Home of Missouri's LTAP
MLTRC
Missouri Local Transportation Resource Center
UMR
MOinfo
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SPRING ◆ 2004

in this issue

ROAD CRASHES REDUCED 42% IN MENDOCINO COUNTY, CALIFORNIA — UNBELIEVABLE, BUT TRUE!

TRANSPORTATION INNOVATIONS

PAVEMENT REHABILITATION THROUGH ULTRA-THIN WHITETOPPING (UTW) OVERLAYS

TAGS PART V: INVESTIGATING NEW PRODUCTS & PROCESSES

SEPTEMBER 28-29, 2004
Road System Traffic Safety Review (RSTSR) Showcase
Ukiah, California
www.pdshowcase.org

OCTOBER 26-27, 2004
MINK4: Local Roads Conference
St. Joseph, Missouri
campus.umr.edu/mltrc

Road Crashes Reduced 42% in Mendocino County, Calif. — Unbelievable, But True!

By Gib Peaslee, Coordinator, NLTAPA Product Demonstration Showcase Program

Mendocino County lies on the coast of California, about one hundred miles north of San Francisco. Mendocino County Department of Transportation (MCDOT) is responsible for just over one thousand centerline miles of roadway and serves a population of 87,000 people inhabiting an area of 3,510 square miles. By implementing a simple, yet thoughtful program they have achieved a 42 % reduction in low volume road crashes.

Learn how they did it!

You and your road safety management team are invited to experience the entire MCDOT process start to finish at the Mendocino County Road System Traffic Safety Review (RSTSR) Showcase in Ukiah, Calif., September 28-29, 2004.

At this showcase, MCDOT staff will share every detail including the start-up, roadway selection, field review, and deficiency correction processes, as well as subsequent treatment evaluation, treatment selection methodology and cost-benefit measurement process details. An integral part of this Showcase experience will be guided visits to previously improved field sites.

You should attend if...

- you are responsible for a large number of low volume roadway miles
- you are responsible for signs and markings of your roadways
- you think safety is important
- you are a public official concerned about roadway safety

Travel Stipend Program

Travel Stipend Program (TSP) scholarships are available for two rural agency teams per state or TTAP. TSPs will cover air travel, overnight accommodations and motor coach transportation fees directly related to the showcase. They will not cover showcase registration fees Priority will be given to agencies which…

- Serve populations under 50,000.
- Have extensive low volume road miles or high crash rates on low volume roads.
- Have a restricted travel policy.

For more information on the Travel Stipend Program contact Renee Curtis at the Florida LTAP Center, 352-392-2371 ext. 233, email: pdshowcase@ce.ufl.edu.

Registration Information

The showcase will convene at Mendocino College. The registration fee is $125 per person. AAA Travel is available (800-881-6707 ext. 2234) to assist with airline and hotel accommodations.

To register, or for more details...

Visit: www.pdshowcase.org

Contact: Chris Ritch, Florida LTAP Center
Phone: 352-392-2371 ext. 223
Email: chris@ce.ufl.edu

Daiana Mathis, California LTAP Center
Phone: 510-231-5672
Email: daianam@berkeley.edu

THE FINE PRINT:

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MLTRC reserves the right to edit content for length and clarity. Please include your name, address, phone number, and email address with all submissions. Digital images submitted to accompany articles must be submitted in JPEG or TIFF format at a resolution of at least 300DPI.

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1 (866) MO-ROADS

3 BRIDGES FOR SALE

Bridge No. 2760011
Andrew County • Missouri

Bridge No. 2760011 over Muddy Creek in Andrew County, Missouri is available at no cost for adaptive reuse at a new location. This National Register-eligible bridge is a steel, 5-panel, 2-angle, rigid-connected Camelback pony truss with a roadway width of 15.8' and length of 71.0'. The fabricator was Inland Steel Company of East Chicago, Illinois. If the bridge is transferred to another party, the transfer deed may include preservation covenants that require the new owner to preserve and maintain the bridge in accordance with established standards for historic bridges. Funds may be available for reuse of the bridge.

Please contact: Bob Burnett, P.E., Snyder & Associates, LLC
4730 Frederick Avenue, St. Joseph, MO 64506, Ph: (816) 364-5222

Bridge No. 1770008
Dekalb County • Missouri

Bridge No. 1770008 over Grindstone Creek in Dekalb County, Missouri is available at no cost for adaptive reuse at a new location. This National Register-eligible bridge is a steel, 5-panel, pin-connected Pratt through truss with a roadway width of 11.8' and length of 97.5'. Two (2) steel stringer approach spans also are present on each end of the bridge. The bridge was built by Dildine Bridge & Construction Co. of Cameron, Missouri, in the early 1900s. If the bridge is transferred to another party, the transfer deed may include preservation covenants that require the new owner to preserve and maintain the bridge in accordance with established standards for historic bridges. Funds may be available for reuse of the bridge.

Price: n.a. • Square feet: n.a. • Lot size: n.a.
Contact: Philip E. Schrick, P.E., McDonald & Warger, Inc.
P.O. Box 236, Liberty, MO 64069, Ph: (816) 781-6182

Bridge # 0360020
Gasconade County • Missouri

Bridge # 0360020 over a tributary of Barren Fork River is available for adaptive reuse at a new location. The National Register – eligible bridge was built by Miller and Borcherding in 1915. The structure is a 42 foot long steel, 3-Panel, rigid-connected Pratt/Warren pony truss with a 14.2' roadway width. If the bridge is transferred to another party, the transfer deed may include preservation covenants that require the new owner to reserve and maintain the bridge in accordance with established standards for historic bridges. Monies may be available for re-use of the bridge.

