

LTAP MATTERS

Montana's Answer To Technical
Education of Roads & Streets

College of Engineering
Montana State University-
Bozeman

Bozeman, MT 59717-3910
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October, November, December 2001

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12th Annual Equipment Operator Training & Snow Rodeo

2 Snow Rodeo (continued)

3 Snow Rodeo (continued)

4 2001 "You Show Us How"
Contest Winner

5 2001 "You Show Us How"
Contest Winner (continued)

2001 County Road Advisors
Conference

Calendar of Events

6 Pavement Management Project

Federal Hazard Elimination
Program

7 New Publications

The 12th Annual Equipment Operator Training in Great Falls, MT was a cooperative effort by City of Great Falls, LTAP, T&E Equipment, and the Montana Department of Transportation. Sam Gianfrancisco and Steve Jenkins of LTAP and Steve Green of T&E Equipment provided the training. Equipment for the training, walk around inspection and the competition was provided by City of Great Falls, Caterpillar Equipment and MDT.



Sponsors Fred Ravino (front), T&E and Marty Basta (far left), City of Great Falls watch the equipment training.



Steve Green shows operators how to examine a backhoe to make sure all is in proper working order. His many years of experience on equipment and as a trainer is a great asset to operators in the state.

continued on page 2

Snow Rodeo Continued

MDT played a larger role in the training and competition this year. MDT trainers came to gather information or participate in events.

Great Falls has hosted the training for so long that all of the events and competitions, even though there were over 75 participants this year, ran smoothly. Overall, enjoyment and learning are the top priorities.

The overall winners from this years competition were:

- Del Henman, Yellowstone County, All Around Champion
- Larry Chapman, Lewis & Clark County, Motorgrader
- Doug Nisbet, Lewis & Clark County, Loader
- Del Henman, Yellowstone County, Snowplow
- Robin Miland, Missoula County, Backhoe



Troy Delaney
MDT-Stanford

Darren Kobelt, Clay Moore, Del Henman
Yellowstone Co.

Doug Nisbet, Larry Chapman
Lewis & Clark Co.



The judges assist each competitor to understand the rules and goals for each course.



Dan Williams and Cheryl Burrig observe the competition.

This year's first time participant winners were:

- Robin Miland, Missoula County, All Around Champion
- Robin Miland, Missoula County, Motorgrader
- Jim Avant, MDT Red Lodge, Loader
- Darren Kobelt, Yellowstone County, Snowplow
- Robin Miland, Missoula County, Backhoe

2001 "You Show Us How" Contest Winner

By Larry Chapman, Lewis & Clark County Road & Bridge Department

The Montana winner of this year's "You Show Us How" contest was Lewis & Clark County Road & Bridge Department.

PROBLEM STATEMENT

The problems that our department has encountered relate to pot hole patching. (1) We did not have the right signs out to let the motoring public know what work was being done to the road. (2) We had problems with the public driving too fast around both sides of our pothole patching truck, creating an unsafe situation for our two workers and oncoming traffic. (3) After patching potholes or shoulders with hot or cold mix, rolling patch always leaves rocks and mix on the road for the motoring traffic to fling or throw at other motorists, which causes chipped or broken windows. (4) Backing our patch truck up to the roll patches creates a hazard for the worker on the back and creates a situation where traffic could accidentally hit the worker.

DISCUSSION OF SOLUTION

(1) We now have signs that we place in the roadway saying "Patch Crew Ahead" to inform the motoring public that pothole patching is taking place.

(2) We have installed light bars on the cabs of our patch trucks. These light bars have strobe lights that can be operated from the inside of the truck by hydraulic electrical controls. The lights display arrows

that can be seen by traffic behind the truck and traffic coming towards the truck. The lights have arrows indicating which direction traffic should follow to move around the work crew. When drivers see that they have to enter the other lane of traffic to get around the



patch truck they generally slow down to avoid colliding with oncoming traffic.

(3) When you roll a pothole patch or shoulder patch with the patch truck tires, mix sticks to the tires and falls off later leaving rocks and fines for the motoring traffic to kick up or fling at other cars. We have

changed our procedures by putting the mix in the pothole, level with a rake or shovel, and then with a flat-face shovel glazing over the mix, combing it and then packing it. The mix is then already compacted when traffic drives over the patch. We have a lot of potholes, and have found this process to be much quicker than using a compactor. By the time you set down the compactor, start it up, compact the patch, and put it back on the truck you have greatly mini-



mized the amount of patching that can be done in a day's time.

2001 "You Show Us How" Contest Winner Continued

(4) Our most important improvement is in the area of safety. We no longer back up the truck, which creates a safer work environment for the worker in back. It is also safer for the motoring public because they do not have vehicles coming at them in reverse. One worker stays in the truck at all times looking in front of the truck and behind it for traffic and handling the controls and operation. He warns the worker on the back with a light tap of the horn or brakes that traffic is coming from the opposite direction. The worker in back then knows not to step out to the driver's side of the patch truck because of an approaching car. Two taps on the horn or brakes means more than one car is coming from the driver's side of the patch truck. Both workers wear orange safety vests and hats so they are clearly visible to traffic.



COST

Cost savings are realized by the county and by the public. Front windshields are not broken by mix left on the road. Drivers notice the light bar, slow down, and safely move around the patch crew. Workers on the patch crew are much safer because there is less chance of being run over by the patch truck - this is extremely important because it lessens the chances of having to go to the hospital or a funeral. Workers also know when traffic is approaching the patch truck so they do not step out into oncoming traffic. More pothole patching can be done in a day by not rolling or compacting patches with the patch truck or a compactor.

