

TERRA E-News

TERRA E-News is a quarterly electronic newsletter of the Transportation Engineering and Road Research Alliance. TERRA E-News brings you the latest research on pavement, materials, and related transportation engineering challenges, including issues related to cold climates.

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Member News

Member Profile: University of Minnesota

The [University of Minnesota](#) is a founding member of TERRA, which was created in 2004 after a task force of government, industry, and academic representatives investigated road research governing structures and evaluated ways to broaden the use of the unique capabilities of the Minnesota Road Research Project (MnROAD). The University has been a key partner in the development of MnROAD and is home to many of the researchers using the facility.

As a founding member of TERRA, the University holds two seats on the board. Robert Johns, director of the [Center for Transportation Studies \(CTS\)](#), and Roberto Ballarini, professor and department head of the [Department of Civil Engineering \(CE\)](#), represent the University of Minnesota on the TERRA board. Last year, Ballarini succeeded John Gulliver, who served as CE department head and initially represented the department on the TERRA board.

"TERRA partnerships have provided fresh inspiration for our researchers and staff at the University of Minnesota to find new and innovative ways to address the large-scale challenges before engineers and policymakers," Johns said.

Ballarini added that a priority in working with TERRA is finding ways to reinvest in transportation infrastructure that is both environmentally and physically safe for all users in order to prevent tragedies like the I-35W bridge collapse.

The University of Minnesota also provides two key non-member resources to the TERRA board: Pavement Research Institute (PRI) director Mike Darter and CTS associate director Laurie McGinnis. PRI develops, promotes, and carries out pavement-related research that addresses regional and national needs as well as state and local needs. McGinnis directs critical administrative support for the entire TERRA program.

In addition, the strong University connection to TERRA yields great benefit to the alliance because of the University's extensive research-related activities. The University conducts pavement research, pursues pavement research funds, and serves as a resource for the technology transfer, education, and outreach based on pavement research results.

Several University civil engineering faculty and researchers, as well as several graduate students under their direction, count MnROAD as a key resource in their research, which includes significant contributions to TERRA pooled-fund projects in progress. Associate Professor Lev Khazanovich has been involved in various aspects of concrete pavement research, design, and evaluation, including



Roberto Ballarini



Robert Johns

performance prediction modeling, non-destructive testing, and finite element modeling. Associate Professor Mihai Marasteanu's research activities include the characterization of low-temperature behavior of asphalt binders and mixtures and the characterization of asphalt emulsions in relationship to their field performance. Professor Joseph Labuz's research activities have focused on investigating the mechanical behavior of micro-cracked solids on the material and system levels.

Other founding members of TERRA are: the Minnesota Department of Transportation (MnDOT), the Minnesota Local Road Research Board (LRRB), industry (represented by the Asphalt Pavement Association, the Aggregate and Ready-Mix Association, and the Concrete Paving Association), and the Federal Highway Administration (FHWA).

Member Highlights

The [Minnesota Department of Transportation's \(MnDOT\) Research Services Section \(RSS\)](#) is developing high-level research roadmaps for each of eight strategic program areas identified at a June 2007 strategic research visioning seminar. Next steps for developing a strategically focused research program with a strong emphasis on the implementation of research results have been documented in a seminar report. Attendees at the seminar included division directors, district engineers, office directors, research coordinators, and Federal Highway Administration (FHWA) representatives.

[RMC Research and Education Foundation](#) announced the publication of its latest project report in support of the Prescription-to-Performance (P2P) Initiative, the [Quality Management System for Ready Mixed Concrete Companies](#) (3.2 MB PDF). The guideline document provides an outline to assist ready-mixed concrete companies in developing their own quality plan along the lines of ISO 9000 principles and includes a sample quality plan of a fictitious ready-mixed concrete company and an external quality audit checklist. The purpose of this tool is to establish the credibility of ready-mixed concrete producers to bid on and provide concrete for performance-based specifications.