Contact: Michael Purol, Great River Engineering, Inc.
P.O. Box 1258, Hannibal, MO 63401, Ph: (573) 221-8443, F: (573) 221-2230
grtriver@socket.net

MLTRC TRAINING SURVEY

We need your help in developing our curriculum to best meet local needs. Please take a few moments to fill out the questionnaire below and send us your input.

Would you/others in your agency be interested in attending training workshops on the following topics? If so, please indicate about how many might attend and what time of year works best for your agency.

Post Incident Bridge Inspection—instruction for general transportation employees, e.g. maintenance and construction personnel, regarding what to look for on and around a bridge following an earthquake or other incident to determine if it can remain open for traffic.

This topic would___/would not___ be useful for my agency.

Indicate the number of individuals who might be interested in attending a workshop on this topic: _____

The best month of the year for such a workshop would be _____.

Shoring for Excavation—two training modules are available. The general excavation module will provide basic life-saving information, specifically regarding the dangers of excavation and how to identify hazards for personal protection. Instruction includes hands-on opportunities to install protective equipment properly. The overseer module will cover identification of hazardous situations and the corresponding proper corrective action; identification of unsafe working conditions; classification of different soil types, for determination of the proper protective system for an excavation; and installation and inspection of protective systems

This topic would___/would not___ be useful for my agency.

My agency would be interested the general module___/the overseer module___. (Check one or both.)

Indicate the number of individuals who might be interested in attending the general module: _____ and the overseer module _____

The best month of the year for such a workshop would be _____.

Motor Grader Operator Instruction—both classroom and in-the-field instruction on the principles and proper techniques involved in grading a road.

This topic would___/would not___ be useful for my agency.

My agency would be interested in classroom___/in-the-field___ instruction. (Check one or both.)

Indicate the number of individuals who might be interested in attending a workshop on this topic: _____

The best month of the year for such a workshop would be _____.

Intersection Safety—workshop covering basic enhancements that can be made to improve intersection safety.

This topic would___/would not___ be useful for my agency.

Indicate the number of individuals who might be interested in attending a workshop on this topic: _____

The best month of the year for such a workshop would be _____.

Basic Low-Cost Safety Improvements—workshop covering identification of high crash locations, roadside hazards, signing and marking, intersections, traffic signals, and railroad grade crossings. Instruction includes case studies and low-cost improvement exercises.

This topic would___/would not___ be useful for my agency.

Indicate the number of individuals who might be interested in attending a workshop on this topic: _____

The best month of the year for such a workshop would be _____.

RETURN ADDRESS

PLACE
STAMP
HERE

MLTRC – *Home of Missouri's LTAP*
University of Missouri-Rolla
Civil, Architectural & Environmental Engineering
210 Butler-Carlton Hall, 1870 Miner Circle
Rolla, Missouri 65409-0030

– Please fold in half and seal with tape (not staples) before mailing. –

SUGGEST A TRAINING TOPIC

Please list other topics which would be useful to you/your agency:

1. _____

2. _____

3. _____

4. _____

5. _____

PUBLICATIONS

NCHRP Report 506: Quality and Accuracy of Positional Data in Transportation – Abstract This report presents guidance for practitioners on the use of positional, or spatial data in Geographic Information Systems (GIS) for transportation applications. Transportation spatial data usually describes the location of features on the highway system using a one-dimensional linear referencing system. 67 pages.

NCHRP Synthesis 324: Prefabricated Bridge Elements and Systems to Limit Traffic Disruption During Construction – This report presents results of an investigation on the use of innovative prefabricated elements and systems to limit traffic disruption during construction, rehabilitation, widening, or replacement. 48 pages.

Transportation Research Record, No. 1859: Sustainability and Environmental Concerns in Transportation 2003 – Abstract Sustainability and Environmental Concerns in Transportation 2003 116 pages.

Transportation Research Record No. 1840: Statistical Methods and Modeling Safety Data, Analysis, and Evaluation – A compilation of various studies. 197 pages.

Transportation Research Record, No. 1851: Highway and Facility Design 2003 – A compilation of various studies. 157 pages.

Transportation Research Record, No. 1853: Pavement Management and Rigid and Flexible Pavement Design 2003 – A compilation of various studies. 178 pages.

Transportation Research Record, No. 1838: Transit; Rail, Commuter, Light Rail, Major Activity Center Circulation Systems, New Technology and Maintenance – A compilation of various studies. 80 pages.

Transportation Research Record, No 1845: Design of Structures 2003 – A compilation of various studies. 225 pages.

TCRP Report 99: Embracing Change in a Changing World – This report summarizes the findings of TCRP Project B-22A. It will be of interest to individuals who provide public transportation in rural and small urban areas; local, regional, state, and federal planners and funders of these services. 27 pages.

NCHRP Report 511: Guide for Customer-Driven Benchmarking of Maintenance Activities – Customer-driven benchmarking combines outcomes, outputs, resources, and hardship factors to give analysts and managers a broad perspective on how well various organizations are achieving outcomes that matter to customers in a manner that uses the fewest possible resources while taking into account the level of production and uncontrollable factors such as weather. 254 pages.

