	1 - Not at all satisfied

Comments

North Dakota DOT • Overall rating: 1

The ceramic was not durable and shattered and failed very quickly. There was a heavy drag due to the rubber encasement. They were all replaced with the Kuper Tuca with improved results.

Kuper ceramic-insert blades

<http://kueperblades.com/>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
Illinois	1	2008-09	n/a	5	3	1	4	1
Average rating			n/a	5 - extremely easy	3 - average	1 - noticeable deterioration	4 - well	1 - not at all satisfied

Comments on Kuper ceramic-insert blades

Illinois DOT (2008-2009) • Overall rating: 1

Product does not hold up to our snow plowing environment. Product needs curb guard capability. Noted less noise, smoother and scrapes better.

Lake Effect blade assembly (Ironhawk)

<https://ironhawkindustrial.com/products/blade-systems/lake-effect-blade-system/>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
Iowa	4 sets of front blades	2016-17	4	5	4	4	4	4
Kansas	90	2015-16	n/a	3	2	1	1	1
Utah	2	2016-17	4	1	2	4	3	2
Average rating			4 - helpful	3 - average	2.7 - average	3 - average	2.7 - average	2.3 - not very satisfied

Comments

Iowa DOT (2016-2017) • Overall rating: 4

This is the first year that we have tested these blades. Comments from Operators:

- * Easy to install and seemed to be very durable.
- * Used on Micro surface and concrete with good results. Seemed to work well on packed snow.

Kansas DOT (2015-2016) • Overall rating: 1

Blade was marked as a JOMA equivalent. But it failed to live up to it. A manufacturing defect in the first batch had to be replaced and got everybody off on the wrong foot as far as trying something new.

Utah DOT (2016-2017) • Overall rating: 2

While the blade cleans fairly well and lasts about 3 months it is very hard to install and remove.

Monroe flex plow with trip edge

<https://municipal.monroetruck.com/municipal-trucks/>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
Arizona	25	2015-17	3	4	4	5	5	4
Average rating			3 - average	4 - easy	4 - helpful	5 - maintained excellent condition	5 - extremely well	4 - satisfied

Comments

Arizona DOT (2015-2017) • Overall rating: 4

Goal: Better lane coverage due to wider plow moldboard.

We have problems with uneven bridge expansion joints during the winter months. Whereas a standard expressway plow's bit will either drop in between the expansion joint, or catch on an expansion joint that is higher on one side than the other. Depending on the plow truck's speed, this scenario can cause thousands of \$\$ in damage to equipment.

The Monroe flex plow with trip edge (must differentiate between "trip edge" and trip moldboard. Plows with trip moldboard require the plow driver to exit the vehicle and try to reset the moldboard which is dangerous for more than one reason)

When the Monroe trip edge catches on something, it trips a spring-loaded latch that lets the plow edge go over these hazards. All the operator needs to do to reset the trip edge is bump the plow raise lever to raise the plow about 6" and the edge resets. He doesn't have to get out of the truck or stop the truck.

Multiple-Edge Plows

<https://clearroads.org/multiple-blade-plow-prototypes/>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
Indiana	1	2008-09	4	4	5	5	5	5
Iowa	1	2008-09	4	5	5	5	5	5
Iowa	1	2008-09	1	4	1	2	1	1
Pennsylvania	3	2010-11	3	4	2	3	4	3
Average rating			3 - average	4.25 - easy	3.25 - average	3.75 - maintained good condition	3.75 - well	3.5 - satisfied

Comments

Indiana DOT (2008-2009) • Overall rating: 5

Plow removed majority of moisture from the road service. Enabled road to dry quickly.

Iowa DOT (2008-2009) • Overall ratings: 5, 1

- I would say it the best plow I have had in 36 years with the DOT.
- Kudos for the effort! But nobody in this shop wants this plow. Feel free to move it!

Pennsylvania DOT (2010-2011) • Overall rating: 3

Henke's response and customer service lacked. This product had to be modified greatly to be used with a truck equipped with a wing plow. Blade wear was a concern as well as maintenance.

