

## 2017 YOU SHOW US CONTEST

### “SIGN STEP” TO ATTACH TO PICK-UP RECEIVER HITCH and SIGN RACK

COUNTY: Billings County in North Dakota

DESIGNERS: Jeff Baranko

ADDRESS: Billings County Highway Department  
Medora, North Dakota 58645

CONTACT: Jeff Baranko, Jeff Iverson

E-MAIL: barankojeff@yahoo.com

TELEPHONE: (701)260-2588

#### **PROBLEM STATEMENT:**

A highway department pickup truck that is often used for sign maintenance and inspection is not well-suited to these tasks. This problem is two-fold:

- 1) Employees will use the side panel of a pickup box as a step, or use a ladder and lean it against a sign post when replacing a road sign. The pickup box panel does not have sufficient surface area for footing and creates a safety issue. A safety issue is also created when leaning a ladder against a sign post as the ladder tends to tilt to one side of the post or the other.
- 2) New road signs that are placed in the box of a pickup tend to slide around while the vehicle is in motion. The signs get damaged, and also become mixed with other signs in the box. When looking for a sign, employees must climb into the pickup box and sort through the mess to find the appropriate sign. Climbing in and out of the pickup box is a safety issue.

**SOLUTION:** Designed a sign step that attaches to any pickup with a receiver hitch. This sign step enables an employee to more safely replace signs that have been destroyed.

The sign step consists of three parts. The base part of the step attaches to the receiver hitch and is pinned so it tucks up against the truck during transport mode. The other two parts are placed in the pickup box and pinned to the sign rack with a rod and hooks. This prevents them from sliding around and makes them accessible. Once at the location, it takes less than a minute to assemble the sign step. The base part is retrofitted with a jack and used to stabilize the sign step. The step platform has a square tube trailer jack that is used to raise and lower the platform. The adjustable arm allows the user to pivot the step platform to coincide with the road's slope and allows the

platform to stay at a 90 degree angle. The adjustable 2 – 3 ½ foot safety waist/hand guard keeps the employee from over-extending and falling off. The sign step is designed so minimal disassembly is required for transporting from one location to another; simply remove the step and safety guard sections, close the pickup tailgate, tuck and pin the base part up against the bumper.

Designed a sign rack (26" W x 27 ¾" H x 23" D) that is placed or easily removed from the box of a pickup. The rack holds 12 road signs securely.

Four sign caps are mounted to the outside bottom of the rack platform. 12 modified street sign brackets are mounted to the inside bottom of the rack (each ear end has been sawed off.) 24 street sign bracket ends are mounted on the top inside – 12 on each side of the rack. Each top mounted side bracket has two notches for an "O" ring. The brackets hold and stabilize the signs. The "O" rings keep the signs from "wobbling."

The road signs in the rack are easily accessible, organized and protected from damage. The sign rack is pinned with an arm extension to the truck to prevent it from sliding around.

#### **LABOR, EQUIPMENT, MATERIAL:**

##### **The following materials were used for the sign step:**

Base of the step:

62" - 2 x 2' ¼" square tubing

Jack

2 hitch pins

Expanded step material - 12" W x 32" L

Neck tele spar – 45" H x 2' W

Square tube trailer jack

##### **The following materials were used for the sign rack:**

26" – 2" W x ¼-inch thick flat iron

72" – 1.5" x 1.5" 8-inch thick angle iron

62" – 1" x 1" x 1/8" square tubing

168" – 2.5" x ¼-inch thick flat iron

4 – 'old' sign caps

24 – "O" rings

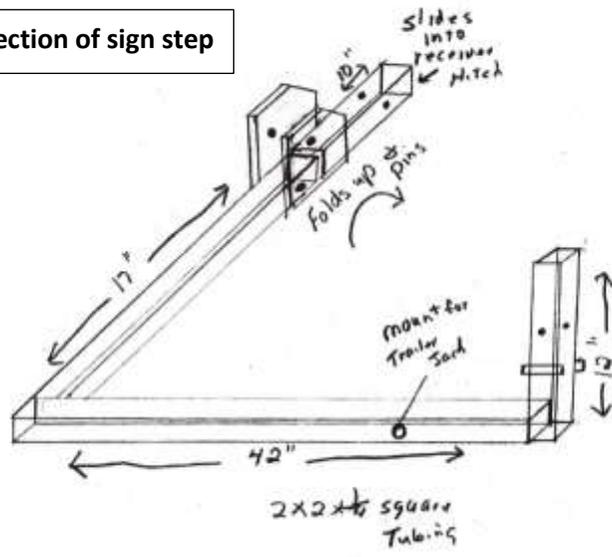
12 – 'old' street sign brackets: ends (ears) of the brackets are removed. 3 parts of bracket are used on the rack as explained earlier.

The material purchased: sign step base material for the platform and the base jack. All other material was on hand.

