

Local Road Research Board
Meeting Minutes
December 10 and 11, 2008
December 10, 2008 – University of MN, Coffman Union, Room 303
December 11, 2008 – Mn/DOT Arden Hills – Room 3

Attendees:

LRRB Members Present:

Sue Lodahl, Mn/DOT, Director, Research Services, **Secretary** (1st day only)
Ken Saffert, City Engineer, City of Mankato
Deb Bloom, City Engineer, City of Roseville, **Chair**
Keith Shannon, Mn/DOT Director, Office of Materials
Julie Skallman, Mn/DOT Director, Division of State Aid
Mitch Anderson, County Engineer, Stearns County
Rick West, County Engineer, Ottertail County
Robert Johns, University of MN, Director, Center for Transportation Studies

LRRB Members Absent:

Sue Miller, County Engineer, Freeborn County
Bruce Hasbargen, County Engineer, Lake of the Woods County
Sue Lodahl, Mn/DOT, Director, Research Services (2nd day only)

Others Present:

Nick Thompson, Mn/DOT, Director, Office of Policy Analysis, Research and Innovation
Ann McLellan, Mn/DOT, Research Services
Cory Johnson, Mn/DOT, Research Services
Maureen Jensen, Mn/DOT, Mn/ROAD
Linda Preisen, University of MN, CTS
Sandy McCully, Mn/DOT, Research Services

Presenters (in order of presentation):

Ryan Rosandich, University of Minnesota, Duluth
Diwakar Gupta, University of Minnesota
Bruce Wilson, University of Minnesota
Mihai Marasteanu, University of Minnesota
Jeff Marr, University of Minnesota
Jason Cao, University of Minnesota
Keith Knapp, University of Minnesota
Eddie Johnson, Materials, Mn/DOT
John Gulliver, University of Minnesota
John Nieber, University of Minnesota
Omar Smadi, Iowa State University
Aaron Budge, Mankato State University
James Wilde, Mankato State University
Darwin Dahlgren, Goodpointe Technology
Shongtao Dai, Materials, Mn/DOT

I. Call To Order and Chairman's Report

LRRB chair, Deb Bloom called the meeting to order 9:30am on December 10, 2008. Introductions followed.

Agenda Review

Agenda was reviewed – no additions made to the agenda.

Approval of September 25, 2008 Minutes

Motion made (Julie Skallman) and seconded (Ken Saffert) to approve the September 25, 2008 minutes. Motion approved.

Approval of November 20, 2008 Minutes

Motion made (Mitch Anderson) and seconded (Rick West) to approve the November 20, 2008 minutes. Motion approved

II. Administration

Budget Status

Ann McLellan gave a budget status. INV 675 was created for RSS salaries for better reportability on expenses from INV 999. INV 999 expenses will now include publishing, website maintenance, conference fees, travel costs, supplies and materials. Outreach costs were moved to INV 997 at an earlier date.

At the September 25, 2008 meeting, Keith said that INV 846 could see a savings, however, this did not occur and the project utilized the entire budget of \$155,225.

At the November 20, 2008 meeting the budget was in the black and today we are in the red. This occurred because of the lag time between when we receive an invoice and update the spreadsheet and when Mn/DOT business services updates the budget status report which shows open POs and expenditures. Between Nov. 2008 and Dec. 2008, this occurred with the LTAP invoice moving the budget into the red.

All spendable assets for FY 2010 are: \$216,788.

2009 and 2010 Meeting Dates

The 2009 and 2010 meeting scheduled was discussed. The summer LRRB meeting will be held in Red Wing, MN and Ann will continue working with Sue Miller to plan location and dates. March 4, 2010 meeting will be held in St. Cloud. The summer 2010 meeting will be held at Voyageur National Park.

September 23, 2010 meeting will be held at Mn/ROAD. December 8 and 9, 2010 meeting at the U of M and Maplewood Lab.

Final Attendance Count for 2008 Conferences/2009 Conference approval/Road Dust Conference final costs/TRB Conference Attendance

Final attendees count for 2008 conferences was provided. List of 2009 conference was also provided. International Conference on Cold Regions Engineering was added and list was approved.

Final costs for the Road Dust Management Conference were \$2,239.21.

LRRB is paying for 18 to attend the 2009 TRB Conference. List of attendees is included in meeting packet.

III. INV 823: The Road to a Thoughtful Street Tree Master Plan – Development of Power Point, brochure and training

INV 823 is a recently completed research project which resulted in a design manual that stresses proper planning in the selection of appropriate trees along roads and highways. There is concern that the results of this research have not been communicated properly.

RSS along with Dan Gullickson (Mn/DOT, Office of Environmental Services) developed an End User Product Definition for this project, which describes how we can share the research results. The board would like Dan Gullickson to present this information at the March 5, 2009 LRRB meeting.