SAVINGS/BENEFITS

Patches seem to hold well. In the past, tires rolling over the patches seemed to pull the patches up a little, lessening the compaction and resulting in patches that did not hold up well over time. Workers are much safer, and we are watchful of working in a small area so we do

not get too spread out. We keep in sight of our patch signs and move them with us as we move forward in our work zone.

LABOR, EQUIPMENT, AND MATERIALS USED

Patch truck, safety clothing, sign board, strobe lights, patch signs.

2001 County Road Advisors Conference

The 2001 Region 8 County Road Advisors Conference will be held October 17-18, 2001 in Rapid City, SD. The registration fee for the conference is \$50 and includes one lunch, one breakfast, breaks, social hour and all handouts. Please send your registration form & fee to:

Bobby Meister
c/o Minnehaha County
PO Box 704, Sioux Falls, SD 57101
Vouchers and/or PO's are acceptable.

A block of rooms has been set aside at Ramkota Hotel. Reservations can be made by contacting the hotel.

Ramkota Hotel
2211 LaCrosse Street
PO Box 1795
Rapid City, SD 57709
(605) 343-8550

2001 Calendar of Events

League of Cities and Towns	October 4-5, Great Falls, MT
MACRS Regional Meetings - Winter Maintenance	October 1, Missoula, MT October 2, Whitehall, MT October 9, Great Falls, MT October 10, Billings, MT October 11, Glendive, MT
Region 8 County Road Advisors Meeting	October 17-18, Rapid City, SD Please see page 5 for more information
Loader - Classroom & Hands On Training	October 23, Thompson Falls, MT October 24, Helena, MT October 25, Bozeman, MT
MACRS Final Planning Meeting	November 20, Lewistown, MT Yogo Inn (406) 538-8721 9:00am - 1:00pm - Lunch Provided
Winter Safety Leadership for New Commissioners Work Zone Traffic Control Motor Grader Forklift Drainage and Trenching	On Request - Please call Steve Jenkins to arrange training

Federal Hazard Elimination Program

By Harry Lauer

Annually the Montana Department of Transportation (MDT) requests that local officials propose highway safety projects for funding in conjunction with the Federal Hazard Elimination Program. The funds are targeted at projects that have a high probability of reducing traffic accidents and/or their severity on any public roadway/streets. MDT allows any city or county to submit up to five (5) locations annually. Each proposed improvement must be documented with supporting information regarding collision diagrams, existing and projected traffic volumes, traffic accident trends, sketch of countermeasures, cost estimates, etc.

Both Lewis & Clark and Flathead counties have taken advantage of these funds by submitting projects over the last two (2) years. They used the assistance of Harry Lauer to help them identify their projects. Their efforts have identified over two million dollars worth of projects, which have been submitted to MDT. As of this date, it appears that all of the projects will be funded. The projects have ranged anywhere from basic traffic control revisions to the realignment of horizontal curves. If you would like assistance in submitting similar safety projects for MDT funding do not hesitate to call Harry Lauer at 1-406-458-3834.

Pavement Management Project

By Garyn Perret

The Montana Local Technical Assistance Program (LTAP), Montana Department of Transportation (MDT), and iWorQ Systems recently carried out a pavement management project with the City of Kalispell. The pilot project was carried out to determine the level of effort required to implement a pavement management program, and to help Kalispell comply with the MDT requirements for preventative maintenance funding.

Leonard Hogan, maintenance supervisor for Kalispell, and Jared Holland from iWorQ Systems spent three days doing a road inventory and pavement distress survey. After three days over half the city was finished and entered into iWorQ's Internet Based pavement management application. iWorQ Systems trained Kalispell to complete the distress surveys and use the pavement management application for reporting, multi-year budgeting, and analysis. The entire project took less than two weeks.

iWorQ Systems can assist the local government agencies with implementing a pavement management program. In addition, iWorQ Systems can help cities and counties identify roads that need preventative maintenance as well as prepare the proposals and reports necessary to secure MDT preventative maintenance funding. For more information contact Garyn Perret at (435) 755-9837 or the Montana LTAP Program.

New Publications

P-0015 GRS Bridge and Abutments - This report presents three recent projects on load testing of geosynthetic-reinforced soil (GRS) bridge abutments and piers.

P-0017 Standard Plans for Timber Bridge Superstructures - Standardized bridge plans for superstructures consisting of treated timber.

P-0018 Assessment of the Environmental Effects Associated With Wooden Bridges Preserved With Creosote, Pentachlorophenol, or Chromated Copper Arsenate - Purpose of this study: Assess the environmental response associated with existing timber bridges; determine the loss of various types of preservatives from overhead bridge structures and ; develop a computer model to assist the Forest Service in understanding the site-specific environmental risks.

P-0019 Guide for Minimizing the Effect of Preservative-Treated Wood Sensitive Environments - This publication addresses this concern by describing the various types of pressure-treated wood, reviewing recent research on the environmental impacts of pressure-treated wood, and discussing methods of minimizing potential environmental impacts.

P-0020 Field Performance of Timber Bridges 18. Byron Stress-Laminated Truss Bridge - This report includes information on the design, construction, and field performance of the Byron bridge.

P-0022 Steel Bridge Fabrication Technologies in Europe and Japan - The objective of this scanning tour was to conduct a broad overview of newly developed manufacturing techniques that are in use abroad for steel bridge fabrication and erection.

P-0065 Laboratory and Test-Site Testing of Moisture-Cured Urethanes on Steel in Salt-Rich Environment - An evaluation of three 3-coat moisture cured urethane commercial products formulated for protecting new steel surfaces against corrosion.

P-0067 Inspection of Timber Bridges Using Stress Wave Timing Nondestructive Evaluation Tools - This guide was prepared to assist inspectors in the use of stress wave timing instruments and the various methods of locating and defining areas of decay in timber bridge members.

