RESEARCH AND TECHNOLOGY

REVIEW

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RESEARCH BULLETIN

New Research Projects Selected for FY 2001

The department's Research Management Committee (consisting of the deputy director and four assistant directors), at its annual meeting on August 15, 2000, approved five new research projects based on recommendations from NDOT Research Advisory Committee. These new projects will be included as part of the fiscal year 2001 NDOT research, development and technology transfer program. They are:

1) **Development of New Guidelines for the Selection of Crack Sealing/Filling Materials and Application Procedures in Asphalt Concrete Pavements.** The research will study three major problems associated with the NDOT crack sealing/filling program: material effectiveness, deployment of cold-applied materials, and overlay "bumps" caused by crack sealing/filling materials.

August 15, 2000 Research Management Committee, Susan Martinovich, Jeff Fontaine, Ruedy Edgington, Tom Fronapfel, and Alan Hilton

2) **Seismic Evaluations and Retrofit of the Las Vegas Downtown Viaduct.** The objectives of this research include: a) estimate the type and extent of deficiency of the bridge components with respect to their seismic performance; b) develop potential retrofit methods for the deficient components and evaluate the relative merit of each; c) conduct large scale shake-table model studies of as-built and retrofitted components and piers, and verify the retrofit design; and d) develop recommendations to be used by NDOT staff to design the retrofit details for the Las Vegas downtown viaduct.

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In This Issue

Research Program Cycle Begins Again

Each fall (usually in October) the Research Division begins the research-program annual cycle by issuing a general solicitation for research problem statements. The intent of the solicitation, and really the basis for the department's research program, is for division/districts to identify operational problems that may be addressed through an applied-research project.

Last year was a particularly successful year in terms of getting the message out about the potential benefits of submitting research problem statements. The reason for this success is the fact that in addition to the general solicitation, Research staff personally visited divisions and districts to discuss their specific research needs. This year Research will again follow-up the initial solicitation with personal visits to key divisions and the districts.

One thing to keep in mind is, research does not necessarily have to be structures or materials related. Administrative issues and/or policy development problem statements are eligible for research funding along with the more traditional "hard-side" research proposals.

Divisions/districts will have until the end of January 2001 to submit problem statements; all problem statements will be screened by staff for "researchability" through the conduct of a literature search. If deemed researchable, the problem statement will be fully developed and then prioritized by the department's Research Advisory Committee. Problem statements determined to be of high priority will be submitted to the University of Nevada System or private consultant with a request for a research proposal that addresses the problem statement.

Ultimately, the department's Research Management Committee will determine which research proposals are to be funded in the annual R,D&T work program.✪

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3) **Comparative Evaluation of Analysis and Simulation Software for Traffic Operations.** This research will perform a comparative evaluation of several transportation analysis and simulation software with the purpose of identifying software programs(s) that are suitable for use on NDOT projects. The software will be evaluated on their ability to accurately reflect real-time observed field traffic conditions. The evaluation will be done for traffic conditions on freeway segments, freeway ramps and interchanges, isolated intersections and coordinated arterials.

4) **Analysis of Temperature Segregation of Plantmix Bituminous Surfacing Using the Infrared Camera.** This project will be conducted to determine if temperature segregation exists in asphalt mats in Nevada. An infrared camera will be used to monitor paving operations at various locations across the state. If it is determined to be a construction problem, then a second phase will determine methods to reduce it.

5) **Predicting the Resuspension and Deposition of Sediment Around Bridge Piers Along the Truckee River.** The proposed research will evaluate the suitability of existing, accepted methods for predicting sediment scour around bridge piers located along the Truckee River. It will characterize the Resuspension and deposition of natural sediment samples and improve the ability to predict the potential for scour.

The scope of work and budget for each project is being finalized with most of the projects expected to start on January 1, 2001.✪

NDOT Research: Soundwall Evaluation Standards and Procedure

As reported in a previous issue of our newsletter, research was conducted to establish NDOT specifications for various types of soundwall installations, particularly those systems using non-traditional materials, and to develop performance criteria by whic proposed soundwall systems will be evaluated for placement on a qualified product list (QPL). The final report of this research, along with a soundwall system evaluation manual, has been submitted to the NDOT management for approval.

In this report, the soundwall acceptance criteria are grouped into two different categories; primary evaluation factors and secondary evaluation factors, The primary evaluation factors are objective evaluation criteria which include noise attenuation, structural integrity and materials durability. The secondary evaluation factors are subjective evaluation criteria which include aesthetics, adaptability to signage or lighting, and constructibility.