Transportation Research Record, No. 1850: Air Transportation Challenges Airspace, Airports, and Access – A compliation of various studies on air transportation challenges airspace, airports, and access. 81 pages.

Transportation Reasearch Record, No 1848: Transportation Management and Public Policy 2003 – A compliation of various studies on transportation management and public policy. 136 pages.

Transportation Research Record, No. 1852: Traffic Flow Theory and Highway Capacity 2003 – A compilation of various studies on traffic flow theory and highway capacity. 270 pages.

Transportation Research Record No. 1854: Traveler Behavior and Values 2003 – A compilation of various studies on traveler behavior and values. 198 pages.

Transportation Research Record No. 1855: Transportation Data Research – A compilation of various studies on transportation data research. 199 pages.

Transportation Research Record No. 1856: Freeways, High-Occupancy Vehicle Systems, and Traffic Signal Systems 2003 – A compilation of various studies on freeways, high-occupancy vehicle systems, and traffic signal systems. 247 pages.

Transportation Research Record No. 1857: Transportation Network Modeling 2003 – A compilation of various studies on transportation network modeling. 127 pages.

Transportation Research Record No. 1858: Transportation Planning and Analysis 2003 – A compilation of various studies on transportation planning and analysis. 157 pages.

Transportation Research Record No. 1860: Pavement Assessment, Monitoring, and Evaluation 2003 – A compilation of various studies on pavement assessment, monitoring, and evaluation. 193 pages.

Transportation Research Record No. 1861: Construction 2003 – A compilation on various studies on construction and materials. 160 pages.

NCHRP Report 505: Review of Truck Characteristics as Factors in Roadway Design. – Abstract The heavy truck vehicle fleet constitutes a significant percentage of the traffic on major routes in the United States, such as the Interstate highway system. 150 pages.

TCRP Report 95 Chapter 18: Parking Management and Supply – Abstract +Information on how travelers respond to differences in the supply and availability of vehicle parking, including changes that might occur as a result of shifting land-use patterns, changes in regulatory policy, or attempts to "manage" the supply of parking. 86 pages.

Title TCRP Report 95 Chapter 11: Transit Information and Promotion – Abstract Traveler response to mass market information, mass market promotions, targeted information, targeted promotions, costumer information services, and real-time transit information dissemination are examined. 71 pages.

TCRP Report 100: Transit Capacity and Quality of Service Manual – Transit Capacity and Quality of Service Manual. 479 pages.

NCHRP Report 513: Simple Performance Tester for Superpave Mix Design: First-Article Development and Evaluation – This report presents the findings of a research project to develop a practical, economical simple performance tester for use in routine Superpave mix design and possibly in the characterization of hot mix asphalt (HMA) materials for pavement structural design. 115 pages.

NCHRP Report 510: Interim Planning for a Future Strategic Highway Research Program – Interim Planning for a Future Strategic Highway Research Program. 75 pages.

NCHRP 2003 Summary of Progress – Summary of Progress. 100 pages.

NCHRP Report 512: Accelerated Pavement Testing: Data Guidelines – Report consist of identifying the developing definitions of the data elements associated with APT and recommending guideline for their collection, storage, and retrieval. 42 pages.

NCHRP Report 514: Bonded Repair and Retrofit of Concrete Structures Using FRP Composites – Abstract The long-term performance of bonded repairs and retrofits of concrete structures using FRP composites is very sensitive to the process by which the FRP material is stored, handled, mixed, applied, and cured. 62 pages.

TCRP Synthesis 51: Transit Advertising Sales Agreements – This synthesis will be of interest to transit agency staff responsible for advertising sales in their agencies. They can use this report to learn from the experiences of other transit agencies and to compare their experiences with those of others. 99 pages.

Transportation Research Record No. 1836: Initiatives in Information Technology and Geospatial Science for Transportation – A compilation of various studies on Initiatives in information technology and geospatial science for transportation. 156 pages.

Transportation Research Record No. 1842: Energy, Air Quality, and Fuels 2003 – A compilation of various studies on energy, air quality, and fuels. 134 pages.

Transportation Research Record No. 1844: Traffic Control Devices, Visibility, and Rail-Highway Grade Crossings 2003 – A compilation of various studies on traffic control devices, visibility, and rail-highway grade crossings. 102 pages.

8th International Conference on Low-Volume Roads – A publication from the Transportation Research Board from the 8th International Conference on low volume roads in Reno, Nevada.

Transportation Research Board 77th Annual Meeting – Transportation Research Board 77th Annual Meeting

Transportation Research Board 78th Annual Meeting – Transportation Research Board 78th Annual Meeting

Transportation Research Board 79h Annual Meeting – Transportation Research Board 79th Annual Meeting

Transportation Research Board 80th Annual Meeting – Transportation Research Board 80th Annual Meeting

Transportation Research Board 81st Annual Meeting – Transportation Research Board 81st Annual Meeting

Title Transportation Research Board 82nd Annual Meeting – Transportation Research Board 82nd Annual Meeting

Title Transportation Research Board 83rd Annual Meeting – Transportation Research Board 83rd Annual Meeting

TRANSPORTATION INNOVATIONS

Now and then, we all hear about intriguing technologies and innovations that can be used to improve the transportation network in some way. FHWA recently saw the need to develop a national listing of such technologies and innovations that were judged to be market-ready and responsive to existing priority needs. The result was the following list:

511 Traveler Information—An easy-to-remember three-digit telephone number available to State and local transportation agencies nationwide so that they can readily provide information and highway and transit conditions to travelers by telephone. Contact: Bob Rupert, 202–366–2194.