P-0070 Highway Bridge Inspection: State-of-the-Practice Survey - This report documents the findings of a State-of-the-Practice Survey for the inspection of highway bridges.

P-0075 Reliability of Visual Inspection for Highway Bridges (Volume I & II) - This report documents the findings of the first comprehensive study of the inspection process since the adoption of the National Bridge Inspection Standards.

P-0076 Performance of Concrete Segmental and Cable-Stayed Bridges in Europe - European technology and experience with prestressed concrete segmental and cable-stayed bridges is one to two decades longer than in the United States, and the purpose of the Federal Highway Administration scan was to examine durability; identify possible future needs for maintenance, repair, retrofit or replacement; and compare trends and current practice.

P-0251 Intelligent Transportation Systems at International Borders, A Cross-Cutting Study - This document is one is a series of products designed to help you provide ITS solutions that meet your local and regional transportation needs.

P-0260 Long-Term Durability of Geosynthetics Based on Exhumed Samples From Construction Projects - This report presents the results of mechanical and chemical tests on 24 retrieved geosynthetics from 12 sites across the United States and provides a baseline databank of mechanical and chemical properties of many commonly used geosynthetics in transportation applications as tested by industry.

P-0261 Field Evaluation of Long-Term Performance of Geocomposite Sheet Drains - This evaluation is part long-term performance geocomposite sheet drains that were monitored at three sites by measuring the effect of the drains on site groundwater hydrology during peak groundwater events, which is an on-going study with a maximum record of 14 years at one site in the southern Sierra Nevada Range, CA.

P-0262 "A Shared Vision for California" - Upon implementation of the Initiatives throughout that time frame, Californians can expect to enjoy reduced congestion, improved safety, reduced pollution, enhanced mode choice, stimulated economic growth, and the enrichment the quality of life in California.

P-0263 Integrating Intelligent Transportation Systems within the Transportation Planning Process - Provides information on how ITS technologies can be considered as an integral part of an overall transportation program at both the metropolitan and statewide level.

P-0264 Montana Statewide ITS Strategic Plan-June 1999 - Provides the framework for the development of an ITS Program in the State of Montana.

Publications Continued

P-0265 Communications for Intelligent Transportation Systems - The primary objectives of this publication is to raise the awareness of and provide a tool for public agencies responsible for transportation programs including or supporting ITS.

P-0266 Performance Test for Geosynthetic-Reinforced Soil Including Effects of Preloading - A study was undertaken to investigate the behavior of Geosynthetic Reinforced Soil (GRS) masses under various loading conditions and to develop a simplified analytical model for predicting deformation characteristics of a generic GRS mass.

P-0267 Intelligent Transportation System Benefits: 2001 Update - This report continues the series of reports that document evaluation results of ITS user services and the benefits these services provide to the surface transportation system.

P-0268 What Have We Learned About Intelligent Transportation Systems? - A National ITS Program summary. The National ITS scope of study includes Freeway, Incident, and Emergency Management, and Electronic Toll Collection (ETC); Arterial Management; Travel Information Systems; Advanced Public Transportation Systems; Commercial Vehicle Operations (CVO); Cross-Cutting Technical Issues, and Cross-Cutting Institutional Issues.

P-0270 Guide To Earthwork Construction - This guide has been prepared to provide construction engineers and technicians with information on all aspects of earthwork construction.

P-0370 Superpave Mixture Design Guide - This document is intended to be a companion to National Asphalt Pavement Association's *Superpave Construction Guidelines*, is a guide for the HMA designer to maximize the benefits of Superpave while avoiding potential problems.

P-0371 Hot-Mix Asphalt Paving Handbook 2000 - This handbook covers the state of the art of asphalt paving, including plant operations, transportation of materials, surface preparation, laydown, compaction, and quality control processes.

P-0375 Superpave Mixture Design Guide - This document, intended as a companion to the National Asphalt Pavement Association's *Superpave Construction Guidelines*, is a guide for the HMA designer to maximize the benefits of Superpave while avoiding potential problems.

P-0376 Selecting a Preventive Maintenance Treatment for Flexible Pavements - A continuation of research and efforts to promote the principals of pavement preservation by the Foundation for Pavement Preservation.

P-0377 Field Management of Hot Mix Asphalt - A discussion of the factors that contribute to the differences that occur in the properties of a Hot Mix Asphalt (HMA) mix designed in the laboratory and the properties of the "same" mix produced in an asphalt batch or drum mix facility.

P-0378 Uses of Waste Asphalt Shingles in HMA State-of-the-Practice - How the Hot Mix Asphalt (HMA) Industry has developed procedures for using waste asphalt shingles in HMA.

P-0379 Quality Control for Hot Mix Asphalt Operations - The purpose of this publication is to assist HMA producers in establishing a quality control system, which will assure a high probability of compliance with specifications.

P-0380 A Predictive Approach for Long-Term Performance of Recycled Materials Using Accelerated Aging, Volume I & II - Use of recycled materials in a proposed highway application frequently requires the assessment of physical and environmental performance.

P-0415 Portland-Cement Concrete Rheology and Workability: Final Report - The report outlines modifications to these existing techniques and equipment to permit the measurement of rheological properties at two or more shear rates.

P-0420 Backcalculation of Layer Parameters for LTPP Test Sections, Volume I - This report documents the results of backcalculation of layer material properties for rigid pavements included in the Long Term Pavement Performance (LTPP) program in the United States and Canada using deflection testing data.

P-0421 Rural Roadway Information & Management System For Windows - A Windows application program developed by the North Dakota State University Technology Transfer Center for Roadway Inventory and Management.