IV. Review Process: What we need to accomplish at this meeting.

A spreadsheet with information on today's and tomorrow's research presentations was distributed. The objective is to hear the presentation, note comments, and at the end of the day tomorrow decisions will be made on which projects the board recommends for funding. Keep in mind that proposals can be modified based on board comments, some projects may be more appropriate for the RIC, and that we need to be thinking about how the projects can be implemented.

RIC members are the TLs for projects they fund and LRRB board members should consider being TLs or TAP members for the project funded by the LRRB to keep involved and help assure successful outcomes.

V. Robotic Roadway Message Painter Prototype – Ryan Rosandich, University of Minnesota, Duluth

This proposal is to develop, build, and test a full-sized prototype for a robotic roadway message painter. The prototype will be mounted on a wheeled structure that will be manually rolled around for positioning and will be equipped with a standard pavement striping power paint sprayer. Software will also be developed to enable it to paint a variety of characters.

Discussion: The system will be designed to dispense paint only, but a glass bead dispenser can be added later. There is no off the shelf device message painter, however, off the shelf components will be used to develop this system. The dimensions of the device will be 10' x 16". Mn/DOT is also interested in this project.

This project was not approved for funding. Maybe the ITS Institute or Mn/DOT will fund the project.

VI. Performance Based Transportation Construction Contracts – Diwakar Gupta, University of Minnesota

This proposal will focus on identifying implementation barriers and solutions for overcoming barriers that transportation agencies face in utilizing performance based contracts (PBCs). PBCs are increasingly becoming the norm for the procurement of services. The research will develop a synthesis of knowledge on PBCs that cover best practices from a variety of industries including the construction industry and will develop mathematical models that shine light on identifying the relationship between contract parameters and the nature of bids, the efficient allocation of risk, and the coordination, with the goal of identifying optimal parameters.

Discussion: This is an exploratory proposal and is looking at non-standard ways of doing business. Understanding and analyzing performance based transportation construction contracts is a huge task. Mn/DOT's Office of Construction needs to be involved and they will want to incorporate existing incentives and disincentives into this for more immediate use. Finances are the focus of the project. Targets need to be developed in the project for items such as; ride quality, pot holes, cracking, etc.

LRRB could put funds towards the project with the potential for re-scoping. A Technical Synthesis could be developed as a first phase. Is Michigan willing to put funds towards the project?

Motion made and seconded (**Bob Johns/Julie Skallman**) to put \$30,000 (FY10) towards the full research project (not a technical synthesis) with the contingency of funding by others. CTS and RSS to work together to identify other funding options and their related scope requirements.

VII. Development of a Stormwater BMP Web Portal – Bruce Wilson, University of Minnesota

The project will develop a web portal which will provide a single point of access to stormwater BMPs that includes guidance on the selection of practices and CAD design templates. The webportal will be part of the University of Minnesota's Erosion and Sediment Control Certification program. And a committee will be appointed to provide broad oversight of the portal. With the growing interest in stormwater BMPs, a webportal should save time and effort in assessing available practices.

Discussion: This would essentially be a clearinghouse of information. The committee that would be appointed would select the BMPs in the webportal. A city/county representative would need to be a member of the committee. A high cost of a clearinghouse.

The project was not approved for funding.

VIII. Costs and Benefits Comparison of Pavement Preservation Techniques Used in the Real World – Mihai Marasteanu, University of Minnesota

This project will develop performance models and life cycle cost analyses of current practices and selection processes of pavement preservation activities. In the analysis, the historical performance of these activities and the prediction of future performance through the use of performance models will be

taken into account. The success of the project is dependent on collaboration between the University of Minnesota, the Materials Lab, the State Aid Office, and city and county engineers.

Discussion: With the budget cuts occurring we are trying to figure out long-terms costs and issues in pavement preservation. Samples could be taken from Mn/ROAD. Maintenance records will need to be found. Reliability will be incorporated into the life cycle costs.

This project was not approved for funding.

IX. Performance Testing of Minnesota Scour Countermeasure Practices – Jeff Marr, University of Minnesota

This research project focuses on 1) quantifying current scour countermeasures (riprap and non-riprap) usage in Minnesota, 2) providing a field-based evaluation of Minnesota sites where alternative (non-riprap) countermeasures have been deployed included bridge scour sites and river training sites, 3) providing a synthesis of alternative (non riprap) countermeasure options available to state engineers, 4) providing field-based assessments of example alternative countermeasures application currently used in upper Midwest sites, and 5) developing recommendations for future scour countermeasure usage in the Minnesota.

Discussion: This research should focus on both bridge and river scour. Could look at sites that are designed and recently went through a big event. The primary project stakeholders are MN, but scour is shared problem with neighboring states. The report in Task 5 would be written for user (very applied) and could be used for technology transfer.