Asset Management Guide—The guide illustrates asset management principles and identifies techniques and methods for adopting the decisionmaking framework in transportation agencies. Contact: Stephen Gaj, 202–366–1559.

Augered Piles—The technology is characterized by the drilling of a hollow-stem auger into the ground, pumping grout or concrete into the hole, and installing reinforcement in the pile. This eliminates the need for a temporary casing. Contact: Silas Nichols, 410–962–2460.

Border Wizard—A PC-based software model that accurately simulates all cross-border movements of autos, buses, trucks, and pedestrians, using customs, immigration, and security procedures. Contact: Mike Onder, 202–366–2639.

Dispute Resolution Guidance for Environmental Streamlining—These procedures present strategies for interagency collaborative problem solving during the transportation development and environmental review process. Contact: Ruth Rentch, 202–366–2034.

Expanded Polystyrene (EPS) Geofoam—Lightweight material that can be used as fill behind walls and other support structures. Contact: Peter Osborn, 410–962–0702.

FHWA Traffic Noise Model (TNM), Version 2.1—By improving the ability to predict noise impacts in the vicinity of highways, this model improves the quality of project development decisions. Contact: Bob Armstrong, 202–366–2073.

Highway Economic Requirements System, State Version—A software model that is designed to evaluate the implications of alternative programs and policies on the conditions, performance, and user cost levels associated with highway systems. Contact: David Winter, 202–366–4631.

Improved Decisionmaking Using Geographic Information Systems—A software program that allows for manipulation, analysis, and display of geographically referenced data. Contact: Mark Sarmiento, 202–366–4828.

Interagency Funding Guidance for Environmental Streamlining—Guidance provides transportation and resource agencies with options for using Federal funds to support Federal resource agency coordination for streamlining environmental reviews. Contact: Ruth Rentch, 202–366–2034.

Intelligent Transportation Systems (ITS) SpecWizard—A software tool that can help transportation agencies write specifications for the National Transportation Communication for ITS Protocol (NTCIP) standards-based ITS equipment. Contact: Jason Hedley, 202–366–4073.

Load and Resistance Factor Design and Rating of Structures—An AASHTO Load and Resistance Factor Design (LRFD) and Rating (LRFR) bridge specification provides for more uniform levels of safety, which should lead to superior serviceability and long-term maintainability. Contact: Firas Ibrahim, 202–366–4598.

Pavement Smoothness Methodologies—The new pavement smoothness specification covers smoothness test methods, smoothness equipment specifications, and equipment-certification programs. Contact: Mark Swanlund, 202–366–1323.

QuickZone—A user-friendly computer software tool for estimating and analyzing length of queues and delays in work zones. Contact: Scott Battles, 202–366–4372.

Red Light Cameras—The traditional enforcement of violations for running red lights is automated by using camera systems at light-controlled intersections that detect an offending motorist, capture an image of the license plate, and issue a citation by mail. Contact: Hari Kalla, 202–366–5915.

Roundabouts—A circular intersection that requires entering vehicles to yield to existing traffic in the circulatory roadway. Contact: Hari Kalla, 202–366–5915.

Rumble Strips—Shoulder rumble strips are continuous grooved indentations in roadway shoulders that provide both an audible warning and a physical vibration to alert drivers that they are leaving the roadway. Contact: Dick Powers, 202–366–1320.

Safe Speeds in Work Zones—Two technologies that can improve safety in work zones are portable speed limit signs that automatically display the safe speed based on traffic conditions and the nature of the roadwork, and feedback displays that show the speed of approaching vehicles. Contact: Davey Warren, 202–366–4668.

Transportation, Economics, and Land Use System (TELUS)—This information-management and decision-support system helps State DOTs and metropolitan planning organizations prepare their annual transportation improvement programs and statewide transportation improvement programs. Contact: Fred Ducca, 202–366–5843.

AASHTO Technology Implementation Group Approved Technologies Accelerated Construction—This undertaking

promotes creative techniques to reduce construction time and enhance quality and safety. Contact: Dan Sanayi, FHWA, dan.sanayi@fhwa.dot.gov.

Air Void Analyzer—The air void analyzer can be used to provide real-time evaluation for measuring air content, specific surface, and the spacing factor of fresh portland cement concrete. Contact: John Wiakowski, Kansas DOT, johnw@ksdot.org.

Fiber-Reinforced Polymer—This material can be used to repair cracks in overhead sign supports by wrapping the support with the fiber-reinforced material. Contact: Paul Wells, New York State DOT, pwells@gw.dot.state.ny.us.

Global Positioning System (GPS) Surveying—The GPS uses satellites that transmit signals continuously; it has many highway applications, including surveying pavement conditions and inventorying highway assets. Contact: Charlie Brown, North Carolina DOT, charliebrown@dot.state.nc.us.