[RMC Research and Education Foundation](#) also announced the availability of a new CD: *Research in Support of Sustainable Development*. The CD includes all of the Foundation's published reports and studies on pervious concrete, the *Ready Mixed Concrete Industry LEED Reference Guide*, and the *Crushed Returned Concrete as Aggregates for New Concrete* final report. Copies of the CD are available by contacting Jennifer LeFevre at 240-485-1151 or at jlefevre@rmc-foundation.org.

Projects and Initiatives

TERRA seeks project ideas by May 16

The TERRA board is seeking project ideas from partners and friends by May 16 as the board and its committees prepare for their annual review of ideas accumulated during the past year.

TERRA collects project ideas to facilitate opportunities for research collaboration among those with similar interests, needs, and resources as part of a comprehensive program for addressing pavement, materials, and related transportation engineering challenges. Project ideas are not limited to pavement projects—ideas may include other projects related to road research.

Once introduced, project ideas are honed through a communication process to prioritize objectives according to the needs of each partner involved. Projects typically have evolved from the original idea submitted as the result of discussions and further collaborations. Previous project ideas have led to the initiation of pooled-fund projects as well as public/private partnerships.

TERRA is composed of members from government, industry, and academia that work closely in dynamic partnerships. Though TERRA members, as a benefit of membership, may propose project ideas anytime, this annual solicitation provides an opportunity for TERRA partners and friends also to introduce their ideas into the process.

The annual idea review process is one mechanism for TERRA to build sufficiently funded project partnerships through the combined resources of the participants. In addition to facilitating project funding, the main TERRA goal is to move ahead projects that advance innovations in road engineering and construction.

To share a project idea with the TERRA board, please complete the TERRA Project Proposal Form on the [TERRA Projects Web page](#). Again, the deadline for submitting project ideas for consideration this year is May 16. For more information or assistance with submissions, please contact Stephanie Malinoff at 612-624-8398 or malinoff@umn.edu.

TERRA board focuses on implementation

In support of a key long-term goal to have successful and visible "on-the ground" implementation of research results, the TERRA board has renamed its research committee the Research and Implementation Committee.

The change comes as Mark Maloney, public works director for the City of Shoreview, Minnesota, succeeds Keith Shannon, director of the MnDOT Office of Materials, as committee chair. Maloney is one of two Minnesota Local Road Research Board representatives on the TERRA board.



Mark Maloney

In October, the TERRA board gathered for a strategic planning session to assess the status of the alliance and make decisions about future strategic priorities for external action and internal operations. To help meet that goal, the board considered the creation of a

committee to plan, initiate, support, and monitor research implementation.

In another committee change, Keith Shannon and Fred Corrigan, executive director of the Aggregate and Ready Mix Association of Minnesota, succeed TERRA Marketing and Communications Committee chair Tom Sorel, recently appointed new MnDOT commissioner. Developing new products, services, and practices to show how research costs pay off in benefits was identified as another top priority during part of the board's strategic planning session last fall.



Keith Shannon



Fred Corrigan

TERRA cosponsors Minnesota Pavement Conference

TERRA, along with a number of other organizations including the [Minnesota Department of Transportation \(MnDOT\)](#), the [Minnesota Local Road Research Board \(LRRB\)](#), and the University of Minnesota's [Pavement Research Institute \(PRI\)](#) and [Department of Civil Engineering](#), cosponsored the 12th Annual Minnesota Pavement Conference, held February 14 in St. Paul.

Speakers at the daylong conference described news of emerging areas such as green roads and greenways, warm-mix asphalt, and sustainable innovations in concrete pavements. Presentations about pavement rehabilitation using diamond grinding, Minnesota Trunk Highway 36 reconstruction innovations, and PRI may be of special interest to TERRA members, partners, and friends.