As a result of this study and in accordance with FHWA noise guidelines along with NDOT's traffic and construction noise abatement policy, the acceptance criteria for noise attenuation are established at a minimum Sound Transmission Classification rating of 25 dB and a minimum Noise Reduction Coefficient rating of 0.8 for absorptive materials. The established criteria for structural design are based on the current version of the applicable AASHTO design specifications. The soundwall components such as framing, panels and foundation are

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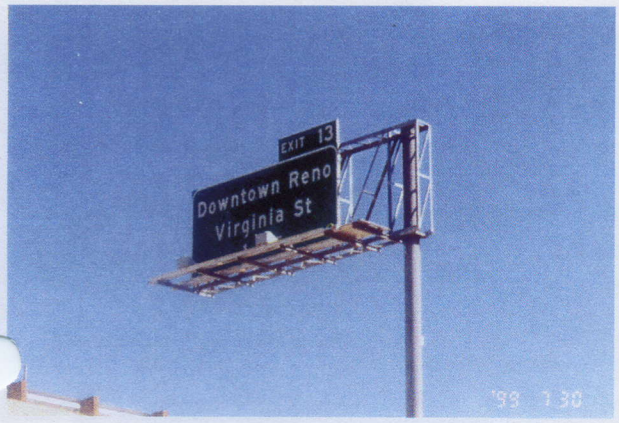
Product Evaluation Committee (PEC) Meeting Recap

Approved
Better Products for Overhead Sign Structures

Based on field test results, the PEC approved the use of the Lumi Trak luminaire retrieval system. Particular application for this product will be determined during the project field-review phase by district traffic engineers in conjunction with the Traffic Engineering Section.

The Lumi Trak system is an alternative to conventional walkways on overhead sign structures. The PEC approved a one-year field test of this system in January 1999. The system was installed on Interstate I-80 at the Keystone Interchange. The test determined that this product has an advantage of providing complete access to overhead-sign luminaires for repair/replacement from the edge of the paved shoulder, eliminating the need for lane closures and reducing maintenance time. In addition, this system has a good cost/benefit ratio compared to NDOT's current method of replacing and maintaining sign lights.✪



Lumi Trak Overhead Sign Structure

Approved
Reflective Sheeting Materials

The PEC approved a specification revision and development of QPLs for reflective sheeting materials for permanent signs and construction zone traffic control device reflectorization.

In the past, reflective sign sheeting has been accepted based on requirements prescribed in section 716.03.01 of the NDOT Standard Specifications. However, these requirements are not specific for flexible fluorescent-orange sheeting as required to be compliant with NCHRP Report 350 regarding temporary sign stands used in work zones. In addition, no formal QPL was created either for permanent signs or for construction-zone reflective sheeting, including sheeting for other traffic control devices (drums, cones, etc.).

Currently, Research, Construction, Specifications, Maintenance, and Traffic are working on specification revisions and the establishment of QPLs for permanent sign and construction-zone reflective sheeting. Once the work is completed, companies seeking to place their products on QPLs will be directed to submit proposals for acceptance under the revised NDOT specifications.✪

Approved
Service Pedestals

Based on a recommendation from Traffic, the PEC approved a QPL for service pedestals, initially comprised of two already approved products. These products are used as low profile enclosures for distribution of and access to underground electric power lines serving traffic signals and luminaires. To date, Traffic has used two service pedestals that meet specifications and have performed well in the field. To ensure that approval of the service pedestals is in line with the established product evaluation process, Traffic proposed a QPL for this type of product. Standards for service pedestals are shown as generic details on the Standard Plans and prescribed in section 623.02.04 of the NDOT Standard Specifications. Companies seeking to place their product on the QPL will be directed to submit their proposals for acceptance under current NDOT specifications.✪

Specification Revision
PCCP Crack Sealers and Epoxy Injection Systems

In an effort to clarify specifications for PCCP epoxy injection systems and concrete crack sealer repair products, the PEC approved

specification revision for these materials. As reported in the spring issue of this newsletter, Research was directed to work with Materials and Specifications to determine the need for separating current specifications for epoxy injection systems as opposed to crack sealers. The work group found that current specifications for epoxy injection and crack sealers could be separated based on application purpose, material requirement and approval process. The group also proposed relevant changes in the NDOT Standard Specifications. For example, two separate applications could be differentiated by the width of the cracks to be repaired by either product. Materials, Specifications, and Research will continue their efforts to develop specification details for PCCP crack repair.

Once the specification revision is completed, Research will proceed with establishment of separate QPLs for these types of products. The product manufacturers will be advised to follow NDOT product evaluation procedures to place their products on the qualified products list (QPL).✪

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required to meet the applicable ASTM standards that are listed in the evaluation manual.

According to the procedure described in the report, application for soundwall system approval will be made through the NDOT Research Division, which will distribute responses as necessary for divisional review. The systems will initially be evaluated based on the complete criteria including both primary and secondary evaluation factors. All soundwall systems are required to meet the primary evaluation factors to be approved for placement on the general QPL. The secondary evaluation factors will be further considered on a project-by-project basis by a project soundwall review team composed of representatives from affected divisions to identify those systems listed in the general QPL that meet project specific conditions. Systems meeting the project-specific conditions, after approval by the NDOT director's office, will be placed on the project-specific QPL within the Special Provisions and these manufacturers will be permitted to bid on the project.

After the approval of this report by the NDOT director's office, the acceptance criteria and procedures presented in the report will be implemented. Soundwall systems both submitted for NDOT evaluation and previously approved for use on a case-by-case basis will be evaluated or re-evaluated following the new procedure and acceptance criteria. *(The full report of this research is available for loan from the NDOT library)*

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The Research Division administers the department's research, development and technology transfer program and serves as the "clearing-house" for product evaluations.

Research and Technology Review is published quarterly by the NDOT Research Division. Its purpose is to provide the latest information on the NDOT research activities including product evaluation and other pertinent research topics.

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