

2019 YOU SHOW US CONTEST

Snow Bank Buster

COUNTY: Steele County Highway Department

DESIGNERS: Reed Oien, Tim Nerby, Daniel Aberle

ADDRESS: 201 Gordon Street, Finley, ND 58230

CONTACT: Reed Oien

E-MAIL: steelecohighway@nd.gov

TELEPHONE: (701)789-0536

PROBLEM STATEMENT: Ditches fill with snow and become level with the road. As a result, snow drifts/banks build up on the edges and along the road shoulders. These events are more prevalent where there are shelter belts and road approaches. When the ditches are full of snow, and normal snow drifting occurs, there is no place for the snow to go but to stay on the road. This creates hazardous conditions for the motoring public.

SOLUTION: Some of the road crew designed the snow bank buster. The bank buster was designed to move more snow in one swipe from deep steep ditches and from culverts at intersections. With one swipe, the snow bank buster cuts a 5-foot swath versus a 2-foot swath (size of a backhoe bucket) into a snowbank or drift. The snow is pulled up onto the shoulder and then blown into field out past the ditches. While snow removal work is being done, flaggers are placed at each end of the work zone to warn and regulate the movement of traffic.

The snow bank buster consists of three five-foot cutting edge wings. The wings are attached to the bucket of a rubber tired backhoe using angle iron and ½-inch bolts.

LABOR, EQUIPMENT, AND MATERIAL:

Equipment used:

Chop saw, drill saw, handheld drill

Materials:

New materials:

6 – sections of 1.5-inch angle iron, 7-inch long, ¼ inch thick

3 - 5-foot cutting edges for wings

8 - 1/2-inch and 1.5-inch long bolts, 24 grade

Total Labor Hours: *(Includes time required for design and discussion.)*

3 people

4 hours

COST SUMMARY:

3 Cutting edges: \$100 each x 3 = \$300

Bolt: \$3 each x 8 = \$24

Angle iron: \$20

Total Cost: \$350 plus labor

SAVINGS AND BENEFITS:

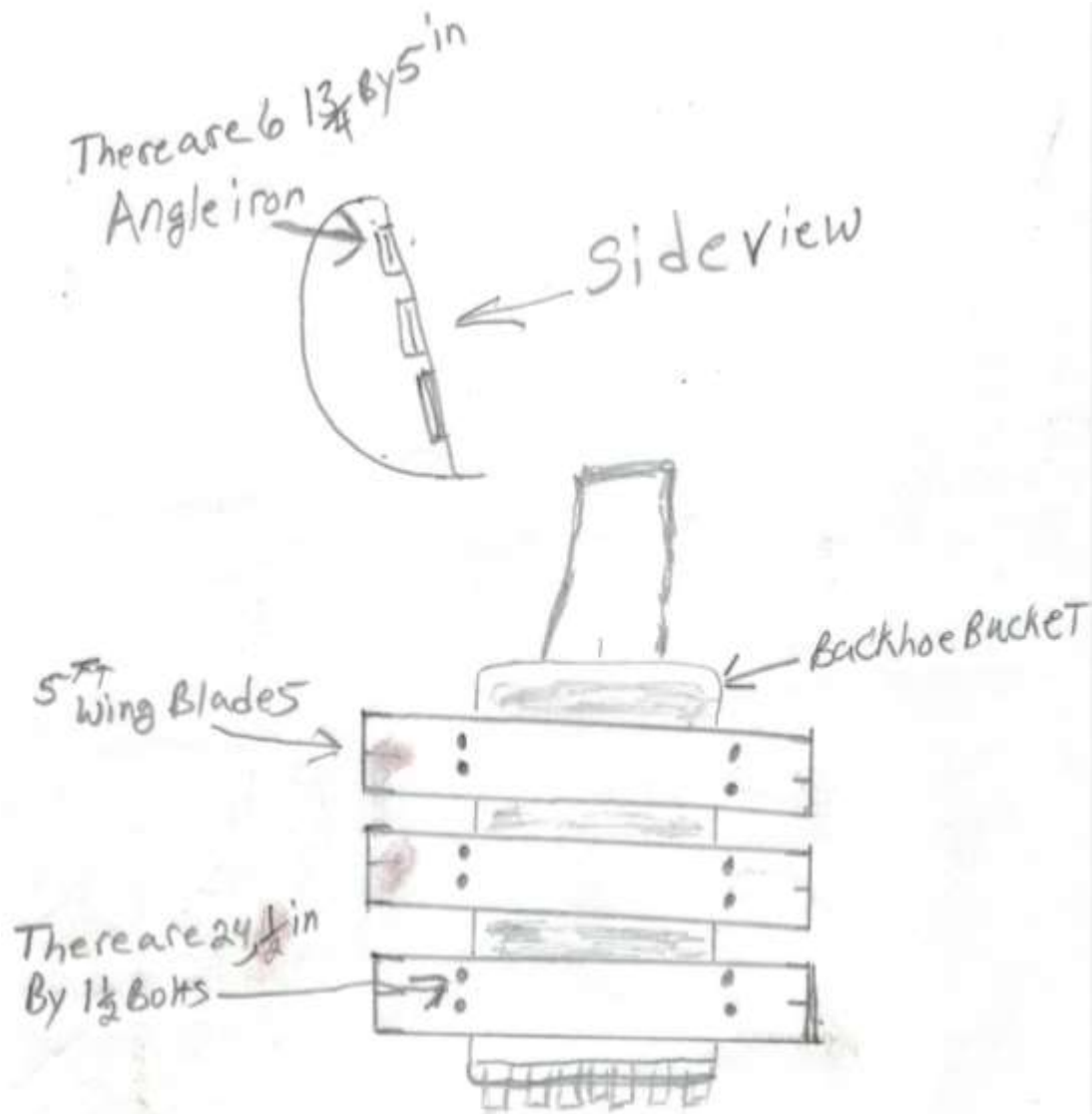
The county now has a more effective and efficient means of moving snow, while creating safer roadways. There has been a savings in time, money and workforce. Less time is used moving the snow. The backhoe is being used more efficiently which is putting fewer hours on other snow removal equipment. The number of hours needed to complete the task have also been reduced. Moving snow more expeditiously allows for the snow to drift off into the ditch which keeps the roads clear of snow. Snow doesn't build up on the shoulders where it creates visibility issues for the motoring public.

ANNUAL OPERATING COSTS:

Prior to using the innovation – The average cost to run the backhoe is approximately \$125 per hour. A project took three times as long to complete with the 48-inch bucket. If it took three hours to pull snow from the ditch, the cost was \$375.

After using the innovation – The width of the snow bank buster is 5 feet. A snow-removal project can be completed three times faster than previously. A project that previously took 3 hours to complete can now be completed in 1 hour at a cost of \$125. Typically the backhoe is not used in the winter. The county now uses the backhoe year around.

DRAWING (SCHEMATIC) WITH DETAILS:



Snow bank buster ready for use.



Angle view of snow bank buster attached to backhoe bucket.



Backside of snow bank buster attached to bucket using angle iron and bolts.



Angle iron and bolts.



Busting snow in ditches and pulling onto roadway.



Snow pulled on half of roadway.



Blowing snow from road into the field past the ditch. On this road stretch, it was necessary to blow snow across the road...in the direction of a typical wind.



Videos

Snow Bank Buster 1

https://drive.google.com/a/ndsu.edu/file/d/1CT09XK0ihgxaXjMPsdpTXs_E_uiSHOT/view?usp=sharing

Snow Bank Buster 2

<https://drive.google.com/a/ndsu.edu/file/d/1fyLU3buJ4jqekffaLV2DL5kCEKk8b46S/view?usp=sharing>