Project manager Bernard Izevbekhai, the concrete research operations engineer with MnDOT's Office of Materials, described a TERRA pooled-fund project studying ways to rehabilitate portland cement concrete (PCC) pavements without the need to restore structural capacity. The research project, funded at \$275,000 over five years, moved to the MnROAD mainline in October 2007 with the help of donated services from project partner Diamond Surfaces, Inc. In particular, researchers are studying details in the grinding operation, such as blade spacing, depth of cut, and kerf (width between cut) configuration. Research findings will enable transportation agencies to set standard specifications for diamond grinding, which optimizes ride quality, quietness, safety against hydroplaning and splash/spray, and concrete durability. (See [previous story, Jan. 2008](#))

Three Minnesota Department of Transportation (MnDOT) officials discussed several innovations used during the reconstruction of Minnesota Trunk Highway 36 through North St. Paul in 2007. Chris Roy, MnDOT metro district north area manager, spoke about the T.H. 36 project development and full road closure. Steve Adamsky, MnDOT project engineer in charge of the reconstruction, gave an overview of the construction and project innovations. Tom Ravn, MnDOT acting state construction engineer, talked about innovative contracting and FHWA Highways for LIFE (HFL), which helped fund the project with a grant. The reconstruction project is especially noted for its use of complete closure and intelligent compaction. It also was the first HFL demonstration project in the country and was featured as the first event in the TERRA Innovation Series in November. (See [previous story, Jan. 2008](#))

PRI director Michael Darter described a major project funded through the second Strategic Highway Research Program (SHRP 2) that will investigate the design and construction of new composite pavements. The project is one of several MnROAD Phase II projects in the works. The overarching goal of the SHRP 2 project is to investigate—and prove—the benefits of composite pavements. Will they produce long life surfacing? How will they match up with asphaltic layers in terms of noise, friction, and splash/spray? Will they be valuable for easing utility repair? "Putting it all together," Darter summarized, "can we do these and reduce the life cycle cost over time? Will it be competitive with regular asphalt or regular concrete pavements?" (See [previous story, Oct. 2007](#))

Other Minnesota Pavement Conference presentations included: pavement preservation with bituminous surface treatments, the technical and cultural information exchange between four U.S. state DOTs and the Russian Regional Highway Administration, pavement reclamation, and geotech innovations. Maureen Jensen, manager of the MnDOT road research section and a key TERRA resource, also moderated a session on road foundations.

A complete summary of the 2008 Minnesota Pavement Conference is available for download from the [Minnesota Local Technical Assistance Program \(LTAP\) website](#).

2008 projects underway at MnROAD

Testing began this spring on the Minnesota Road Research Project (MnROAD) farm loop constructed last year to determine how the pavement responds to various configurations of agricultural equipment. Two bituminous test sections were constructed last year for the testing, one designed to represent a 7-ton road and the other, a 10-ton road. The test roadway design is typical of many rural, low-volume county roads, which often take a beating under heavy equipment, especially during seasonal transitions with many freeze-thaw cycles.



Testing is planned for two weeks in spring and in fall of each year under the national three-year pooled-fund study, "Effects of Husbandry 'Farm Equipment' on Pavement Performance, TPF-5(148)," The first spring tests, conducted from March 17 to March 26, included six pieces of farm equipment. Testing of 18 different types of equipment is planned. Private industries participating in the study are providing all test equipment.

Over the past few decades, significant changes in both farm size and farm equipment have prompted the farm equipment industry to produce larger and larger application equipment. Innovations such as steerable axles, flotation tires (spreading the load over a much larger area), and new tire designs have been implemented on the equipment in recent years as well.

The length, width, and axle loads of the large equipment could potentially create accelerated damage on roads. But a 2001 Minnesota Department of Transportation (MnDOT) scoping study found it difficult to link specific pavement damage to agricultural equipment because other heavy vehicles, such as trucks hauling gravel or rock from quarries, also might have contributed to the damage on the roads.

The current agricultural equipment study on the farm loop is one of seven TERRA pooled-fund projects that are part of Phase II at MnROAD and includes participation from MnDOT, the Iowa Department of Transportation, the Illinois Department of Transportation, the Minnesota Local Road Research Board (LRRB), and the Professional Nutrient Applicators Association of Wisconsin. Several other partners also have joined the research effort at MnROAD, including the Wisconsin LTAP and equipment manufacturers, to determine how the effects of the agricultural equipment compares to those of a typical five-axle semi tractor-trailer.