Nordik Move cutting edges

<https://nordikblades.com/>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
Connecticut	Several dozen	2016-2018	4	4	4	4	4	4
North Dakota	N/A	2016-2017	3	2	3	3	3	3
Average rating			3.5 - helpful	3 - average	3.5 - helpful	3.5 - maintained good condition	3.5 - well	3.5 - satisfied

Comments

North Dakota DOT (2016-2017) • Overall rating: 3

While there were positive comments about the edges, there were also other concerns. In the three districts that tested the new blades, there was a varying level of knowledge of the different types of cutting edges and how to compare them all. Some of the operators were evaluating against standard carbide edges. We all agreed that the MOVE edges performed better than the standard carbide edges, but this was not really an apples to apples comparison. Those with experience with different hybrid edges did not like the MOVE edges as much as the other hybrid edges that NDDOT currently uses. The MOVE edges were more complex to our operators than the other hybrid edges.

PolarFlex blades (Valley Blades Ltd.)

<http://www.valleyblades.com/polarflex/>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
Illinois	2+	2011-16	4	4	4	5	5	4
Illinois	20	2010-15	4	4	4	5	5	5
Illinois	8	2009-13	5	4	4	5	5	5
Illinois	3	2009-12	4	5	5	5	4	5
Iowa	8 sets of front blades	2015-17	4	4	4	4	4	4
Maine	n/a	2010-11	n/a	5	5	3	4	4
Minnesota	3	2013-14	4	2	5	3	3	3
North Dakota	3	2010-11	n/a	4	4	5	4	3
Utah	6	2016-18	4	4	3	4	4	4
Utah	Statewide	2015-16	4	3	4	4	4	4
West Virginia	1	2012-13	4	4	4	5	5	5
Wyoming	n/a	2014-15	3	4	4	2	1	2
Average rating			4.0 - helpful	3.9 - easy	4.2 - helpful	4.2 - maintained good condition	4.0 - well	4.0 - satisfied

Comments

Illinois DOT (2011-2016) • Overall rating: 4

Polar Flex blades were tested to compare the product to Joma blades. Joma blades had an issue w/ the bolt holes at the time becoming worn and oval shaped that would cause damage to the blade segment where it would need to be replaced. Polar Flex blades did everything the Joma blades did - decreased number of blade changes/injuries, cleaned the surface better, and provided a smoother ride with less vibration. Polar Flex blades also solved the bolt issue Joma blades had. Polar Flex blades have lasted 1-5 years, depending on the surface it's clearing: blacktop vs. concrete roadways. Polar Flex blades have had issues with the plow driver damaging some of the 4' sections, but that has been mostly due to hazards in the road while plowing where they catch/hit the blade on something. Parts are expensive. Overall, Polar Flex is a great product.

Illinois DOT (2010-2015) • Overall rating: 5

Feedback from our districts indicates [the PolarFlex blades] clean roads effectively and they last on average at least 3 times the length of conventional plow blades.

Illinois DOT (2009-2013) • Overall rating: 5

The Polar Flex systems have lasted 2 winters in most locations. Typically we would go through multiple sets of blades per winter in those locations. The operators like them as they are very quiet. They also do a great job clearing the pavement because they conform to the pavement.

Illinois DOT (2009-2012) • Overall rating: 5

Provides both an increased length of life and a performance improvement over standard carbide hard blades.

Iowa DOT (2015-2017) • Overall rating: 4

Operator comments: -- Install was fairly easy. -- Seemed to wear good on all surfaces. -- Flexed very well on uneven surfaces. -- Very quiet.

Minnesota DOT (2013-2014) • Overall rating: 3

The difficulty in installation was a large setback in the use in this product.

Utah DOT (2016-2018) • Overall rating: 4

Most of the drivers love the Polar Flex, but there have been a few that complain that the individual teeth snag on the edge of pavement. Another challenge is that sometimes teeth get shoved upward and won't come back down. Another complaint is when you change out an individual tooth and then you have to wait for it to wear down to be flush with the older teeth.