P-0422 The ND Technology Transfer Center's Roadway Sign Inventory & Management System for County Road or City Street Dept.-Operations Manual (Version 6.0 for Windows) - The system detailed in this manual assumes a route number in combination with a mile point reference to pinpoint sign locations, but this can be changed to accommodate other procedures.

P-425 Microdamage Healing in Asphalt and Asphalt Concrete, Volumes I, II, III, IV - Primary objective of the study is 1) demonstrates that microdamage healing occurs and that it can be measured in the lab and in the field 2) confirm that the same fracture properties that control propagation of visible cracks control the propagation of microcracks 3) identifying asphalt constituents 4) establishing appropriate correlations & 5) predict the effects of microdamage healing on pavement performance.

Publications Continued

P-427 The Effects of Higher Strength and Associated Concrete Properties on Pavement Performance - The major goal of this project was to develop recommendations for PCC properties and materials characteristics found in higher JPCP's with improved long-term performance as determined by joint spalling and faulting, and transverse slab cracking.

P-0463 Off-Hwy. Vehicle-Final Environmental Impact Statement and Proposed Plan Amendment for MT, ND, and Portions of SD - The Forest Service's decision to amend forest plans which would eliminate wheeled motorized cross-country travel with few specific exceptions.

P-0465 Soil Bioengineering An Alternative for Roadside Management - This publication provides viable alternatives known as soil bioengineering.

P-0470 Forest Service Roadless Area Conservation Final Environmental Impact Statement-Volume 1 - This final environmental impact statement responds to strong public sentiment for protecting roadless areas and the clean water, biological diversity, dispersed recreational opportunities, wildlife habitat, forest health, and other public benefits provided by these areas.

P-0471 Forest Service Roadless Area Conservation Final Environmental Impact Statement Volume 2-Maps of Inventoried Roadless Areas - This volume contains maps of inventoried area maps for the National Forest System lands analyzed in Volume 1 of this final environmental impact statement.

P-0472 Forest Service Roadless Area Conservation Final Environmental Impact Statement-Volume 3-Agency Responses to Public Comments - The Forest Service has documented, analyzed, and responded to the public comments received on the Draft Environmental Impact Statement (DEIS).

P-0475 Field Guide for Unpaved Rural Roads - This guide is to provide assistance to local governments responsible for safety of unpaved rural roads.

P-0476 Evaluation of Aggregate Sections at Mn/ROAD - This report communicates results of an evaluation of four common, locally available, surfacing aggregates at the Minnesota Road Research Facility (Mn/ROAD). This report will serve as the final report for the aggregate surfaced sections.

P-0477 Forester C-2000-Demonstration Project - A project conducted by the Coronado National Forest, where the Forester C-2000 mobile rock crusher was used.

P-0629 NACE Action Guide Volume III-5 Stormwater Management & Drainage - This guide is concerned with erosion resulting from man's use of land; this is called accelerated erosion.

P-0635 Soil and Base Stabilization and Associated Drainage Considerations (Volume I and II) - These manuals include new information and procedures incorporated into the pavement field since that time.

P-0637 A Landowners' Guide to Montana Wetlands - The purpose of this guide is to provide information for Montana landowners' informed use and management of their wetlands, bringing to life options for wetland protection, enhancement, and restoration.

P-0710 Dust Palliative Selection and Application Guide - This publication is to help practitioners understand and correctly choose and apply the dust palliative that is appropriate for their particular site, traffic conditions, and climate.

P-0712 Effectiveness and Environmental Impact of Road Dust Suppressants - This report describes a research project conducted at Colorado State University to evaluate the relative effectiveness and environmental impact of road dust suppressants.

P-0770 Proof of Concept For Prediction of Pavement Temperature: A Tactile Decision Aid For Highway Safety - A thermal-mapping program dubbed WinTherm/RT; Windows base Thermal Model for Road Temperature was developed in this study. The computational highway thermal map is an outgrowth of software developed for the U.S. military to determine the infrared signature of vehicles.

P-0772 Snow-Removal Attachments for Motor Graders for Local Agency Personnel Subtask B-Video Development Report - This report provides a brief outline of the videotape script and state-of-the-practices presented in the videotape.

P-0790 Guidelines for the Design and Application of Speed Humps - This Recommended Practice provides guidelines for the design and application of speed humps, a geometric design technique to control vehicular traffic speeds along a roadway.

P-0835 NACE Action Guide Volume III-4 Roadway Safety - This guide has been prepared to assist county agencies-specifically, road superintendents, engineers, and assistant engineers-with highway responsibilities.

P-0836 Regional Traffic Incident Management Programs - The purpose of this document is to assist organizations and their leaders in implementing and sustaining regional traffic incident management programs, both by examining some

Publications Continued

successful models, and by considering some of the lessons learned by early implementers.

P-0840 Roadway Safety Guide - Designed to provide local elected officials and other community leaders with basic information to improve roadway safety in their communities.

P-0845 Road Transport and Intermodal Research Safety Strategies for Rural Roads - The Road Transport and Intermodal Linkages Research Program (RTR) is a cooperative approach among Member countries to address technical, economic and policy issues relevant to safe and efficient road transport.

P-0847 Safety Engineering 2nd Edition - To help engineers recognize potential hazards in products and systems they design, and to eliminate or reduce those hazards as much as possible.

P-0850 Traffic Incident Management Handbook - This handbook will assist agencies responsible for incident management activities on public roadways to improve their programs and operations.

P-0855 Getting To School Safely Community Action Kit - Children get to school many different ways. Getting To School Safely is a new program launched by the National Highway Traffic Safety Administration and a broad range of national organizations committed to child safety to address the full range of school transportation safety issues.