In other news from MnROAD, Progressive Contractors, Inc. (PCI) of St. Michael, Minnesota, was awarded in February the 2008 contract for Phase II construction. Several Phase II research projects require reconstruction of pavement test sections over three years, from 2007 to 2009. The primary efforts related to the construction for 2008-2009 will be national pooled-fund research, SHRP 2 composite pavements, and MnDOT-partner research studies. Specific cell-by-cell scheduling of construction activity for the 2008 season is in progress, with demolition and recycling of certain concrete and asphalt sections to begin shortly.

Related resources:

- [Contact project manager Shongtao Dai](#)
- [Effects of Husbandry "Farm Equipment" on Pavement Performance \[TPF-5\(148\)\] pooled-fund project](#)
- [TERRA projects](#)
- [MnROAD research](#)
- [About MnROAD](#)

Announcements

TERRA publishes fact sheet about new technologies implemented at MnROAD

The second in a series of TERRA fact sheets highlighting findings from the 2007 report *MnROAD Lessons Learned* has been published this month. The [Implementation of New Technologies fact sheet](#) describes how MnROAD engineers have introduced, developed, and encouraged the use of new technologies and techniques for pavement engineers. Though the list of new products tested and/or developed at MnROAD is extensive, this fact sheet highlights three technologies with influence reaching far beyond MnROAD: the Dynamic Cone Penetrometer (DCP), Ground Penetrating Radar (GPR), and Intelligent Compaction (IC). The next fact sheet, to be published in early summer, will address full-depth reclamation.



TERRA Innovation Series: MnROAD open house scheduled for July 30

TERRA, in cooperation with several industry partners and MnDOT, is hosting an open house at MnROAD on July 30 as the second event in the TERRA Innovation Series.

TERRA kicked off the Innovation Series with industry representatives, University researchers, and a variety of state and local agency personnel in November with a daylong program about the innovations used in the reconstruction of Minnesota Trunk Highway 36 through North St. Paul.

The TERRA Innovation Series communicates TERRA activities, innovations, and products through knowledge transfer, exchange, and demonstration. These transportation engineering and road research events have a technical focus and address research results, trends that affect or improve productivity, innovative partnering and contracting models, and hot topics that may lead to new research related to TERRA priorities.

A detailed program will be available on the TERRA website and announced electronically as the date gets closer. For more information, contact Stephanie Malinoff, malinoff@umn.edu, 612-624-8398.

Tom Sorel appointed MnDOT commissioner

TERRA board member Tom Sorel, former Federal Highway Administration (FHWA) division administrator for Minnesota, was appointed commissioner of the Minnesota Department of Transportation (MnDOT) by Gov. Tim Pawlenty. Sorel, who started at MnDOT on April 28, has served on the TERRA board as the FHWA representative since coming to Minnesota in early 2005. Among his many contributions to TERRA, Sorel recently completed service as chair of the TERRA Marketing and Communications Committee.



Tom Sorel

CTS Transportation Research Conference scheduled for May 20-21

The 19th Annual CTS Transportation Research Conference will be held May 20–21 at the Saint Paul RiverCentre. The conference will open with panel session on national congestion strategy. In addition, luncheon speaker Stephen H. Schneider will discuss transportation options for lowering our carbon footprint. Other sessions will cover how well-designed transportation projects can enhance communities, roundabouts, crash statistics, agency approvals, and public buy-in, as well as topics ranging from driver behavior to rural safety to precast bridge girders. Program and registration information is available on the [CTS website](#).

TERRA E-News is produced quarterly by the Center for Transportation Studies at the University of Minnesota.

Comments?

We would like to hear what you think of *TERRA E-News*. Please e-mail us at mpmccarthy@umn.edu.

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