Motion made and seconded (**Keith Shannon/Ken Saffert**) to hold this project until the March LRRB meeting.

X. Benefits and Disbenefits of Various Highway Shoulder Design Exception – Jason Cao, University of Minnesota

This research project will address the potential negative consequences (benefits and disbenefits) of innovative uses of highway shoulders to provide capacity of travelers. The impacts on single-occupancy vehicle (SOV) drivers, transit riders, emergency vehicles, lower-income drivers, and maintenance personnel will be measured and will include qualitative interviews and analysis of quantitative data from Mn/DOT, Metro Transit and other agencies.

Discussion: The research project did not look at the affect design exception projects could have on local roads/arterials, but this could be added to the project.

This project was not funded.

XI. Driver Behavior Impacts of Residential Street Warning Signs – Keith Knapp, University of Minnesota (INV 890)

This research project will investigate the ability of residential street warning signs to impact driver behavior such as speed choices and attention levels. Both field data collection and a simulation are proposed to measure these changes in driver behavior. Vehicle speeds can be collected in the field but

the simulation, if completed, will also allow, among other things, for an evaluation of more specific driver actions (e.g., eye movements and vehicle lane placement).

Discussion: Chad Smith from the City of Bloomington submitted the problem statement for this project and the City of Bloomington is willing to be involved in the project. The PI will also work with other cities to do field testing. There is high cost in FY2010 and if funded will need to spread the costs out. We should focus on the practical researcher (vehicle speeds, field testing) and eliminate simulator work. The cost without the simulator was revised to \$80,273.

Motion made and seconded (**Deb Bloom/Keith Shannon**) to fund project at \$80,273 (FY10: \$37,323 and FY11: \$42,950)

XII. Performance of Recycled Asphalt and High Rap Asphalt Mixtures – Eddie Johnson, Mn/DOT Office of Materials (INV 889)

The objectives of this project are: (1) document the field and laboratory performance of asphalt pavements that are constructed with high amounts of recycled material, (2) document plant operations that produce high quality recycled material, and (3) conduct a laboratory trial mixture investigation to produce asphalt mixtures designed with maximum amounts of recycled material.

The evaluation will consider these key issues for RAP performance and design:

- Virgin and mixture binder grade
- Binder modification (polymer, other)
- Percent recycled material in design (RAP plus shingles or other)
- Recycled material type (RAP, shingles, other)
- RAP fractionation
- Warm asphalt

Discussion: Is RAP wasted? Is it used somewhere else? Any report or outreach should state where exactly RAP is used. Will we be successful going to 70% RAP if we don't want to go to 30% now. There is so much variability in RAP that it scares people. Any research that shows how to use RAP will help future legislation. We need to add shingles into research project.

Motion made and seconded (**Mitch Anderson/Ken Saffert**) to fund project with shingle research included. **Motion approved.** Total project cost is \$60,000 (\$15,000 FY10; \$30,000 FY11; \$15,000 FY12).

XIII. Sand Filtration with Steel Wool for Stormwater Heavy Metal and Dissolved Phosphorus Removal – John Gulliver, University of Minnesota

This research will look at the effectiveness and determine the optimal design and operation for a linear sand filtration system enhanced with steel wool in an attempt to provide significant treatment of particulate pollutants and dissolved phosphorus from stormwater along roadway projects.

Discussion: A pilot scale lab will be built at the St. Anthony Falls Laboratory. Could we take things a step further and use steel wool in rain gardens? There are lots of applications for steel wool and it is cost effective. There is not strong support at Mn/DOT. Would the project be more appropriate as a pooled fund project.

This project was not funded.

XIV. Performance Assessment of Oversized Culverts to Accommodate Fish Passage – John Nieber, University of Minnesota

This research will assess if oversized culverts that allow for the passage of fish and to maintain the continuity of sediment transport are functioning to meet the intended objectives. What are the impacts the oversized culverts have on fish passage and the adjoining stream characteristics? There is a need to identify the morphologic and hydraulic conditions introduced by the oversized culverts that may negatively affect fish passage.

Discussion: It is important to understand how we should design culverts. The DNR is not forcing us to look into oversized culvert design but it is being discussed. There is support for the project but not an immediate need. Mn/DOT may fund the project.

Motion made and seconded (**Rick West/Ken Saffert**) to fund 50% of the project contingent on Mn/DOT funding 50%. **Motion approved.** If Mn/DOT does not fund, this project should be brought back to the board. LRRB funding for \$41,713 (\$19,814 FY10: \$19,814 FY11: \$12,085 FY12).

