

2018 YOU SHOW US CONTEST
Sign Reflectivity Assessment Tool

COUNTY: Burke County Road & Bridge

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PROBLEM STATEMENT:

Inspecting 1,500 road signs, which includes testing them for reflectivity has its challenges especially if trying to do it all during daylight hours. To rent a reflectometer is cost prohibitive. To inspect a sign during the day using a handheld spotlight and digital camera is cumbersome and takes more time. To inspect signs during the day and test them for reflectivity at night is inefficient and more costly. In addition, working on the roadside at night increases an employee's risk safety and the motor public. The county strived to find a more efficient and effective way to do annual sign reflectivity inspections and inventory 1,500 signs during daylight hours.

DISCUSSION OF SOLUTION:

Design and develop a tool and process so complete sign inspections can be done during normal daylight hours. We placed two high power LED lights with adjustable mounts on the headache rack of a pickup. By putting, a slight angle to the lights we are able to obtain better reflectivity results. We pulled electrical wiring from the LED lights into the pickup and installed an in-line switch so the driver can turn the lights on and off from inside the vehicle. The switch connects to the power supply with an in-line fuse or an auxiliary port in the fuse box.

We park the pickup between 50 to 75 feet from the road sign. From inside the cab, we take a picture of the sign using a digital camera. We then turn on the LED lights and take a picture of that same sign. When comparing the two photos, we are able to assess the reflectivity of the sign. The dated photos are up-loaded to the computer and stored in folders for their respective county road locations. Results become part of the sign inventory program.

LABOR, EQUIPMENT, AND MATERIALS:

Equipment used: Plasma cutter, drill and bits, wiring pliers

Salvage Material:

2 - 4"x18"x1/8" pieces of flat iron to build the light mounting plates to put the LED lights on the headache rack

New Material:

2 LED lights

Digital camera

Electric wiring

20 Amp inline fuses to hook lights to power supply

Various fasteners – bolts, nuts, flat and lock washers, zip ties

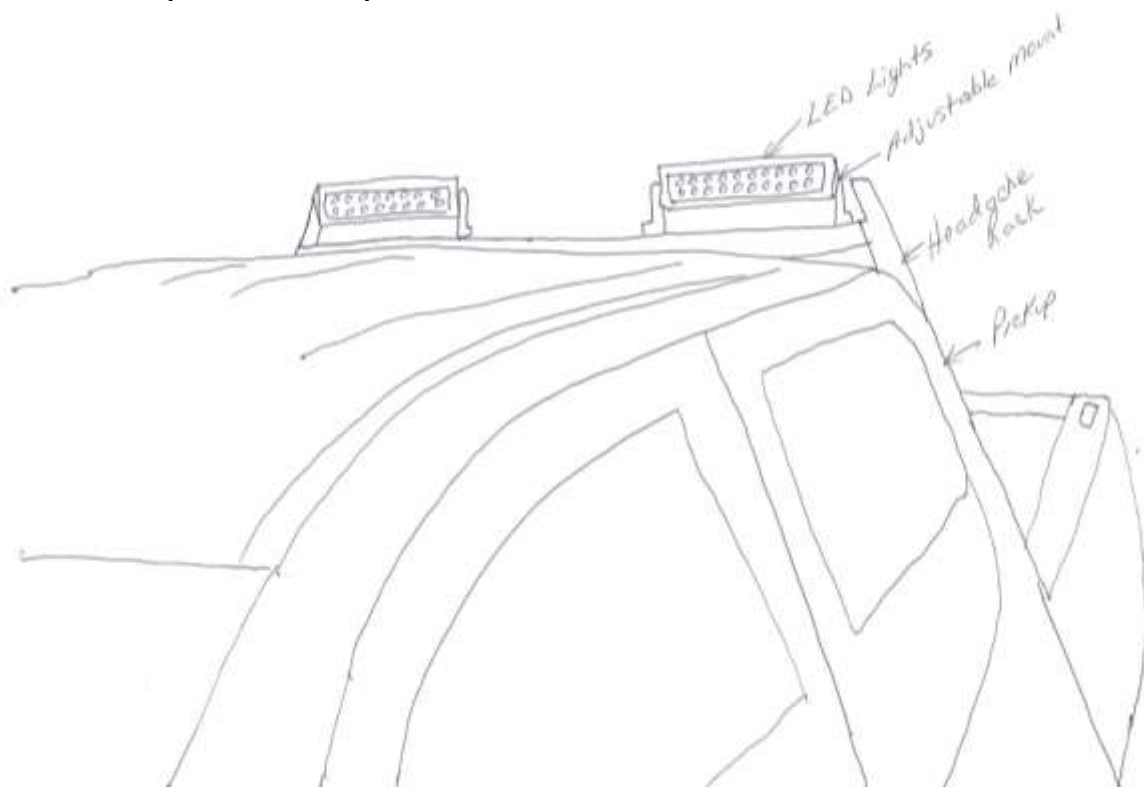
Connectors

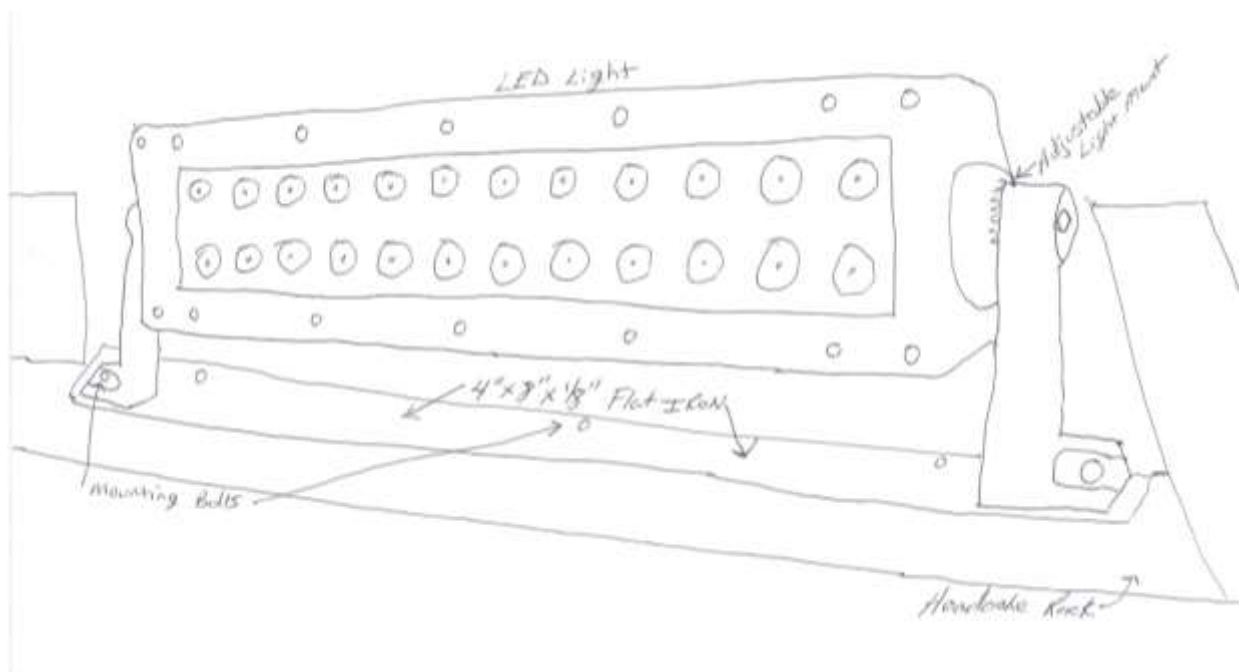
Total Labor Hours:

Total number of persons: 2

Total hours: 4

DRAWING (SCHEMATIC) WITH DETAILS:





COST SUMMARY:

The headache rack was already on pickup to mount LED lights on.

2 LED lights - \$350 (175.00 each)

Digital camera - \$300

Fuses, wiring, connectors used to hook lights up - \$15

Flat iron for mounts to headache rack- \$5

Total Cost: \$670 plus labor

SAVINGS AND BENEFITS

With the Sign Reflectivity Assessment Tool, the county has experienced an annual savings of approximately \$8,000 in time, manpower, and fuel. The 1,500 signs were tested for reflectivity in 6 days verses 25 days. Inspecting signs for damage and reflectivity is accomplished at the same time. Records with dated photos for each sign showing reflectivity and location is a great benefit in the event relating to liability concerns. Employee safety has improved since sign reflectivity testing is done during the daylight hours.

The following is a breakdown of the known costs/savings:

Reflectometer (new hand held): \$13,395

2 employees x \$25 per hour x 8 hours/day x 25 days = \$10,000

15 gallons of gas per day at \$2.50 per gallon for 25 days is \$937.50

Sign Reflectivity Assessment Tool: \$670

2 employees x \$25 per hour x 8 hours/day x 6 days = \$2400

15 gallons of gas per day x \$2.50 per gallon x 6 days is \$225

ANNUAL OPERATING COSTS:

Prior to using the innovation – estimated cost: \$10,937

After using the innovation - estimated cost: \$2,625

Before and after LED lights - comparison photos used to show sign reflectivity





LED lights mounted on vehicle headache rack



LED lights turned on to test sign reflectivity.



Photos taken with LED lights off, then on, to compare for sign reflectivity.



SIGN INVENTORY RECORDING FORM

Date of Inventory: 7 8 09 Rd Section: BC 19 Mile Marker: 12.4
 Intersection With: _____ Township: North Star Site No: 19-125
 GPS: NAD83 55.396 W-102 14.888
 Reason for Inv: New Sign Employee: RR First Inv. Date: / /
 Is Sign Removed? 0 MUTCD Code: RXR
 Date Installed: 7 8 09 Expected Service Life (Years): 7

NOTE: Sign messages, colors and size details are supplied separately.

No. & Position in Assembly: 1 A Facing: East Side of Road: North
 Intersection: _____ Width/Height: 36 36 Condition: New
 Facing Material: HIP Refl. Value Obs: _____
 Refl. Value Elec. (B_Grd, F_Grd): _____ Date Refl. Inv. _____

NOTE: Refl. Value Installed only with signs in position 1.

Post No: 1 Type: Telespar Size: 2" Length: 12'
 Condition: good Distance from Rd. St. (feet): 14' Mounting Height (feet): 5.5'

Remarks:

- Line 1: Good 99 8-12-12
- Line 2: .3-1-13 CH good
- Line 3: 4-29-14 Sign good. Post good. CH
- Line 4: 12-18-15 good. Two holes CH
- Line 5: 12-21-16 good CH
- Line 6: 12-18-17 Reflectivity Good CH