P-1025 Summary of Evaluation Findings for 30-meter Handheld and Mobile Pavement Marking Retroreflectometers - This report summarizes the results of detailed evaluations performed on the four handheld and two mobile pavement marking retroreflectometers that were evaluated this program.

P-1027 Older Driver Highway Design Handbook: Recommendations and Guidelines - This report contains highway design information that will help accommodate the needs and capability of older road users.

P-2265 Guide to Seeking Transportation Enhancement Program Funds - The purpose of this guide is to help Federal agencies gain a basic understanding of the *Transportation Enhancements (TE)* program and how the funding process works.

P-2266 International Guide To Highway Transportation Information - The intent of this document is to provide for the highway transportation professional, a guide to aid in identifying principally non-U.S., as well as key U.S. highway transportation information sources and document acquisition services.

P-2310 Enhancements to Effective Motivation of Highway Maintenance - This project is basically a thorough review of the materials produced by NCHRP 14-11 and of the panel comments to assist in developing an enhanced package for *Effective Motivation of Highway Maintenance Personnel*, while recognizing the very real institutional and financial constraints/issues.

P-2375 Highway Improvements and Rural Growth: An Annotated Bibliography - A very broad search of literature to characterize the very multidimensional concept of rural growth and its relationship to the highway transportation system.

P-2380 Movements in Land-Use Regulations - This report reflects on "New economy" undercurrents, economic development, economic growth, future trends and land use.

P-2381 Arizona Local Government Safety Project Analysis Model - The focus of this research has been primarily on development of site identification and implementation strategies for local safety projects.

P-2442 Traffic Collision Workbook for Tribal Roadways-Crow Reservation - This training is intended for those individuals that have been given the traffic engineering responsibilities for rural and small urban areas. This program is organized to present the steps involved in a typical safety analysis of a low volume roadway in one chapter.

P-2443 Traffic Collision Workbook for Tribal Roadways-Northern Cheyenne Reservation - This training is intended for those individuals that have been given the traffic engineering responsibilities for rural and small urban areas. This program is organized to present the steps involved in a typical safety analysis of a low volume roadway in one chapter.

P-2570 Journal of Public Transportation - The article concludes that conversion of park-and-ride lots to transit-oriented developments holds considerable promise for promoting walk-and-ride transit usage in years to come.

P-3000 Cornell Local Roads Program: 2001 Video Catalog - A complete listing of videotapes available for loan.

P-3005 Arizona Intelligent Vehicle Research Program-Phase one: 1997-2000 - This Phase One report documents a three-year research program by the AZ Transportation Research Center to study possible practical applications of vehicle and infrastructure-based technologies.

P-3008 Preliminary Human Factors Guidelines for Traffic Management Centers - This document provides human factors guidance for designers, owners, operators and planners engaged in the development and operation of traffic management centers.

Publications Continued

-3015 VISTA-Vehicles with Intelligent Systems for Transport Automation - This project documents the work performed on the work performed on the *Research Program Vehicles with Intelligent Systems for Transport Automation* (Vista).

P-3100 Manual on Uniform Traffic Control Devices - January 2001 - A brochure summarizing the Millennium Edition of MUTCD and where to contact to receive a copy of the edition.

New Videos

- M136 Smart Road** - 7 minutes
M138 Smart Sign An I.T.S. Report - 5 minutes
M140 Pacific Northwest Transportation Technology Expo - Time Not Specified
RM175 Innovative Pavement Maintenance Technology 5 minutes
RM177 Working It Out Together - 8 minutes
RM179 The NCAT: Believe In The Future - 9 minutes
M182 Paving Site Work Practices for Quality It's Up to You! - Time Not Specified
RM184 Right Road, Right Treatment, Right Time - 30 minutes
RM210 Better Ways To Build...With Cement Treated Base - 10 minutes
SG185 Power Line Hazard Awareness - 17 minutes
SG187 Rural Transportation & Safety: An Evolution of Change - Time Not Specified
ST135 Leading the way to Safer Roads - Time Not Specified
PROMO Road Management Equipment - 7 minutes
PROMO Walk 'n' Roll Packer/Roller - 3 minutes
PROMO Golden Bear Oil Specialties (CD-ROM)
PROMO U.S. Bridge (CD-ROM)

New Software

- SW133 Work Zone Operations: Improving Mobility and Safety on Both Sides of the Barrel (CD-ROM)**
SW138 Snowfighting Training Materials (CD-ROM)
SW140 Rural Challenges and the Application of Advanced Technology Must Be a "Community" Investment FHA (CD-ROM)
SW142 Pedestrian/Bicycle Safety Resource Set (CD-ROM)
SW144 Safer Journey-Interactive Pedestrian Awareness (CD-ROM)
SW146 Information on Modern Timber Bridges in the United States (CD-ROM)
SW148 Hot Mix Asphalt for the Undergraduate (CD-ROM)
SW150 City of Calgary-Dust Abatement Tests (CD-ROM)
SW152 Rural Technology and Transportation Systems 1997 International Conference (CD-ROM)
SW154 Motorgrader Operation (CD-I)
SW160 Moving Safely Across America- The Interactive Highway Safety Experience (CD-ROM)
SW162 Transportation Research Thesaurus (CD-ROM)
SW164 Compendium of Papers-Institute of Transportation Engineers 2000 District 6 Annual Meeting (CD-ROM)
SW166 Transportation Research Board 79th Annual Meeting (CD-ROM)
SW168 Transportation in the New Millennium (CD-ROM)
SW172 Orion-Intelligent Transportation for the Twin Cities (CD-ROM)
SW174 A Framework for Integrated Transportation into the 21st Century (CD-ROM)
SW176 Transportation Research Board 80th Annual Meeting (CD-ROM)
SW178 Preparing for the New Millennium 1999 (CD-ROM)
SW262 Montana Public Works Standard Specifications (CD-ROM)

Request for Videotapes & Publications

The publications and videotapes in the LTAP library are available free or for a nominal charge upon request. Publications and software marked *Lending Library may be borrowed for several weeks, but must be returned to LTAP. Anyone may borrow up to three videotapes at a time rent-free for two weeks.