Ground-Penetrating Radar—Vehicle-mounted, ground-penetrating radar can be used to collect information about underlying highway pavement layers without incurring the time and labor costs and traffic delays associated with traditional methods of drilling for core samples. Contact: Mike Murphy, Texas DOT, mmurphy@dot.state.tx.us.

Highway Rail Warning System—A low-cost active warning system used at low-volume, highwayrailroad at-grade intersections, most often mounted on standard crossing poles, and the technology is solar battery-powered with wireless communications between the device and the locomotive. Contact: Dave Huft, South Dakota DOT, dave.huft@state.sd.us.

ITS Technologies in Work Zones—The use of ITS technologies in work zones, such as ramp-metering systems, intrusion alarms, and queue-detection information (sensors/cameras), is aimed at increasing safety for workers and road users and ensuring a more efficient traffic flow. Contact: Doug Rose, Maryland State Highway Administration, drose@sha.state.md.us.

Prefabricated Bridge Elements and Systems—These systems minimize traffic impacts of bridge construction projects, improve construction workzone safety, and make construction less disruptive for the environment by minimizing the need for lane closures, detours, and use of narrow lanes. Contact: Mary Lou Ralls, Texas DOT, mralls@dot.state.tx.us.

Thermal Imaging Safety Screening System—The system allows an operator at a weigh station to view the relative temperatures of brake drums through the wheel rims of commercial vehicles, using infrared images to detect whether brakes are functioning properly. Contact: Gary Hoffman, Pennsylvania DOT, ghoffma@dot.state.pa.us.

Further information is available at the following FHWA website:

www.fhwa.dot.gov/rnt4u/pti.htm

Research, Development and Technology
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www.modot.org/services/RDT Missouri Department of Transportation Published quarterly since 1996

TECH BRIEF

Pavement Rehabilitation through Ultra-Thin Whitetopping (UTW) Overlays

Introduction

The objective of this study has been to determine the feasibility of placing an ultra-thin whitetopping (UTW) overlay as a viable pavement rehabilitation method on low to medium volume asphaltic concrete (AC) pavements where rutting or shoving or both have become a problem, particularly at urban intersections. The procedure of milling and overlaying with asphaltic concrete is the least expensive and most commonly used practice in these areas. However, this usually serves as only a short-term fix. Other alternatives such as full depth asphalt or concrete pavement reconstruction are more expensive and cause more user delay. In lieu of these methods, an UTW overlay has been proposed as a more economic pavement rehabilitation alternative. UTW overlays are known to perform better and last significantly longer than a conventional AC overlay. In addition, UTW overlays are often placed using "fast track" paving techniques, and therefore, offer the long-term benefits of concrete pave-ment but allow for minimal delay during construction.

An UTW overlay is known as a thin (2"-4") concrete overlay bonded to a milled, existing AC surface. Once milled, it's important that the AC surface be cleaned to further enhance bonding of the UTW overlay. After placement of the over-lay, joints are sawn in both the transverse and longitudinal directions using a spacing of 1' per 1" of overlay thickness (e.g. for a 4" overlay, 4' x 4' panels). The short joint spacing and their narrow widths eliminate the need for joint seal-ant. It's strongly recommended that joints be sawn early to control cracking of the newly placed overlay. UTW overlays typically use conventional PCCP mixes reinforced with synthetic-thetic fibers or high early strength (HES) PCCP mixes with synthetic fibers, depending upon construction requirements. Good candidates for pavement rehabilitation with an UTW overlay should meet the following conditions:

- a minimum of 3" of existing sound asphalt after cold milling
- existing pavement must be over a sound base
- traffic volume should be low to medium

A newly placed section of UTW overlay pavement at the intersection of Rte. 78 and Rte. 291 in Jackson County

In April 1999, the first MoDOT UTW (4") was placed on U.S. Route 60 west of Neosho, Mo. in Newton County. In September 2000, MoDOT placed another UTW (3") at the intersection of Missouri Route 169 (Belt Highway) and Route YY in St. Joseph. In May and June 2003, MoDOT placed an UTW (4") at the intersection of Missouri Route 291 and Route 78 (23rd St) in Independence. The asphalt surface on all projects was coldmilled before hav-

continued inside…

TAGs PART V:
Investigating New Products & Processes

The Operations TAG (Technical Advisory Group) is responsible for reviewing and initiating MoDOT research and development activities that will support, increase efficiencies and provide new or better products or processes for MoDOT's Maintenance, Construction and General Services business units. The Operations TAG reviews new products or processes submitted by MoDOT functional units, state and federal agencies and/or vendors.

The introduction of a new product or process for possible study usually begins with the submittal of a New Product Evaluation or a Research Idea Statement (RIS). Either form normally comes through the Research, Development and Technology (RD&T) business unit within MoDOT for assignment to the appropriate TAG that has the expertise to review the new product or process. Once the new product or process has been assigned to the appropriate TAG, the product/process is then documented and assigned an investigation number, usually by the team leader, for recording and project tracking purposes. The team leader will then arrange a meeting with the team members to discuss and vote on each new product/process received. The team usually meets quarterly. Also during the meeting, opportunity is given to each of the team members to bring forth any ideas they have received from people in their district or business unit for the TAG to consider. If the TAG finds value to the Department in the submittal, a study will be formed. If little or no value to the Department at this time can be realized from the submittal, the proposal is rejected by the team and forwarded on to the RD&T administration team for the final review. In either case, the submitter will be notified of the TAG/RD&T administration team's decision.