Utah DOT (2015-2016) • Overall rating: 4

We had a few minor problems with the blades but the reps came out and worked with us to fix the issues and they did not occur again.

West Virginia DOT (2012-2013) • Overall rating: 5

Very quiet. Worked good at cleaning the road and did a great job cleaning over/around raised pavement markers. Virtually eliminated shock and vibration from the plow transmitted back into the cab. Operators loved it!

Wyoming DOT (2014-2015) • Overall rating: 2

WYDOT will need to purchase another test set. The set provided did not hold up but there may have been operator and mechanical errors that played into the less than stellar performance of the product.

Power float valves (Cirrus)

<https://www.certifiedpowersolutions.com/products/snow-ice/hydraulic-systems/>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
Iowa	12 units	2016-2017	3	3	4	4	4	4
Average rating			3 - average	3 - average	4 - helpful	4 - good	4 - well	4 - satisfied

Comments

Iowa DOT (2016-2017) • Overall rating: 4

We installed these units on trucks that were also being used for blade testing. Goals were to reduce weight on the front plow and to increase blade life. Operator comments:

- Not sure how much more blade life was achieved but this obviously made a difference. Much better when operating in conditions of light fluffy snow or when clearing areas that have pillow drifts.
- Need a different setup in the truck for the operator to engage the Float valve. (Operator had a to use a toggle switch that was remotely mounted to engage the float. Operators had a difficult time using this toggle switch. This winter season, we are removing the toggle switches and going to a 3 button joystick that will be much easier to operate.)
- This float valve must be used with a load sense pump not a gear pump.

We plan to outfit approximately 30% of our fleet for the 2017-2018 winter season and continue testing this Power Float.

Razor XL (Winter Equipment)

<https://winterequipment.com/razor-xl.html>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
Utah	30	2017-18	4	3	4	5	4	5
Average rating			4 - helpful	3 - average	4 - helpful	5 - excellent	4 - well	5 - extremely satisfied

Comments

Utah DOT (2017-2018) • Overall rating: 5

This was one of the most popular blades that we tested and there was much interest in trying them out as indicated by the 30 blades tested.

TowPlow (Viking-Cives)

<https://www.vikingcives.com/Products/?CategoryID=7>

State	Quantity tested	Season tested	Instructions	Ease of installation	Vendor support	Durability	Addressed problem	Overall satisfaction
Arizona	1	2015-16	3	4	5	5	4	4
Colorado	3	2010-13	5	3	4	5	5	5
Idaho	2	2016-2017	4	3	4	3	3	3
Kansas	2	2015-16	n/a	4	5	5	4	4
Maine	1	2008-09	5	5	5	5	5	5
Michigan	1	2012-13	3	3	n/a	4	5	5
Minnesota	12	2011-14	3	4	3	4	5	4
Minnesota	1	2010-11	4	2	4	4	5	4
Minnesota	1	2009-10	3	4	4	4	4	5
Minnesota	4 districts	2008-09	No Response	No Response	5	No Response	No Response	5
Minnesota	1	2008-09	4	3	4	5	4	5
Missouri	6	2009-11	5	5	5	5	5	5
Missouri	1	2009-11	4	3	5	4	5	4
Missouri	2	2009-11	5	5	5	5	5	5
Missouri	8	2008-09	4	5	5	5	5	5
Missouri	No Response	2008-09	4	4	4	4	5	5
Missouri	No Response	2008-09	5	4	4	4	5	5
Missouri	1	2008-09	5	5	5	5	5	5
Missouri	No Response	2008-09	5	5	4	4	5	5
Missouri	No Response	2008-09	5	4	4	4	5	5
New Hampshire	1	2011-12	4	3	5	5	4	4
North Dakota	2	2011-12	n/a	5	5	4	5	5
Ohio	1	2010-11	5	5	5	5	5	5
Pennsylvania	N/A	2011-2017	3	2	3	2	1	2
Pennsylvania	4	2009-11	2	2	3	5	4	4
South Dakota	1	2015-2017	5	5	5	5	5	5
Utah	10	2011-14	5	4	5	5	5	5
Vermont	2	2013-2017	4	5	4	5	4	5
Washington State	1	2013-16	4	4	4	5	4	4
Wisconsin - Marquette Co.	n/a	2009-11	5	4	5	5	5	5
Wyoming	n/a	2014-15	4	3	5	4	4	4
Average rating			4.2 - helpful	3.9 - easy	4.4 - helpful	4.5 - maintained excellent condition	4.5 - extremely well	4.5 - extremely satisfied