XV. Minnesota Local Agency Pavement Marking Practices – Phase 1 – Omar Smadi, Iowa State (INV 888)

This research will review existing pavement marking practices in local agencies and the second is to develop recommendations for better management of pavement marking through the use of pavement marking management tools. Guidance will be provided on material selection and installation in order to maintain good pavement markings.

Discussion: We need to get our arms around this and need to listen. Need to look at concerns that local agencies have and we may need to change maintenance practices.

Motion made and seconded (**Julie Skallman/Deb Bloom**) to approve full funding at \$18,720 (FY10) for the project. **Motion approved.**

XVI. Pavement Marking Performance Under Challenging Pavement Surface Conditions – Chip Seal, Seal Coat and Micro Surfacing – Omar Smadi, Iowa State

The research will develop recommendations for efficiently providing pavement markings under roadway surface treatment conditions. Improving pavement marking performance in terms of daytime presence, night time retro reflectivity, and life-cycle costs will improve efficiency and safety for the traveling public.

Discussion: A part of the project is to determine how many locals perform own snowplowing or contract snowplowing out.

The project was not funded.

XVII. Sub grade Stabilization ME Properties Evaluation and Implementation – Aaron Budge, Mankato State

This research will look at which types of sub grade stabilization have been attempted and to evaluate how well each method appears to be working. The main objectives of this research are to: 1) determine the various materials that have been used (or are currently being used) by local agencies, using the Skok study as a basis, 2) evaluate the usefulness of such materials in achieving the desired results, 3) determine the appropriate material properties of field and laboratory specimens such that these properties can be implemented for more cost-effective road design, 4) summarize the advantages and disadvantages of each material/technique and provide material properties for desired materials, and 5) provide this information to the state and counties to aid in making informed decisions and designs with respect to future projects. Failed efforts should be addressed to determine (if possible) the reason for the failure and to comment on whether adjustments could be made such that the method could be used successfully in other circumstances. Successful utilizations can certainly be shared such that other groups can benefit from the implementable technologies and ME properties.

Discussion: This project is essentially taking the work of Gene Skok and building on it. Do we need this follow-up?

This project was not funded.

XVIII. Bridge Deck Sealant Best Practices and Field Study of Various Sealants and Methods of Application/Installation – Aaron Budge, Mankato State

This research project will build on work done in Wisconsin that determined which bridge deck sealant products are most effective. The findings from the Wisconsin work will be used to narrow the list of products, and then perform field and laboratory tests of these products to determine the best products and methods of application for Minnesota implementation.

Discussion: Scott Morgan from Mn/DOT recommended pursuing this project.

This project was not funded.

XIX. Cost-Effective Pavement Preservation Solutions for the Real World – James Wilde, Mankato State (INV 886)

This research project will first compare the advantages and disadvantages (cost, longevity, performance, etc.) of different pavement preservation techniques and verify these with real-world projects in the field. Secondly, the project will develop a linkage between pavement design and the future performance (maintenance activities) and rehabilitation needs of a roadway, based on that design. Tradoffs between initial pavement structure and the future repair will be examined.

Discussion: Yesterday a presentation on this topic was heard. The Mankato approach is more practical. Lon Aune, Marshall County, should be on the Technical Advisory Committee.

Motion made and seconded (**Keith Shannon/Ken Saffert**) to approve 50% funding for the project contingent upon Mn/DOT funding. **Motion approved.** The total LRRB funding is \$54,992 (\$28,662 FY10; \$21,704 FY11; \$4,626 FY12).

XX. Potential Probe System for Pavement Performance Phase I – Darwin Dahlgren, Goodpointe Technologies

This project will identify and improve the utilization of existing resources and equipment available to monitor pavement performance measurements through the use of redundant existing resources and enable this data to improve related roadway condition, capacity, safety and security needs. The type and use of information can be gathered using existing vehicles and platforms as part of existing vehicle work flow by tracking use.

Discussion: Some cities already have tracking systems in use. This is a demo of existing vehicles and shows how they are doing. One goal of the project is to improve the quality of data.

This project was not funded.

XXI. Structural Evaluation of Asphalt Pavement with Full-Depth Reclaimed Base – Shongtao Dai, Mn/DOT Office of Materials (INV 887)

This research project will determine what granular equivalent (GE) should be used for stabilized full depth reclamation (FDR) material and the seasonal effects on FDR base.

Discussion: Calculation of GE is important and it is possible to split GE from spring load restrictions. Taking out spring load restriction portion of project would be a 20% savings and would be a 2 year project.

Motion made and seconded (**Deb Bloom/Rick West**) to approve 50% LRRB funding for the project with a compressed schedule and including spring load restriction portion of the project. **Motion approved.** Therefore, LRRB funded \$39,904 (\$4,940 FY10; \$29,450 FY11; \$5,474 FY12) and State-Aid funded the other 50% at \$39,904.

The meeting adjourned at 4:30pm.