New product or process investigations range from new asphalt oils for chips seals to reviewing proposals for special hot mix asphalts to new paint coatings for snowplow blades in order to help reduce costs associated with year end re-coatings.

The following are examples of current investigations:

Lightweight Aggregate Chip Seal

The objective of this study is to determine if the use of lightweight aggregate as the cover aggregate in

maintenance chip seals will reduce the number of claims pertaining to chipped/broken windshields and chipped paint on vehicles while still having adequate durability performance as compared with our standard sealing aggregate chips.

Recycled Asphalt Pavement (RAP)

The objective of this project is to learn if 100 percent recycled asphalt millings material mixed with an emulsion asphalt oil could successfully be used as a riding surface pavement for low volume routes. After time

allowed for curing, the surface will need a sealing treatment on the surface to retard moisture infiltration due a lack of gradation controls allowing an open-graded surface.

MISSOURI HIGHWAY AND TRANSPORTATION DEPARTMENT

RESEARCH IDEA STATEMENT

Check the appropriate area(s): Geotechnical Operations Pavements Traffic/Safety Social/Environmental/Economic Project Development/Bridge

IDEA TITLE: _____

IDEA STATEMENT: _____

_____

OBJECTIVE: _____

_____

_____

_____

APPLICATION(S)/BENEFIT(S): _____

_____

_____

_____

_____

KEY WORD *(Key words are needed to assist in literature search for research idea subject):*

_____

_____

DATE: _____

NAME: _____ **TITLE:** _____

ORGANIZATION: _____ **DIV/DIST:** _____

ADDRESS: _____ **CITY/ZIP:** _____

PHONE: _____

Complete and return to
Missouri Department of Transportation
Attn: Research, Development & Technology
PO Box 270
Jefferson City, MO 65102
FAX: (573) 522-8416

MISSOURI HIGHWAY AND TRANSPORTATION DEPARTMENT

PRODUCT LISTING/NEW PRODUCT EVALUATION REQUEST FORM

When request is submitted, enclose a completed copy of this form and the required information as indicated below.

CONTACT INFO

Manufacturer Fabricator Distributor Other _____

Business Name _____ Contact Name _____

Address _____ City _____ State _____ Zip _____

Telephone Number _____ Fax _____

Email _____ Website _____

PRODUCT INFO

Manufacturer _____

Name of Product _____ Model No. _____

Description and intended application of product: _____

Key Words *(requested for literature search)*: _____

List other states using the product: _____

What is the approximate unit cost of the product? _____

Is material available at no cost for lab and field installation evaluation? _____

SPECS

Does the product comply with MoDOT specifications? Yes No

If yes, provide specifications name/number.

If no, attach separate explanation as to why not and why MoDOT should consider the product.

Does product comply with other specifications (such as ASTM, ITE, AASHTO, NEMA, NTPEP, etc.)? Yes No

REQUIRED INFO

In addition to this form, please submit the following:

1) Product data (mixing info, installation requirements, product brochures, specification sheets, etc.)
2) Decoumentation required by the MoDOT specification (if applicable)
3) Applicable test data
4) Unit cost data and whether the unit cost includes installation
5) Material Safety Data Sheet

SIGNATURE

SUBMITTED BY:

_____

Signature *Print Name* *Date*

MAIL TO

Please send the new product evaluation request form and all other required information to the appropriate address below. Submittals related to the Traffic Signal and Highway Lighting Approved Products List should be submitted to Traffic Operations. Submittals that meet a current MoDOT specification and have a Qualified or Pre-Acceptance List should be submitted to Project Operations. All other submittals should be submitted to Research, Development and Technology. If a sample is required by the specification, submit the sample with a copy of the required documentation to the Central Laboratory. If the specification does not specify a sample or there is no specification, sample submittals will be required upon request.

Traffic Operations
PO Box 270
2211 St. Mary's Blvd.
Jefferson City, MO 65102

Project Operations
PO Box 270
2211 St. Mary's Blvd.
Jefferson City, MO 65102

Central Laboratory
PO Box 270
1617 Missouri Blvd.
Jefferson City, MO 65102

Research, Development & Technology
1617 Misouri Blvd.
Jefferson City, MO 65102

OFFICE USE

FOR OFFICE USE ONLY:

Initial date received _____ All required documentation submitted? Yes No

Date of additional documentation receipt _____ Product Development / NP number assigned _____

Ultra thin Bonded Asphalt (Novachip®)

The objective of this study is to determine if an open-graded, thin-applied hotmix will aid in the dispersion of moisture from the surface to reduce hydroplaning and over-spray from vehicle tires. It is anticipated that this treatment will be used at locations where pavement friction problems relating to wet accidents or high accidents are occurring.

AC15-5TR Chip Seal

The objective of this project is to determine, by using a special fast curing asphalt oil, if it would allow early release of traffic onto the chip seal without sacrificing treatment durability. This study was initiated to explore other preventive maintenance (PM) treatments for higher volume routes to possibly be added to the preventive maintenance toolbox. Preventive maintenance treatments, such as chip seals, are needed to arrest minor pavement distresses such as cracking, raveling and age hardening before these distresses result in structural problems in the pavement.