Comments

Arizona DOT (2015-2016) • Overall rating: 4

AZ has ordered one more tow plow for the upcoming winter maint season

Colorado DOT (2010-2013) • Overall rating: 5

We are anxious to get a reversible cast towplow.

Comments on TowPlow (continued)

Kansas DOT (2015-2016) • Overall rating: 4

One plow in rural interstate and one plow in urban interstate. First winter went well and we have ordered 4 more of the units.

Maine DOT (2008-2009) • Overall rating: 5

I'm the first driver in MDOT to try out the Tow plow. I can only hope that from the test, Maine will buy one or more. The Tow plow made my job easier and safer.

Michigan DOT (2012-2013) • Overall rating: 5

The tow plow seems like a viable tool to improve winter maintenance operations. Upon delivery, the TP needed to be enhanced to work with truck, etc. Needed to add lights, etc. We also had to put on a flexible blade, as the pilot route had raised pavement markers, which tore up steel blades. Unloading unused material is a pain because the discharge is on the tongue side (our mechanics plan to alter this in future years). By allowing other regions in our state to use the towplow, we increased interest and plan to buy more, when the funding allows.

Minnesota DOT (2011-2014) • Overall rating: 4

We have added salt brine tanks to some of the tow plows.

Minnesota DOT (2010-2011) • Overall rating: 4

MnDOT has now expanded the use of tow plows throughout the state to about 15-18 units.

Minnesota DOT (2009-2010) • Overall rating: 5

Since initial test period, MnDOT has added six more including some outside the Twin Metro Area. More are planned to be purchased and installed in the future.

Minnesota DOT (2008-2009) • Overall rating: 5

There were some initial problems due to the learning curve, but the more familiar my operators became with the towplow, the more they liked it. I now have 5 operators trained on this piece of equipment.

Missouri DOT (2009-2011) • Overall ratings: 5, 5, 4

• We use the tow plow to clear the driving lane shoulder while the truck clears the driving lane. We then are trying to be equipped to have a left wing on the truck plowing the left lane. This enables us to clear grass to grass with one pass with two trucks versus having to make extra passes to clear the shoulders. When just clearing the left shoulder that truck is in a dangerous position while partially in the lane (sitting duck) with speeds approaching 75-85 MPH. When clearing the shoulders the same time lanes are cleared is much safer. It also enables you to have shoulders cleared if there is an incident. Emergency vehicles have a better chance getting to the incident in a more timely manner. The ability clearing grass to grass also helps when the snow is blowing, it give some storage on the shoulder instead of filling quickly the driving lanes. Plowing grass to grass speeds up the process, saves time and is cheaper. It allows us to get to other routes much sooner. You also have the ability to plow both lanes in a blizzard like condition just to help keep lanes open. Towplow is a very good tool and hope to get more and make more improvements. Need some left towplows or something to be more versatile. VERY GOOD TOOL

• Would like to see a 20' towplow. Would like a spreader rather than a brine tank.

• This has been a very good tool for snow removal and I'm in hopes of getting a third tow plow at Ste Genevieve and using it on I 55 in Ste Genevieve County and Southern Jefferson County

Missouri DOT (2008-2009) • Overall rating: 5 (from all six respondents that year)

• Tremendous product. Worked well. Has improved our snow removal operations considerably. Widens the clearing path of a single truck. TowPlows can also be used to move the snow farther off the shoulder in a way similar to a wing. The positive part of this is that the truck stays on a good driving surface and the TowPlow will cantilever out past the edge of the shoulder.

