

2021 INNOVATION CHAMPIONS CONTEST

Cutting Edge Rack

COUNTY: Dunn County Highway Department

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PROBLEM STATEMENT: In the winter, cutting edges for maintainers are stacked on the ground outdoors and must be dug out of the snow and brought indoors to be installed. Consequently, the cutting edges are extremely cold, making them impossible to work with. Crew members have to wait for the metal cutting edges to warm up before mounting them onto the moldboard or risk frostbite or other injury. Cutting edges stored inside the shop occupy needed work space. Two people were needed to move them when opening up work space or to lift onto the cutting-edge lift. This created staffing and time management inefficiencies as well as a safety hazard.

SOLUTION: Designed and fabricated a rack for cutting edges. Cutting edges brought into the shop can now be put on the rack instead of stacked on the shop floor. With the being mobile, it is easy to move around the shop to keep work areas open or to move closer to a maintainer. It takes only one person instead of two people to put a cutting edge onto a lift (a previous innovation) and install it on a moldboard. Cutting edges are always at room temperature making them easier and safer to work with and resulting in fewer injuries.

The rack which ideally holds 10 cutting edges has an a-frame design with brace supports. The design, metal weight rating, brace supports, and wheel rating were factored in to ensure the rack can handle the weight of 100-pound cutting edges regardless of where the edges were placed on the rack.

EQUIPMENT, MATERIAL and LABOR:

Equipment used:

Stick Welder
Torch
Chop Saw
Grinder
Drill Press

Materials:

Salvage material:

(4) 6-inch caster wheels
8 feet: 2x8-inch Chanel iron

New material:

60 feet: 2 x 2 x 1/4-inch square tube
78 inches: 1 1/2 x 1 1/2 x 1/8-inch square tube
44 inches: 2 x 3/16-inch in flat iron
(16) 1/2 x 2 1/2-inch bolts
(16) 1/2-inch nuts
2 lbs.: 3/32" 7018 welding rod
4 cans gray primer
4 cans yellow paint

Total Labor Hours: *(Including time for design and discussion)*

2 people
20 hours per person

COST SUMMARY:

Tubing: 2 x 2 x 1/4-inch	\$401.40
Flat iron: 2 x 3/16-inch	\$ 3.20
Bolts Nuts Washers	\$ 15.00
7018 welding rod	\$ 7.00
Total Cost:	\$426.00 plus labor

SAVINGS AND BENEFITS:

The cutting-edge rack has a multitude of benefits. Cutting edges placed on the rack are always at room temperature, which makes them easier to work with when they are needed. Fewer injuries occur because the cutting edges are warmed up.

The rack is easy to move around so that work areas can be easily opened up when needed. It can be moved closer to a maintainer when a cutting edge is being replaced.

In addition, the task of putting the cutting edge onto the lift can be done by one person as opposed to two people. With the rack there are greater efficiencies and fewer injuries.