Cold mix Motorpaving

The objective of this study is to determine if a cold-mix paving procedure can be developed that will out-perform our existing practice of placing cold-mix from a windrow with motorgraders and learn if the performance and cost of the cold-mix motorpaving will be comparable to our 1-inch contract level course. A longer pavement life cycle is needed with a construction procedure that has better acceptance from our customers. A better cold-mix paving procedure will benefit parts of the state where hot-mix asphalt plants are not available.

Operations TAG members:

Tom Borgmeyer, MoDOT GHQ – Maintenance
Bob Lannert, MoDOT GHQ – Maintenance
Eric Schroeter, MoDOT District 5 – Maintenance
Ed Hess, MoDOT District 9 – Operations
Mark Shelton, MoDOT GHQ – Construction and Materials
Dennis Bryant, MoDOT GHQ – Construction and Materials
Larry Whiteside, MoDOT District 7 – Construction and Materials
Gerald Shipman, MoDOT GHQ – Multi-modal
Donnell Rehagen, MoDOT GHQ – General Services
Mary Ridgeway, FHWA – Missouri Division
Don Davidson, MoDOT GHQ – RD&T
Tom Anna, MoDOT GHQ – RD&T

MoDOT wants to hear from you!

If you have a research idea that could benefit the state transportation system or a new product to be reviewed, please fill out the corresponding RIS or New Product Evaluation form included in this issue.

ing a thin layer (3"or 4") of PCC overlay placed as the driving surface. All the UTW overlays were placed according to MoDOT's UTW special provision using a PCCP mix containing synthetic-thetic fibers. Texture was then applied to the overlay using transverse tining. Application of curing compound then fol-lowed at 1.5 times the normal rate for standard PCCP pave-ment. After placement and initial curing, saws were used to cut panels (3' x 3' or 4' x 4') in the concrete surface with no joint sealant applied. Research, Development, and Technol-ogy (RDT) monitored the construction of all three projects. RDT is now performing visual dis-tress surveys on a yearly basis to track in-service per-formance.

Project Descriptions

Route 60, Newton Co.

In April 1999, APAC of Missouri constructed the first UTW overlay placed on a state route in Missouri. The project was 0.80 mile in length with an intersection on the east end. The existing roadway was placed in 1960 on 10" of rolled stone base with 3" of type B and 1 1/4" type C as-phalt mixes. In 1974, 1/2" of type C was used for leveling, followed with 1 1/4" type C asphaltic con-crete. The full depth of the original asphalt of the two 12' lanes with vari-able width gravel shoulders was 7" thick. For the UTW overlay, 2"- 4" of the existing asphalt pavement was cold-milled and then 4" of con-crete pavement was placed.

The pre-construction visual survey indicated numerous moderate transverse cracks across both lanes of traf-fic. Sev-eral moderate longitudinal cracks were found in the wheel paths of both lanes. 75% of these cracks were removed during the milling operations. Following placement of the UTW overlay, only 4 transverse cracks that ran parallel to the sawed joints were observed within the first 48 hours. These cracks were found within the first 1,000' of the project and could be attributed to late sawing. Placing and furnishing costs on the Route 60 UTW project were $6.00 per square yard and $89.30 per cubic yard, respectively.

Route 169 and Route YY, Buchanan Co.

The existing intersection in St. Joseph consisted of four through lanes, each 12' wide, and a median or left turn lane 14' wide. The speed limit was 40 mph along Belt Highway and the amount of vehicles, especially trucks, that must stop and start again had provided the force neces-sary to cause a rutting and shoving problem. The original intersection included a PCC pavement, 40'wide, built in 1931. Additional 11' lanes were con-structed in 1964 of 11" of plant mix bituminous base. In 1977, a 3" asphalt over-lay was placed, and in 1989, a 1/2" leveling course, 1 3/4"of type B, and 1 1/4" of type C asphalt mixes were placed full width, overlaying the concrete and bituminous base lanes. For the UTW project, 3" of the existing asphalt pavement was cold-milled and 3" of UTW was placed.

This intersection project, performed by Realm Construc-tion, was designed for construction to be completed over one weekend, with the east side of the intersection constructed first followed by the west side. "Fast Track" technology was applied, which places high early strength (HES) concrete mixtures that can be opened to traffic in a matter of hours instead of days. The maturity concept, a method of monitoring the early age and temperature of concrete to estimate in-place strength, was successfully used to facilitate early sawing and opening the pavement to traffic. There were no cracked panels observed within the first 48 hours after the pavement was placed. Placing and furnishing costs on the Route 169 and Route YY UTW project were $19.00 per square yard and $110.00 per cubic yard, respectively.

Route 291 and Route 78, Jackson Co.

The intersection at Rt. 291 and Rt. 78 had a long histo-ry of rutting and shoving. Maintenance repairs were being performed on a regular basis. The intersection has been subjected to a high volume of traffic, many of which have been trucks. The original intersection con-sisted of 17" of asphalt pavement with 2-12' thru lanes, 2-12' left turn lanes, and 1-12' right turn lane. For the UTW overlay, 4" of the asphalt surface was removed by coldmilling and re-placed with 4" of concrete pave-ment.

The whitetopping project, performed by Musselman and Hall Construction, was scheduled for construction to be per-formed over two weekends, with the east side constructed first followed by the west side. "Fast Track" technology and HES concrete was used along with the maturity concept to facilitate early sawing and opening the pavement to traffic.

