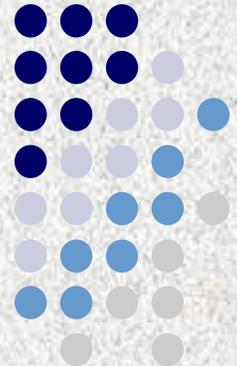




Research and Technology Review



FY2008 New NDOT Research Projects

by Tie He, Research Division Chief

Winter Maintenance Improvements (phase II): The purpose of this study is to implement the technologies (e.g. airfoil and air blower systems) identified during phase I of the research to improve snow plowing visibility including driver’s visibility and vehicle visibility. The principal investigators: Dr. Cahit Evrensel, Dr. Yangyo Jiang, and Dr. Kwang Kim (UNR).

Investigation of Corrosion of Mechanically Stabilized Earth (MSE) Walls in Nevada: The proposed research is to develop an inventory of MSE walls and to identify the extent of corrosion problems associated with MSE wall reinforcing elements. The principal investigators: Dr. Raj Siddharthan (UNR) and Dr. Barbara Luke (UNLV).

Evaluation of Asphalt Bridge Deck Joint Systems: This proposed research will investigate the failures of bridge deck joint systems, compile information on available products and develop a plan for laboratory and field evaluations of these systems. The principal investigators: Dr. Nader Ghafoori and Dr. Moses Karakouzian (UNLV).

Tree Crown Mortality Associated with Roads in the Lake Tahoe Basin- A Remote Sensing Approach: This research is proposed to use satellite imagery to study the roadside vegetation health in the Lake Tahoe area. The principal investigators: Dr. Peter Weisberg and Dr. Bob Nowak (UNR).

Impact of System Expansion on Maintenance Resources: The objective of this research is to develop a policy and some analytical tools to assist NDOT Maintenance managers to analyze the distribution of manpower, equipment, and materials over the life cycle of transportation systems. The principal investigator: Dr. Harry Teng (UNLV).

Evaluation of Video Detection Systems and Development of Application Guidelines at Signalized Intersections: This research is proposed to evaluate various video detection systems deployed in Nevada urban areas and to develop an application guideline to improve their detection accuracy. It is a cooperative research project with Southern Nevada Regional Transportation Commission (RTC) and Washoe RTC. The principal investigator: Dr. Tian Zong (UNR).

Analysis of Alternatives for Accommodating Trucks on Urban Freeways in Southern Nevada: The research is proposed to evaluate different operational strategies for accommodating trucks in Las Vegas. Both field observations and traffic simulation will be conducted to assess the impacts of different truck strategies on mobility and safety. It is a cooperative research project with the University Transportation Center (UTC) at UNLV. The principal investigator: Dr. Harry Teng (UNLV).

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Jason Van Havel

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Reflective Cracking of Flexible Pavements

by Dr. Peter Sebaaly, Ph.D.

Pavement rehabilitation is rapidly becoming one of the most important issues facing many highway departments. The Nevada Department of Transportation (NDOT) uses hot mixed asphalt (HMA) overlays as a rehabilitation technique for the majority of the state's flexible pavements. One major type of distress influencing the life of an overlay is reflective cracking. When asphalt overlays are placed over cracked existing flexible pavements, cracks will reflect to the surface in a relatively short period of time. Physical tearing of the overlay occurs because of movements under heavy wheel loads at the cracks in the underlying pavement layer. Therefore, the long-term performance of the HMA overlays will depend on their ability to resist reflective cracking. Reflective cracking in the overlay allows water to percolate into pavement structure and weaken the HMA and the supporting layers, hence contributing to many forms of pavement deterioration. Moisture can damage the HMA mix by promoting the stripping of the asphalt binder from the aggregate. It can also significantly reduce the strength of the base and subgrade materials, which would lead to the total failure of the flexible pavement structure.



