



# N.C. Department of Transportation

## Continuous Process Improvement

### Results & Award Form

**Category (Check One Only)**

- |   |  |
|---|--|
| <input type="checkbox"/> Dollar Savings               | <input type="checkbox"/> Internal Customer Service     |
| <input type="checkbox"/> Cycle Time Reduction         | <input type="checkbox"/> External Customer Service     |
| <input type="checkbox"/> Internal Communications      | <input checked="" type="checkbox"/> Safety Improvement |
| <input type="checkbox"/> External Communications      | <input type="checkbox"/> Labor Hour Savings            |
| <input type="checkbox"/> Environmental Sustainability |  |

**Submission (Check One Only)**     Award Application     Results Book Only  
 (Do not complete questions 1-4)

**Person or Team Being Nominated:**

Team Name Granville Co. Maintenance    Team Leader Mark Cooney  
 Team Members Roger Elliott, Clay Averette  
 Facilitator(s) \_\_\_\_\_ Team Sponsor \_\_\_\_\_  
 Process Owner \_\_\_\_\_

**Organization Name:** Division of Highways, Division 5, Granville Co. Roadway Maintenance

**Name of the Project:** Advance Flashing Warning Light for Flagman Stop/Slow Paddles

Provide a brief description of the problem, action taken to solve it and results of your action.  
 This description is not considered in scoring but will appear in the Results Book. (300 words)

Motor Vehicle Operators on North Carolina Roadways are experiencing greater difficulties seeing our Roadway Maintenance Flaggers while approaching NCDOT Work Zones. After several "close-call" reports of motorists driving into the work zone buffers prior to stopping, it was deemed necessary to develop a safety device which would increase the visibility of our flaggers and provide for earlier recognition of our stop/slow paddles by motorist approaching NCDOT Work Zones.

Our solution was to develop an advance warning flashing (red) light with a 12-volt mobile power source that can easily be attached to our current stop/slow paddles. Prior to approaching a NCDOT Work Zone, motorists are immediately alerted by the flashing red light to the presence and location of our flagger and that a stop condition exist ahead. The flashing warning light is extremely effective in low visibility conditions or when the flagger is positioned in shaded areas of the roadway. Experiments with lights powered by traditional batteries failed to generate the required light intensities to catch motorist's attention. Previous attempts to develop a warning light where also hampered by the 12-volt power requirement of LED lights. It was not until battery booster packs were produced that we were able to generate a 12-volt power source capable of powering LED lights. LED lights were the only light source capable of acquiring awareness distances in excesses of 1500 feet.

The advance warning flashing light has dramatically increase the motorist awareness distance of our flaggers. Surveys conducted during the use of the advanced warning light have shown that distance in which motorist recognize our flaggers have nearly doubled. Since the implementation of the light, motorist have strictly adhered to the stop condition as indicated by the red flashing light. There has not been a single incident involving motorists failing to stop and driving into the work zone buffer. The light has proven to be an invaluable asset in low visibility conditions, at night, and emergency situations. Overall, the advance flashing warning light is an additional factor of safety in NCDOT Work Zones and serves to protect our employees, which are our most valuable asset, as well as the traveling public, whom we serve.

*To check eligibility for the State Employee Incentive Bonus Program, contact the DOT Bonus Program Coordinator at (919) 733-7686.*

## **Criteria**

- 1- What are the tangible, intangible and verifiable results or impact of the project? Applicant should compare before and after data. In projects without data, evidence should indicate a verifiable improvement in quality. [50 points]**

Based on motorist surveys and results measured in the field, the advance flashing warning light has increased the distance in which motorist recognize our flaggers by a factor of two. On level terrain and a clear day, motorist recognized our flaggers at nearly 1500 feet. The flashing red light now provides motorist with an early warning recognition that a stop condition exists ahead. Since implementation of the light, we have not experienced a single motorist drive past the flagger and into the work zone buffer. Motorists have been extremely positive of the advance warning light and commented on how they were able to see the light much prior to recognizing the flagger or the stop/slow paddle. They commented that the light caught their attention and only then did they recognize the stop/slow paddle indication. Logging truck drivers commented that the advance flashing warning light gave them ample time to gear down their tractor-trailers and stop. They also added that the light reinforced that work zone signing was valid and that a work activity was actually in progress. The advance flashing warning light can provide to motorists as much as 9 seconds of advance warning to stop when approaching NCDOT work zone. The advance flashing warning light has proven to be an invaluable asset in providing early recognition of our flaggers by motorists in low visibility conditions (rain, dust, dawn or dusk), at night, and during emergency situations.

- 2- What is the size of affected population, or potential population if the project is implemented among its widest possible audience? [10 points]**

The initial affected population was motorist in Granville County using the State Maintained Roadway System. Since its conception, the light has been expanded to seventeen light units in service throughout Division 5 Maintenance and Construction Operations. Division 7 and Division 9 have expressed an interest from the Division Engineer and Safety Officer, respectively, in implementing the lights. The advance warning light can be implemented throughout the Division of Highways Maintenance and Construction Units where operations require the utilization of temporary lane closures, one-way traffic control, and flaggers.

- 3- Explain how the project could serve as a model for others to follow. Include the innovation, difficulty of implementation and documentation of results. [20 points]**

This idea was conceived by a Transportation Worker on the back of a napkin during lunch. The best ideas come from the people on the cutting edge, in this case, a flagger who realized that a safety improvement was needed before someone got hurt. He did something about it. The light is simplistic in design but fully serves its purpose. All equipment components are purchased commercially off-the-shelf or from the NCDOT inventory. The total cost for the light's components was \$205.00. Only Minimal training is required to use the light. The implementation is still on going as those who see the light are quickly drawn to its advantages. The documentation of results required conducting a survey of 50 motorist's initial reactions and feedback to the effectiveness of the new light. Actual field measurements were required to quantify the light's effectiveness and its comparable differences to have no light. This project should serve as a model for others to follow due to the fact that even simple ideas can make a big difference in safety- maybe even saving ones life.

- 4- Explain the process of implementation and provide documentation. [20 points]**

Implementation of the process began with the development of a prototype of the light. Once a light was designed and constructed, initial testing was conducted to ensure its compliance with MUTCD and NCDOT signing and warning light requirements. Following the review of the light by the Division Safety Officer, the light was placed into experimental service to determine the reaction of the motorist's and its effectiveness. Following a brief survey and evaluation of motorist reactions and performance, the light proved to be a valuable asset. The Division 5 Engineer approved the construction of an additional sixteen units which were constructed by the Division Equipment Unit and placed into service in both Construction and Maintenance

Units throughout the seven counties of Division 5. The light was presented at the NCDOT Operations Meeting in Raleigh and received positive feedback from Division Engineers from across the state.

Identify attached documentation \_\_\_ Photographs of the Light (Powerpoint Presentation)

<b>Contact Person</b>	<b>Mark Cooney</b>	<b>Date Submitted</b>	<b>7/31/01</b>
	(if different from team leader)		(No later than July 31)
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<b>Immediate Supervisor</b>	<b>Rodney Cooper, P.E.</b>	<b>Phone #</b>	919-693-8164

(Supervisor must approve application.)

**E-mail** to [CPI@dot.state.nc.us](mailto:CPI@dot.state.nc.us), **mail** disk to Productivity Services, Transportation Building, Raleigh, or **fax** to (919) 715-2533.

(Revised 2/2000)