You may order any videos or publications by calling toll-free (800) 541-6671. Contact Donnetta Bohrman if you have any questions or concerns.



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Approximately 2,100 copies of this public document were published at an estimated cost of \$.956 per copy, for a total cost of \$2,008.80 which includes \$1,671.80 for printing and \$337 for distribution.

MDT attempts to provide accommodations for any known disability that may interfere with a person participating in any service, program or activity of the Department. Alternative accessible formats of this document will be provided upon request.

The Local Technical Assistance Program Newsletter is published quarterly. Funding for this program is provided by the Federal Highway Administration through the Montana Department of Transportation, Montana State University and a portion of Montana's gas tax revenues. This newsletter is designed to keep you informed about new publications, new techniques and new training opportunities that may be helpful to you and your community. Individuals wishing to receive future copies of the newsletter at no cost may send their request to LTAP, 416 Cobleigh Hall, PO Box 173910 Montana State University-Bozeman, Bozeman, MT 59717-3910, or call 1-800-541-6671.

Contributions Welcome

LTAP welcomes contributions to LTAP MATTERS. Those wishing to submit relevant material to be published in the next newsletter can submit their ideas/articles to:

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email: mmikkel@coe.montana.edu

LTAP MATTERS

Montana's Answer To Technical
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January, February, March 2002

Vol. 20, No. 1

2 Laughter is the Best Medicine

3 2001 Calendar of Events
Depressed? Exercise can help

6 Laughing in Tough Times

7 MACRS Agenda

8 LTAP Course Descriptions

9 Is it Really a Crisis?
MUTCD Manuals

10 Safety Congress Agenda

11 New Videos and Publications

Governmental Accounting Standards Board Statement No. 34 (GASB 34): Establishing a Value for Infrastructure Assets

By, Tom Maze, Vice President, Howard R. Green Company

One of the most complex issues for agencies attempting to comply with GASB 34 is developing objectives and consistent procedures for estimating monetary values for infrastructure assets (capitalizing assets). Whether an agency chooses to report assets by depreciating their value based on historical costs or using the modified approach outlined in GASB 34 (which applies asset management techniques), ultimately, the agency must include the value of its infrastructure assets in its comprehensive financial reports.

Unfortunately, little research has been conducted to develop standardized methods for capitalizing infrastructure assets. In this article, we provide two possible approaches. The first, relatively simple approach, applies the perpetual inventory method (PIM) to depreciate the value of highway infrastructure assets through time. The second example is taken from work done by the California Department of Transportation (CalTrans) to capitalize bridges. The CalTrans method is based on engineering measurements of the condition of bridges and requires a big management system; such a method would be useful to agencies using GASB 34's modified approach for reporting capital assets.

continued on page 4

**ADVISORY COMMITTEE
MEMBERS**

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Montana Association of Counties

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Town of Sheridan

Sam Gianfrancisco
LTAP

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Lewis and Clark County

Alec Hansen
Montana League of Cities & Towns

Russ Huotari
Richland County

Donna Sheehy
U.S. Forest Service

Bill Michalson
City of Helena

Bob Burkhardt
Federal Highway Administration

Jim Reardon
City of Great Falls

Sue Sillick
Montana Department of Transportation

Dan Williams
Montana Department of Transportation

Jack Knorr
Stillwater County

On and off the job... **LAUGHTER is the BEST MEDICINE**

There's no shortage of talk about the impact of stress on our lives, but an often neglected way to prevent and relieve stress is found in Proverbs: "A merry heart doeth like a medicine, but a broken spirit drieth the bones."

The age-old theory that "laughter is the best medicine;" is becoming scientifically intriguing, as evidence mounts that laughter can lower blood pressure, increase blood circulation, and influence the body's immune system in positively wonderful ways.

It is said that "laughter can help you overlook the unattractive, tolerate the unpleasant, cope with the unexpected and smile through the unbearable."

Laughter can make a difficult person a tolerable one, and a frustrating situation something you can deal with.

When we're facing a difficult task, or are trying to beat a deadline, humor can help us get the job done with the least amount of trouble and tension.

Good managers know that using humor with employees encourages them to work better - with more creativity, more energy, and less stress.

**LTAP MATTERS is published by the Local Technical Assistance Program at
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2002 Calendar of Events

Winter Travel/Survival	January 8, Kalispell, MT January 9, Butte, MT January 10, Dillon, MT January 16, Bozeman, MT January 17, Billings, MT
Train the Trainer/Flagging	February 7, Helena, MT
Safety Congress	February 19-21, Great Falls, MT
IMSA (In conjunction with Safety Congress)	February 21-22, Great Falls, MT
Forest Service Training Forklift or Loader Tech Leadership/Winter Survival Sign Vandalism/WZTC Flagging Signing and Sign Management Culvert Placement/Trenching	March 18-22, Missoula, MT March 18 March 19 March 20 March 21 March 22
Work Zone Flagging	March 26, Miles City, MT March 27, Glendive, MT March 28, Billings, MT
MACRS Annual Conference	April 3-5, Billings, MT
APWA Spring Meeting	April 16-18, Helena, MT
Work Zone Flagging	April 23, Great Falls, MT April 24, St. Mary's/Park Ent. April 25, Kalispell, MT April 26, Butte, MT
Equipment Training Motor Grader Loader Forklift Culvert Design & Installation	May, On Request
Winter Travel/Survival	On Request
Leadership for New Commissioners and Technical Supervisors	On Request
Work Zone Traffic Control	On Request

Depressed? Exercise can help, too

Many psychologists and psychiatrists are so convinced that regular brisk (aerobic) exercise can help people who are feeling depressed, they routinely recommend it for most of their patients.