Pre-construction observations indicated that the exist-ing asphalt pavement at the intersection exhibited signs of rutting, shoving, and moderate-heavy cracking, in both the longitudinal and transverse directions. Over

95% of the cracks were eliminated, along with the rutting and shoving, during the coldmill operation. Following placement, visual distress surveys were performed at 1 day with no cracked panels observed.

Table 1—Project Information

Route	County	Length	ADT	Trucks	Original Pavement Thickness	Milled	UTW Thickness	UTW sq. yd.
60	Newton	4200'	21,452	10%	7"	2-4"	4"	20,723
169	Buchanan	860'	12,920	8%	17"	3"	3"	6,600
291	Jackson	1600'	63,860	9%	19"	4"	4"	16,625

Table 1 provides additional information for all three UTW project locations.

Project Performance Update

Route 60, Newton Co.

After the initial post-construction tests, annual falling weight deflectometer (FWD) and visual inspections were scheduled. The FWD has tested the UTW on Rt. 60 on a yearly basis since the completion of the project. The results indicate that the maximum deflections were in the 3-7 mil range, which is excellent. The UTW overlay continues to provide a composite modulus that is comparable for a structurally sound full depth asphalt pavement. Visual inspection results can be found in Table 2 and Figure 1. Most of the cracks found in the 4' by 4' panels during the yearly visual inspections were diagonal and approximately 2' in length. There has been no evidence of spalling or debonding found along these cracks despite none of the cracks having been sealed. There have been no panels replaced and no maintenance has been performed on this project. Despite an increase in the percentage of cracked panels during the first year or so following placement of the UTW, it appears to have leveled off in the last couple of years. After 4 years of service, the UTW overlay on Rt. 60 is considered to be performing well.

Table 2—Route 60

Time of Service	Total Panels	Panels Cracked	% Cracked
6 Months	6000	29	0.5
1 Year	6000	88	1.5
2 Years	6000	106	1.8
3 Years	6000	122	2
4 Years	6000	123	2

Route 169 and Route YY, Buchanan Co.

After the initial post-construction tests, visual inspections were performed at 1 month, 3 months, and yearly thereaf-ter. Results can be found in Table 3 and Figure 1. It should be noted that 60 of the cracked panels found during the 1-year survey were reflective cracks from an asphalt seam in the original pavement. Nineteen of the cracked panels found were located in the right turn lane onto Rt. YY, an area where the UTW overlay did not meet the minimum recommended 3". None of the cracks have been sealed by maintenance. Similar to the Rt. 60 UTW overlay, the per-centage of cracked panels appears to have leveled off from an earlier increase. After 3 years of service, the UTW overlay at the intersection of Rt. 169 and Rt. YY appears to be performing well, with no maintenance being performed on the intersection. FWD testing will begin on the project starting this year.

Table 3—Route 169

Time of Service	Total Panels	Panels Cracked	% Cracked
1 Month	4520	1	0.02
3 Months	4520	20	0.4
1 Year	4520	82	1.8
2 Years	4520	125	2.8
3 Years	4520	125	2.8

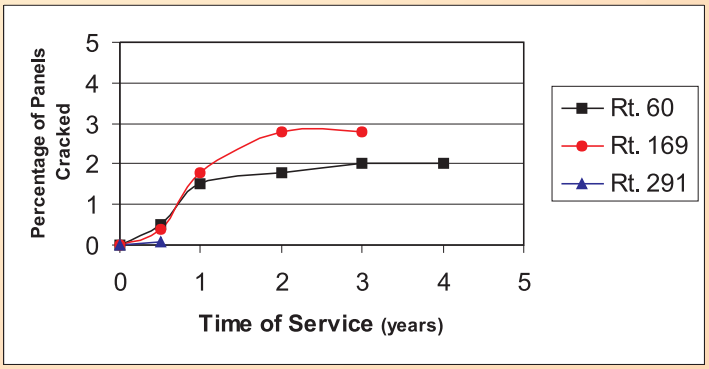
Route 291, Jackson Co.

After the initial post-construction tests, visual inspections were scheduled. Visual inspections were performed at 1 day and 6 months, and will continue yearly thereafter. Results can be found in Table 4 and Figure 1. This project was the most recent UTW overlay placed and only 6-month performance data has been included in this report. After 6 months of service, the UTW overlay placed at the intersec-tion of Rt. 291 and Rt. 78 is performing comparable to the two earlier projects at similar ages. Of the cracks that have occurred, none have been sealed.

Table 4—Route 291

Time of Service	Total Panels	Panels Cracked	% Cracked
6 Months	9352	8	0.08

Figure 1—Percentage of Cracked Panels Over Time



Conclusions To Date

1. The three UTW projects are performing very well to date. All have eliminated the problems of rutting and shoving. UTW appears to be a viable alternative to using asphalt for an overlay, under the appropriate conditions (3" of existing sound asphalt pavement after milling operations, sound base, low to medium traffic volume, and low to medium truck traffic volume).
2. The UTW overlay must meet the minimum thickness to perform as designed.
3. FWD testing on Route 60, Newton Co. indicates the UTW overlay continues to provide a composite mod-ulus that would be acceptable for a structurally sound full depth asphalt pavement with high structural integrity. No recent FWD testing has been performed on Route 169, Buchanan Co. and none is scheduled for Rt. 291.

For more information...

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