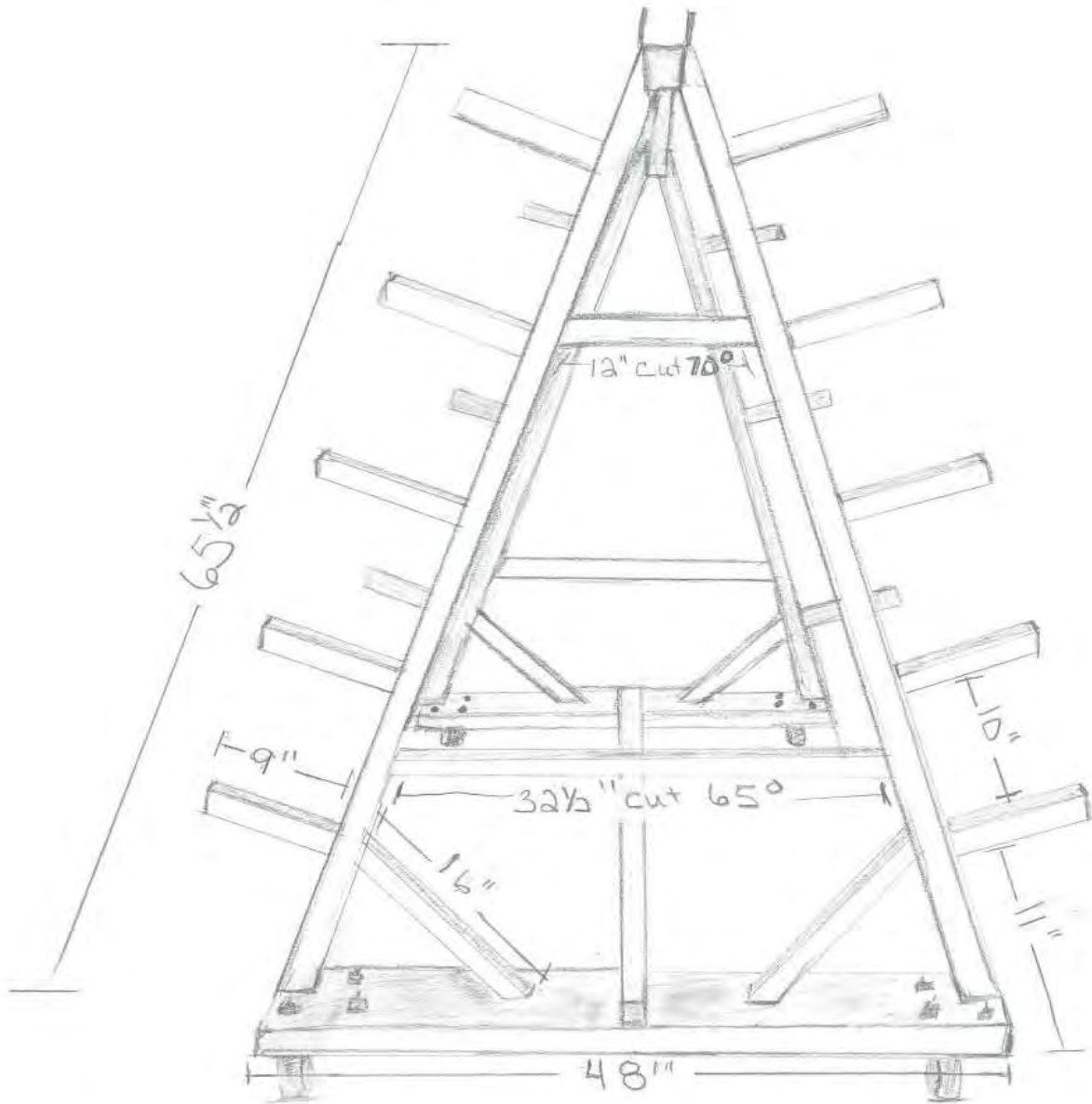
ANNUAL OPERATING COSTS:

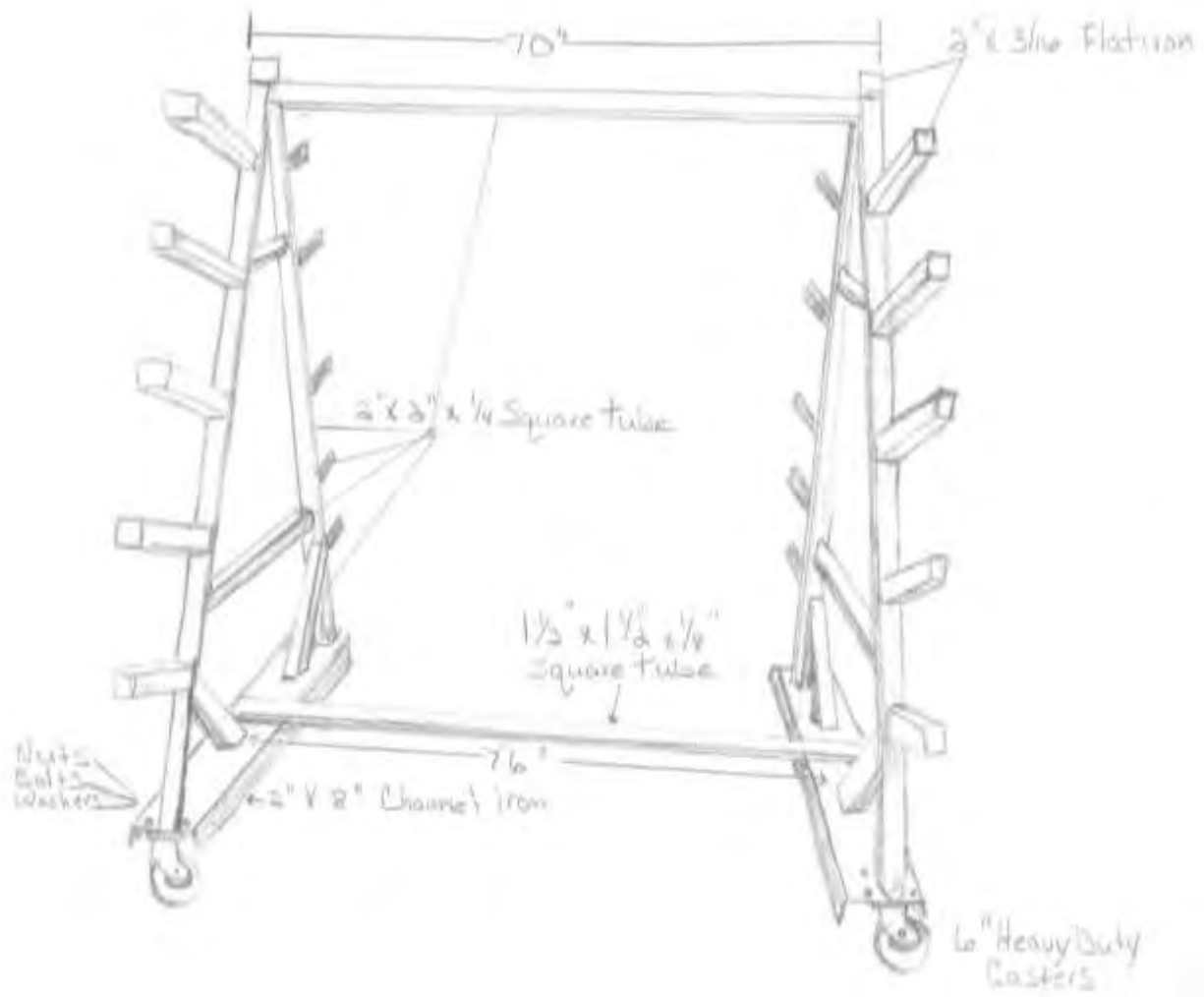
Before using the innovation – a limited number of cutting edges were brought into the shop and stacked on the floor in the shop. They were brought inside because it is safer and easier to work with them when they are warm. Sometimes it was necessary to move them to another location in the shop because the area they were stacked in was needed to do another job. Having to move them again was inefficient, cumbersome and dangerous.

Two people were needed twice when moving cutting edges: first to bring the cutting edges into the shop onto the floor, and again to lift the cutting edge off the floor onto the lift.

After using the innovation – Now, two people are needed only once: to bring the cutting edges from outside onto the rack. Only one person is needed to lift a cutting edge off the rack onto the mobile lift. The rack can be easily moved if the area is needed for another project. Cutting edges can be brought inside and placed on the rack anytime.

SCHEMATIC:





Cutting Edge Rack



Rack ideally holds 10 cutting edges. It can hold more.



4-inch heavy duty caster wheels (4)



Square tubing and channel iron for strength, reinforcement and stabilization.



Cutting edge on rack



Only one person needed to remove cutting edge from rack (onto lift) then over to maintainer.