The type of mental depression that's helped most by exercise is called "Reactive Depression" - where there is a feeling of sadness that's greater and more prolonged than is warranted by its cause. Symptoms include sadness, boredom, a loss of self-esteem, lethargy, and hopelessness.

Most people find that a daily program of 30 to 60 minutes of brisk walking, jogging, swimming, stair climbing, and/or cycling works wonders to eliminate depression.

Flagger Training

Laborers AGC Training Program

Training Schedule

February 18-19, Pablo, MT
February 20, Kalispell, MT
February 21, Missoula, MT
March 1, Billings, MT
March 11, Helena, MT
March 12, Great Falls, MT
March 14, Butte, MT

Participants must register through Laborers AGC. Call (406) 442-9964 for registration

GASB 34: Establishing a Value for Infrastructure Assets

continued from front page

FY	Capital Investment During Current Year (\$)	(1-0.0202) x Infrastructure Assets at the end of the Prior Year (\$)	Estimated Current Infrastructure Assets (\$)
1980	1,200,000	100,000,000	101,200,222
1981	2,500,000	99,155,760	101,655,760
1982	3,000,000	99,602,314	102,602,314
1983	1,000,000	100,529,747	101,529,747
1984	500,000	99,478,846	99,978,846
1985	800,000	97,959,273	98,759,273
1986	750,000	96,764,336	97,514,336
1987	850,000	95,544,546	96,394,546
1988	700,000	94,447,377	95,147,377
1989	900,000	93,225,400	94,125,400
1990	2,500,000	92,224,067	94,724,067
1991	2,700,000	92,810,640	95,510,640
1992	2,500,000	93,581,325	96,081,325
1993	2,400,000	94,140,483	96,540,483
1994	2,900,000	94,590,365	97,490,365
1995	2,400,000	95,521,060	97,921,060
1996	2,200,000	95,943,054	98,143,054
1997	2,800,000	96,160,564	98,960,564
1998	2,550,000	96,961,561	99,511,561
Total	35,150,000		

Table 1: Perpetual Inventory Method

Perpetual Inventory Method

The perpetual inventory method, described by Barbara Fraumeni, is a depreciation method for valuing capital stock that can be applied to transportation infrastructure assets. PIM accounts for annual capital expenditures and assumes that existing capital assets depreciate in value at a standard rate every year.

The following equation estimates the total value of infrastructure assets on a year-by-year basis:

$$IA_{year} = CI_{year} + (1-r) IA_{(year-1)}$$

where

IA_{year} = Infrastructure Assets_{year} — the value of infrastructure assets in the current year

CI_{year} = Capital Investment_{year} — the amount of capital investment in infrastructure assets in the current year

r = the annual depreciation rate of infrastructure assets

$IA_{(year-1)}$ = Infrastructure Assets_(year-1) - the value of infrastructure assets in the year immediately prior to the current year

When using this formula, all capital investments should be expressed in constant dollars so that meaningful comparisons can be made across time. Constant dollars exclude inflation, and express dollars in terms of a base year.

The example in Table 1 uses 1980 as a base year (as does GASB 34) and 100 million dollars as the base value of all

transportation infrastructure assets (streets) in a mock Iowa municipality of 50,000 residents (based on Andrew Lemer's study of typical infrastructure investments). Capital investments, expressed in constant dollars, are allocated during each subsequent fiscal year; Barbara Fraumeni's average depreciation rate for transportation infrastructure assets, 0.0202, is used. To simplify, our example, we assume no growth in the highway and street network.

Note that in our example, the lower annual capital outlays in the mid to late 1980's result in a decline in the value of capital stock that continues through the next decade, although the decline is arrested through a large increase in capital spending.

GASB 34: Establishing a Value for Infrastructure Assets

Note also that a total capital investment of over \$35 million over 19 years is required to maintain the value of existing infrastructure assets at a level somewhat close to the value of those assets in 1980.

CalTrans' approach to valuing infrastructure

Although employing systems for managing assets, like bridge management systems, will generally fulfill GASB 34's modified approach requirements for reporting capital assets, such systems do not provide a method for capitalizing infrastructure assets. CalTrans uses information from its bridge management system to derive the bridge infrastructure values required by GASB 34.

CalTrans manages its bridge network using Pontis (a bridge management system distributed by the American Association of State Highway and Transportation Officials). With Pontis, bridge inspectors regularly inspect and rate the condition of the various elements in each bridge in their network. CalTrans has developed a formula for converting the condition rating for all the elements in a bridge into an overall dollar value for the bridge.

Typically, using Pontis, inspectors rate each element of a bridge according to five conditions: protected, exposed, attacked, damaged or failed. CalTrans assigns weights, or factors, to these conditions according to their severity, from 1 (protected) to 0 (failed), and determines the cost of failure (replacement

cost) for each unit (meter, square meter, etc.) of an element.

CalTrans then uses the following equation to determine the value of each bridge element. The formula incorporates both the severity factor and the unit failure cost:

$$\text{Current element value} = \text{Quantity in condition state} \times \text{WF} \times \text{FC}$$

where
 WF = severity weighing factor
 FC = failure cost of the element (cost to rehabilitate or replace a unit of an element if it fails)

Note that a condition factor of 0 (failed) will always result in a 0 value for that element.