• The Tow - Plow has been a great asset to our operation we have been able to pull two of our trucks and operators off the interstate and put them on other routes to bring our level of service up for those routes. We had a 8 to 10 inch snow storm and blowing winds in our district which was not in my area but we sent our 2 Tow - Plows to help keep the interstate open from drifting snow and they just kicked butt and simply amassed the crews that was fighting the storm before we showed up. They are a great piece of equipment. The more we do with the tow - plows the more we learn to do.

- We were using 5 trucks to clear the 38' section of roadway in the past. We used the tow-plow and 2 other trucks to achieve the same results. We eliminated 2 trucks. It performed very well and the operator was well pleased with how the truck and tow-plow handled.
- I think it is one of the best pieces of equipment that MoDOT has bought and we are glad we have it to use.
- Nothing but kudos and I wish I had 2 more and we could take care of I-55 with 4 Tow Plows on the main driving service which is from one end to the other would be app. 90 miles of 4 lane. We do have a truck on I-55 taking care of the ramps and overpasses and also 2 rest- areas in the mix. Each truck other than the tow plow takes care of about a 20 to 25 mile stretch. If the Tow Plow gets behind or would need help on something they are out there to help out. Thanks

New Hampshire DOT (2011-2012) • Overall rating: 4

We experienced horsepower issues on state assigned equipment, limiting our patrol speeds on roads with grade. With some minor adjustments in driver thought process, we were able to test the product moderately. The winter season did not produce the extreme conditions one might wish for to thoroughly test the plow unit however, the device does have its merit. One concern is, that if the towing unit has a breakdown, the patrol section is now without two plowing devices, unless a back up unit can be mated to the plow for emergencies. The unit does have its place in the system if it were tailored correctly to our specific needs in NH...

North Dakota DOT (2011-2012) • Overall rating: 5

Operators are somewhat hesitant to use the tow plow for the first time but, after spending some time driving it, realize it is a lot easier to use than they originally thought. Operators took trial runs through their plow routes to get used to obstacles they'd face and areas where they could turn around. Once they get used to it, they love it. Word of mouth has spread news of the tow plow's benefits throughout the state. The Districts who have them want more of them. Most of the Districts who don't have them are requesting them. We really like them, have noticed many benefits, and we plan to keep adding to our fleet. Additional Information: http://www.dot.nd.gov/divisions/materials/research_project/MR201001final.pdf

Ohio DOT (2010-2011) • Overall rating: 5

Extremely valuable piece of equipment. No problems with equipment.

Pennsylvania DOT (2011-2017) • Overall rating: 2

Tow plow could not spread the entire snow route with material and Dump Truck required modifications

Pennsylvania DOT (2009-2011) • Overall rating: 4

Vendor support was quick. Operator manual was complete, but service and parts were lacking material for the add-on options. Truck up-fit cost was high and had to be converted for different means of spreading granular material while plowing.

South Dakota DOT (2015-2017) • Overall rating: 5

We finally had a decent snow year to test out the bi-directional tow plow. We plan to purchase 6 more bi-di's for this next season.

Utah DOT (2011-2014) • Overall rating: 5

Units were consistent in road-readiness. Fit and finish was excellent. Post sale support was outstanding from manufacturer

Vermont AOT (2013-2017) • Overall rating: 5

We were able to deploy the tow plow during overnight storms (and others to a lesser degree) and provide winter maintenance to 2 lanes of traffic with one truck, which allows more coverage when we send workers home due to 1.2 to 1.3 operators per route.

Washington State DOT (2013-2016) • Overall rating: 4

We needed to modify the tow-plow to unload excess salt from the rear. This was a relatively inexpensive exercise but would have been better/less expensive if it had come that way.

Wisconsin DOT -- Marquette County (2009-2011) • Overall rating: 5

As I said Tow plow cleanup time is a slight issue.

Wyoming DOT (2014-2015) • Overall rating: 4

Operators are gaining confidence in how the unit handles.