Pavement Surface Exhibiting Reflective Cracking (Courtesy of RILEM 6th International Conference)

The above picture shows an HMA overlay that was applied over a flexible pavement experiencing transverse, longitudinal, and fatigue cracking. All three types of cracking reflected through the newly constructed HMA overlay even though the surface condition still indicates a durable HMA mix. This situation indicates that if reflective cracking would have been mitigated, this HMA overlay would have lasted for a long time without any appreciable distresses. In other words, reflective cracking has led to the rapid deterioration of the pavement. In 2006, the Nevada DOT initiated a three-phase research project to identify the promising techniques to mitigate reflective cracking in HMA overlays: a) Phase I: Review of literature and the performance of the various techniques in Nevada, b) Phase II: Identify analysis models and evaluation tests, and c) Phase III: field verification of the selected techniques and validation of analysis models. The first two phases have been completed and the third phase will be conducted between January 1, 2008 and December 31, 2009. (continued top of page 3)

The following recommendations have been made based on the findings of Phases I and II (reports are available from the NDOT Research Division).

- The cold-in-place recycling (CIR) of the existing HMA layer and overlaying it with a new HMA overlay has been effective in reducing reflective cracking. However, this technique may not be justified and too expensive to be implemented on all flexible pavements in Nevada.
- The first part of Phase III of this research effort will develop a design method and specifications for a stress relief layer that can be constructed under HMA overlay to reduce reflective cracking from the existing pavement. Such a layer will be used over flexible pavements that experience moderate cracking and where CIR is not warranted.
- The second part of Phase III of this research effort will evaluate the constructability and field performance of the designed stress relief layer.



Found on the web at: <http://rns.trb.org/home.asp>

An important function of the Transportation Research Board (TRB) is to stimulate research that addresses concerns, issues, or problems facing the transportation community. In support of this function, TRB Technical Activities standing committees identify, develop, and disseminate research need statements (RNS) for use by practitioners, researchers, and others. The RNS on this website have been developed by the technical committees.

The homepage web address listed above takes you to a very useful "Search" tool, which allows you to query by Keywords, Committee, or Subject title. Look and see what's out there!

FROM QPL TO RESEARCH COORDINATOR

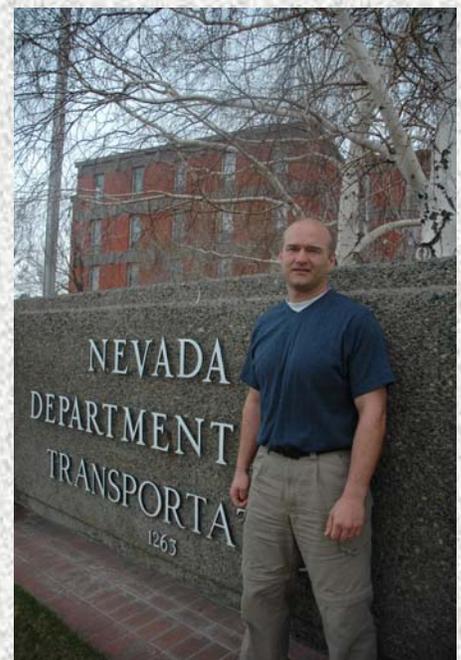
In January of this year, our Research Department team welcomed Jason Van Havel into his new role of Research Coordinator. Jason previously held the position of the Product Evaluation Coordinator for the past two years.

Our past Research Coordinator, Reed Gibby, is happily settling in as the new Chief of Operations Analysis.

Jason brings to his new position fifteen years of experience in Management, Finance, and Marketing. He has earned a Master's in Business Administration from the University of Nevada, Reno, and a BS degree in Mechanical Engineering, also from UNR.

Jason is blissfully married to his wife, Misty; enjoys spending time with his five children; and lives "the Comstock Dream" in Silver City, Nevada. He likes to spend his free time enjoying hockey, baseball, basketball, and spelunking. He is originally from Morenci, Michigan.

Congratulations Jason!



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LIBRARY CORNER

by Heidi Wood

The NDOT Research Library holds a large selection of magazines, journals, study materials, along with publications from FHWA, TRB, TRR, and US DOT. Also look at our webpage on the NDOT Homepage under, “Reports and Publications”.

www.nevadadot.com

The Research Library is located in room 115, in the main NDOT Headquarters building. Stop by whenever you can, and I’ll be happy to show you around. For those of you in other areas, remember; I send any book, anywhere in Nevada! So just send me a request of what you may need, and I’ll put it in the mail to you!

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Library Assistant III

About NDOT’s

R&T Review

The NDOT 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 information and other pertinent research topics.

If you have comments or need additional information regarding any of the topics discussed in this issue, please contact the Research Division.

Edited by Heidi Wood

Library Assistant III