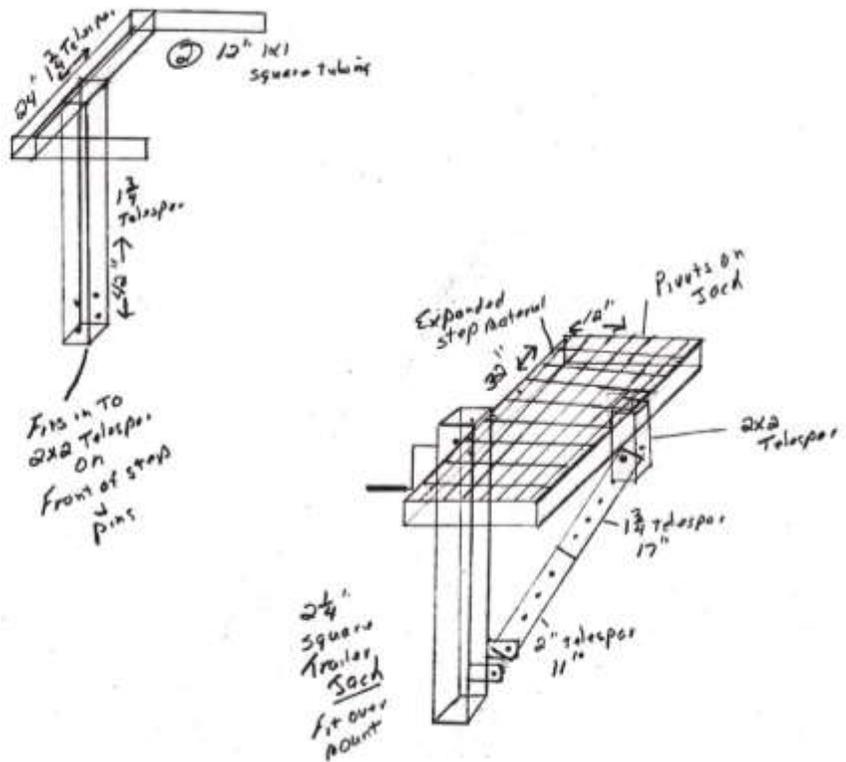
**Total labor hours:** 1 employee. Approximately 5 hours.  
(Note: this includes time for design and modifications)

**DRAWING (SCHEMATIC) WITH DETAILS:**

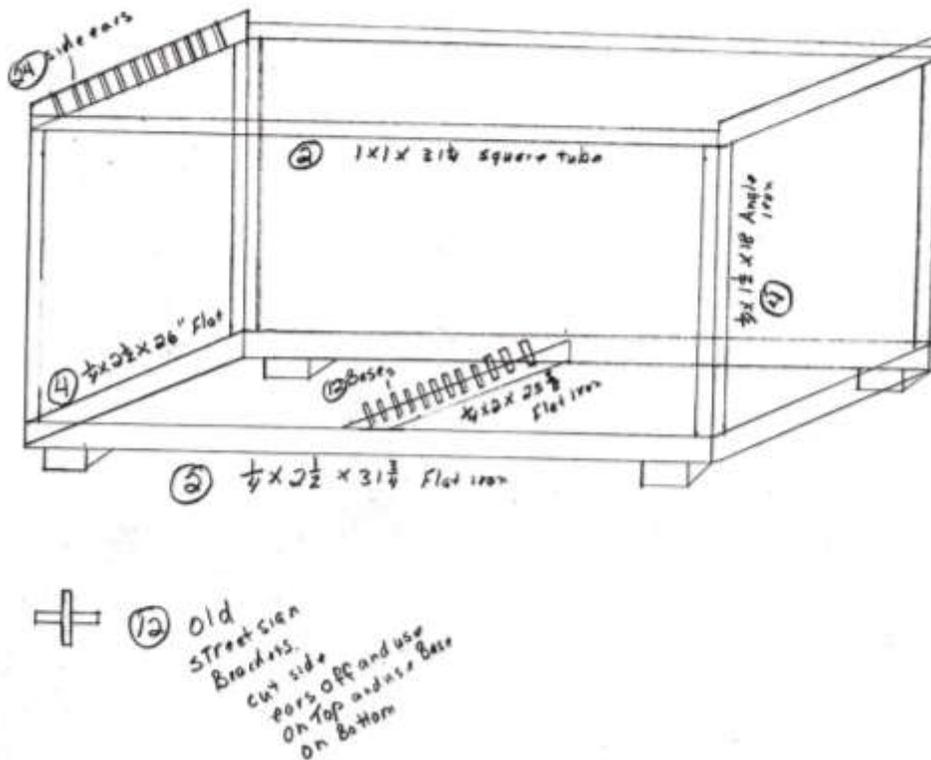
Base section of sign step



Step platform and safety guardrail.



## Sign Stand



### **COST SUMMARY:**

Sign Step - estimate \$150 to \$250 for materials plus labor

Sign Rack - estimate \$250 for materials plus labor

Total cost - \$400 to \$500 plus labor

### **SAVINGS AND BENEFITS** (*monetary and/or safety related*):

The County Road Department has experienced a savings in time, money, and manpower by using a pickup equipped with a receiver hitch sign step and sign rack for sign maintenance.

An employee checking signs has all the equipment and tools needed to replace a sign that has been damaged. This saves a trip back to the shop. There is a cost savings in fuel consumption by driving fewer miles driven and when using of a pickup versus a sign truck.

The cost to build a sign step and sign rack is very affordable. The sign step and rack are easy to lift and assemble. In addition, the sign step has multiple safety features. This makes checking and safely replacing damaged road signs a one-man operation. The benefits and savings are that it is less likely that an injury will occur and one employee, rather than two, is needed for sign maintenance. This innovation is a cost effective, efficient, and safe means for checking and replacing road signs.

Sign step



Adjustable step platform: use trailer jack to raise and lower.



Adjustable step for ditch slope.



Designed in 3 components makes it easy to lift and assemble.



Adjustable safety guardrail



Base of sign step mounted on receiver hitch (in transport mode)



Step platform and guardrail - sign step components pin to sign rack when in transport.



Sign rack – roads signs are easily accessible. No need to climb into pickup box to search through a multitude of signs laying on the bed.



Signs easy to find.



Bracket secures sign stand to pickup box

