NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT

Project Title:	**Safety and Accessibility of Dynamic Message Signs (DMS)**
RFP Number: 2013-09	**NJDOT Project Manager:** Edward Kondrath
Task Order Number: TO-109	**Consultant:** New Jersey Institute of Technology
Customer: Anthony Pelligrino	**Principal Investigator:** Daniel, Janice R.
Project Starting Date: 07/01/2013 **Original Project Ending Date:** 07/01/2014 **Modified Completion Date:**	**Period Starting Date:** 01/01/2014 **Period Ending Date:** 03/31/2014

Task	% of Total Budget	Total Budget	% of Task this quarter	Cost this quarter	% of Task to date	Cost To Date
Literature Review	5.0%	$4,866	100.00%	$4,866	100.00%	$4,866
Develop Research Exit Criteria	3.0%	$2,920	50.00%	$1,460	50.00%	$1,460
Preliminary Data Gathering	15.0%	$14,598	50.00%	$7,299	50.00%	$7,299
Identify Procedural Approach	10.0%	$9,732	0.00%	$0	100.00%	$9,732
Prepare Inspection Schedule	2.0%	$1,946	84.00%	$1,635	100.00%	$1,946
Perform Training of Inspectors	3.0%	$2,920	100.00%	$2,920	100.00%	$2,920
Perform Inspection	30.0%	$29,197	47.00%	$13,723	47.00%	$13,723
Perform DMS Safety Assessment	7.0%	$6,813	0.00%	$0	0.00%	$0
Develop DMS Database	15.0%	$14,598	0.00%	$0	0.00%	$0
Prepare Quarterly and Final Reports	10.0%	$9,732	0.00%	$0	0.00%	$0
Final Report	0.0%	$0	0.00%	$0	0.00%	$0
TOTAL	100 %	$97,323		$31,902		$41,946

Project Objectives:

The overall objective of the proposed research is to perform an evaluation of all older DMS designs to allow employees to safely access overhead DMSs.

Specific objectives to be accomplished in this research include:

- To perform a systematic inspection of the approximately one hundred and sixty DMSs located in the State of New Jersey to determine the safety and accessibility for maintenance of the signs;

- To assess whether existing procedures used for accessing newer signs can also be used for the older signs or whether revised procedures are needed.

- To identify safe work practices and develop engineering solutions or alternative solutions to allow employees to safely access overhead DMSs.

Project Abstract:

The Manual of Uniform Traffic Control Devices (MUTCD, 2012), defines dynamic message signs (DMSs) (or changeable message signs) as "...a traffic control device that is capable of displaying one or more alternative messages". Both permanent and portable DMSs are used to provide messages related to: Incident management and route diversion; warning of adverse weather conditions; travel times; and other types of warning situations. DMSs may also be used by State and local highway agencies to display safety messages, transportation-related messages, emergency homeland security messages, and America's Missing: Broadcast Emergency Response (AMBER) alert messages.

Section 2L.06 of the MUTCD provides guidance on the installation of permanent DMSs. The factors to be considered include: identifying locations to enable road users to select alternate routes or take other appropriate actions; factors related to safety and avoiding driver overload. No guidance, however, is provided to ensure the safety and accessibility to overhead DMSs for the required regular maintenance of these signs.

Occupational Safety and Health Standards (OSHA) Part 1910.23 provides standards on "Walking-Working Surfaces"Â which should be adhered to by employees accessing DMSs. The standards require that catwalks include handrails capable of supporting 200 lbs. of force, with means of egress be from/to permanent or stationary structures. Although DMSs in New Jersey are now designed to meet OSHA requirements for employee access of overhead signs during maintenance, older generation signs exist with limited or no safe access. For some older generation signs, walkways are not provided in accordance with OSHA regulations, may not be wide enough or may be loose and not properly supported. In addition, for some older DMS signs, hand-rails may not meet OSHA standards and although gates in front of the sign are provided, these gates can be loose or do not close.

In this research, work will be performed to evaluate all older sign designs to identify safe maintenance practices and develop engineering solutions or alternative solutions to allow employees to safely access overhead DMSs in New Jersey.

1.Progress this quarter by task:

During the past quarter the research team worked on reviewing the one-page

summaries developed describing the roadway characteristics, DMS features, catwalk, traffic control; and others features for each DMS location. The summaries were reviewed for completion and compared to information in the digital pictures. In addition, the work on Task II-4, Perform DMS Safety Assessment, was continued from the previous quarter. The procedure for performing the safety assessment included determining if minimum standards for safety and accessibility to the DMS were met and then the DMS was ranked.

The minimum standards developed in the proposal were reviewed and modifications made. Three sets of standards were developed including: (1) Minimum Standards for Catwalks; (2) Minimum Standards for Utility lines Adjacent to DMS; and (3) Minimum Standards for Accessibility. The minimum standards for catwalks include that anchorage points are provided and OSHA 29 CFR 1910.23 standards are met. OSHA 29 CFR 1910.23 require provision of: a standard railing system, toeboard (kick-plate), 28 inch minimum width of the catwalk, adequate strength to support weight of all individuals/equipment, and gas a self-closing gate. The minimum standards for utility lines include: (1) Power lines should be at a vertical distance above the DMS that maintenance personnel standing in bucket or on catwalk not impacted by lines; and (2) Horizontal distance from the DMS to the power lines should allow maneuverability of bucket lift. The minimum standards for accessibility include: (1) Parking available where bucket lift can reach DMS/catwalk; (2) Hard surface, not impacted by weather conditions, is available for service vehicle to access DMS; (3) Portable ladder access requires access from a hard and even surface; and (4) Personnel does not have to cross active roadway to get to/from DMS.

In the initial review, 52.7 percent, or about half of the DMS inspected, did not have a catwalk. All ground mounted DMS and 83 percent of Butterfly DMS did not have a catwalk. Eighty percent of cantilever DMS and 69 percent of span DMS had a catwalk. The scheme used to rate the DMS for meeting the minimum standards included: Rating of 0 indicating minimum standards are not met and limited opportunity to improve accessibility; Rating of 1 indicating minimum standards are partially met and recommendations exist to improve accessibility; and Rating of 2 indicating minimum standards are met. For the catwalk standards, 36 percent of DMS met the minimum standards and had a rating of 2. Fifty-two percent of catwalks did not meet the standards and had a rating of 0. The remainder, 11 percent of DMS, partially met the standards and had a rating of 2. Many of the catwalks not meeting the standards are older catwalks that have missing elements of the standards and are currently unused by maintenance personnel.

For minimum standards for powerlines, approximately 84 percent of DMS meet the

minimum standards. The majority of ground mounted (88 percent) and Span (95 percent) DMSs meet the minimum standards for powerlines. Approximately 74 percent of butterfly DMS and 77 percent of cantilever DMS meet the minimum standards.

2. Proposed activities for next quarter by task:

During the next quarter, the research will work on completing Task II-5, Develop DMS Database, and Task II-6, Prepare Quarterly and Final Reports. Recommendations for DMS not meeting the standards will be developed and submitted for review by the Research Panel.

3. List of deliverables provided in this quarter by task (product date):

4. Progress on implementation and training activities:

5. Problems/proposed solutions:

6. Budget summary:

Total Project Budget	$97,323
Modified Contract Amount	$0
Total Project Expenditure to date	$41,946
% of Total Project Budget Expended	43.10 **%**

NJDOT Research Project Manager Concurrence: _____ **Date:** _____