

## TERRA 2013 Highlights

The Transportation Engineering and Road Research Alliance (TERRA) facilitates the implementation of collaborative pavement and road research engineering innovations. The success of TERRA efforts continues primarily because of the committed service of the TERRA general assembly, a new structure to coordinate research and implementation activities, and new ad hoc task forces intended to be the workhorses of the organization. This brief report highlights TERRA research and implementation, engagement, and communications activities during the past year.



Norwegian road researcher Anne Lalagüe at MnROAD

### Research and Implementation

Reflecting a new organizational structure, the TERRA general assembly now guides research projects and initiatives that involve collaborations among the public sector, private and non-profit sector, and academic sector. As part of the new organizational structure, research coordinators representing each state department of transportation member organization will ensure that research and its implementation are being shared among members. Highlights from 2013:

- The Michigan Department of Transportation partnered with four other states, including three TERRA members, to investigate an innovative new bridge design that uses decked bulb T-beams, carbon-fiber prestressing and post-tensioning strands, mild reinforcement, and ultra-high-performance concrete for joints. These bridges could last more than 100 years in a winter climate and require far less maintenance, leading to significant cost savings for taxpayers. The bridges also are easy to construct, inspect, and repair.
- The Wisconsin Department of Transportation and the University of Wisconsin–Madison are partnering with five other states, including another TERRA member, in the Recycled Materials Resource Center third-generation pooled-fund study. The study is seeking to provide resources and activities to break down barriers and increase utilization of recycled materials and industrial byproducts in transportation construction.
- Research at MnROAD has contributed significantly to the understanding of the field performance of thin and ultra-thin concrete overlays of existing asphalt pavement (also known as whitetoppings). The multistate pooled-fund project, which includes three TERRA members, used data from MnROAD and other test sections to develop a rational design method for thin concrete overlays. In addition, a design guide developed through the project as a user-friendly web-based tool accommodates a variety of climate conditions, axle-load configurations, existing asphalt material conditions, and time-dependent bonding conditions between layers.

### Engagement

The TERRA Membership Engagement Committee encourages new ways of thinking about research problems by emphasizing partnership and cooperation to address the large-scale challenges before transportation professionals and policymakers. Highlights from 2013:

- A central feature of organizational changes within TERRA was the creation of a new governing body known as the TERRA general assembly, which comprises all member organizations and is focused on identifying, prioritizing, and sharing road research and implementation. A key driver of the changes has been a large growth in membership, which has climbed to 24 organizations since TERRA's start nine years ago with only a handful of members.
- Budgets for TERRA-initiated research projects through August 2013 totaled nearly \$17.4 million. Active research accounts for \$5.3 million of the total and includes 20 projects covering such topics as whitetopping design, guide-sign fonts, roller-compacted concrete shoulders, and the use of drainable, stable aggregate base to enhance pavement life. This funding reflects contributions, both monetary and in-kind, from industry, federal, and state organizations.
- TERRA has maintained strong Nordic connections in recent years. This past year, the Norwegian Public Road Administration sponsored a 9-month visit to the Minnesota Department of Transportation by Anne Lalagüe, a PhD student and researcher studying the use of ground penetrating radar (GPR) technology in the maintenance of the Norwegian infrastructure. During the visit, facilitated through TERRA, Lalagüe shared her expertise while also learning from the MnDOT road research group working on GPR advancements.

## Communications

The TERRA Communications Committee is focused on providing up-to-date information about ongoing research, communicating research results to a variety of audiences worldwide, and engaging stakeholders in a dialogue on road research and implementation activities. Highlights from 2013:

- A half-day TERRA Innovation Series event about the bioeconomy and transportation featured bio-asphalt produced from renewable, cost-competitive, regionally produced, and high-performing materials derived from non-food biomass. The event was held in August at Iowa State University in Ames, Iowa, in conjunction with the Mid-Continent Transportation Research Symposium.
- TERRA cosponsored webinars about: 1) the implementation of concrete maturity methods to reliably measure without conducting physical tests when a pavement is ready for use; and 2) lab and field tests conducted to evaluate the stiffness properties and quantify the contributions of full-depth reclamation (FDR) to overall pavement performance. These low-cost seminars attracted broad online participation by bringing together a diverse group of transportation researchers and practitioners sharing their latest findings.
- Nearly 200 attended the 17th annual TERRA Pavement Conference in February, keeping pace with last year's record turnout. The conference featured national pavement experts discussing long-life concrete and asphalt pavements. Other conference presentations shared best practices for asphalt and concrete pavements, low-volume roads, pavement preservation, MnROAD research, and more.
- The Minnesota Department of Transportation hosted an open house in October at MnROAD for the Minnesota State Senate Transportation Committee. TERRA members Associated General Contractors of Minnesota, the Aggregate & Ready Mix Association of Minnesota, and the Concrete Paving Association of Minnesota also participated. The open house, which included a site tour, is part of a broader effort to engage legislators by sharing the latest research on materials and road research.



ISU biomass processing facility manager Andy Suby (inset) leads a tour of the BioCentury Research Farm at the 2013 TERRA Innovation Series event in Ames, Iowa.

### Fact sheets

A new TERRA fact sheet provides an overview of the Roundabout Truck Study, sponsored by the Wisconsin Department of Transportation (WisDOT) and the Minnesota Department of Transportation (MnDOT). The study examined current design practices, gathered feedback from the trucking industry, and developed guidance and recommendations for accommodating trucks at multilane roundabouts.

Another fact sheet new this year about porous asphalt provides an overview of the innovative pavement technology, including details from a TERRA-initiated study about its performance in cold climates, key benefits, and several resources for more information.

These publications add to an ongoing series of fact sheets to highlight timely research topics.

Fact sheet topics:

- Accommodating Trucks in Roundabouts
- Porous Asphalt Reduces Storm Water Runoff
- Quiet, Safe, and Smooth Concrete Pavements
- Low-Cost Engineering Infrastructure Safety Improvements
- Concrete Overlays
- Greenroads
- Impacts of Heavy Farm Equipment on Rural Roads
- Shoulder and Centerline Rumble Strips
- Warm-Mix Asphalt
- Pervious Concrete
- Full-Depth Reclamation (FDR)
- Implementation of New Technologies
- Low-Volume Roads

### TERRA Member Organizations

The TERRA general assembly includes representatives of 24 industry associations, transportation agencies, and university research organizations. This year, TERRA welcomed two new member organizations, Flint Hills Resources and Midstate Reclamation and Trucking.