In Table 2, the formula is applied to determine the current value of each element of a bridge. The values of all elements are summed to calculate an estimated value for the entire bridge. Note that the steel girder has 61 meters rated 1 (protected), 34 meters rated 0.75 (exposed), and 5 meters rated 0.5 (attacked). At a replacement value of \$3500

Element	Calculation	Current Element Value (\$)
Concrete Deck	300 m ² x 0.5 x \$600	90,000
Steel Girder	[(61 m x 1.0) + (34 m x 0.75) + (5 m x 0.5)] x \$3,500	311,500
Abutment	24 m x 1.0 x \$ 9,000	184,400
Column	4 x 1.0 x \$ 9,000	36,000
Joint Steel	24 m x 0.0 x \$556	0
Total Current Value of Bridge		622,300

Table 2: Bridge Valuation Calculation

continued on page 6

GASB 34: Establishing a Value for Infrastructure Assets

continued from page 6

per meter, the total current value of the girder is \$311,500. To obtain a current, network-level estimate of its bridges, CalTrans adds together the values of all bridges in its network.

Summary

In this article, we have briefly summarized two methods for tracking the value of infrastructure assets. Either method would meet the requirements of GASB 34.

Many engineers and public works directors may view asset management and GASB 34 requirements as merely an academic exercise or as an activity that may be handled by their agency's financial officer. However, we would urge public works professionals and engineers to become engaged in the financial reporting of the value of the infrastructure assets they manage. Valuing assets over time (regardless of the method used) reflects how well infrastructure stewardship responsibilities were performed. Though outcome could have significant implications of future resources allocated to the management of infrastructure.

The perpetual inventory method (as well as other depreciation-based methods) is a fairly simple approach to satisfying GASB 34 requirements. This method, however, provides only very aggregate, policy-level information.

CalTrans' method, although a more complex process, clearly provides information that is more useful to infrastructure asset managers and decision makers. The CalTrans example demonstrates that the process of capitalizing transportation infrastructure assets can be based on sound engineering practices, using asset-by-asset condition information to build a value estimate for an agency's transportation infrastructure network.

We urge public works professionals and engineers to become engaged in the financial reporting of the value of the infrastructure assets they manage. Valuing assets over time (regardless of the method used) reflects how well infrastructure stewardship responsibilities were performed. The outcome could have significant implications on future resources allocated to the management of infrastructure.

Laughing in the face of tough times

—adapted from *Harvard Business Review*

A simple, effective way to keep workers motivated? Laughter. It's possible to make work fun, even in hard times, if you keep these principles of humor in mind.

People are more accepting of humor than you may think. Sure, some people will roll their eyes or cast a cynical eye at your attempts to organize a "fun" activity. But more will welcome the levity, especially when it's a sanctioned part of the company culture.

There's room for humor during tough times. There are times when fun would definitely be inappropriate. For example, you might want to cancel the company winter party if you've just laid off 10 percent of the company work force. But humor can help workers ride out tough times, especially if they see that you can laugh at yourself.

Fun can be part of the routine. If there are required routines that few people really enjoy—like cleaning up workspaces—there's no reason not to inject a little fun into the drudgery. Promise pizza afterward.

Fun can be spontaneous. You can argue that fun ought to be spontaneous, but that can't always be the case in the workplace. Still, if there's an opening to inject some humor, do it.

Fun needs to come from the bosses. You have to set the tone. Laugh at yourself and you'll find that your employees will find you more approachable and that having a good time is OK.

MACRS Agenda

Montana Association of County Road Supervisors Conference
Billings, MT
April 2-5, 2002

Tentative Agenda

Tuesday, April 2, 2002

Registration

Executive Dinner

Wednesday, April 3, 2002

Registration

Commissioner Jim Reno & John Ostlund

Governor

MACO - Legislative Issues

Funding - How it Works

Pavement/Gravel Management - State Wide

Session 1

Plan Reading

Liability - Lack of Signing

Session 2

Insurance - Health

Road Inventory - Center Line GPS

MACRS Social

Thursday, April 4, 2002

Prayer Breakfast

Easement - Road Law

Permitting - FWP, DNRC, DEQ, State Lands

Attitude Doctor

Session 1

Chip Seals - Double Shots, Milling

Liability Issues - Ditching, Crowning

Session 2

CIP - Equipment

Funding Sources - TSEP, FEMA, MDT

Friday, April 5, 2002

MACRS Business Meeting - Election of Officers

Additional Information

- A final agenda will follow with the brochure that will be mailed in early February, 2002.
- Spouses **MUST** register prior to attending the conference. Please include spouses name and contact information when registering.
- Each county is requested to bring a complimentary gift to be given as door prizes.

Dues

Conference Admission is \$100.00 per individual. This includes meals and activities.

Vendors will be charged \$250.00 each. This includes one conference admission and one vendor table. Additional tables are \$20.00 and \$100.00 will be charged for any individuals that accompany vendors to work tables.

MACRS Membership Dues

MACRS membership dues are \$100. Statements will be going out in the mail the first party of January and will be due back to the LTAP office no later than March 1, 2001. Your MACRS membership entitles you to one conference admission to the MACRS conference in April, PLUS you will be entitled to additional information and benefits throughout the coming year. This will be outlined in more detail in your MACRS membership dues statement.

LTAP Course Descriptions

LTAP assists local governments with understanding new transportation technologies. In addition to workshops, we participate in and sponsor other training events, and offer technical assistance through a variety of partnerships. Here are some of the annual events where we give presentations and training.

Work Zone Flagging

- Combination of lecture, manuals, video and hands-on problem solving. Flagging duties and responsibilities, safety, uniformity and liability issues will be covered.

Work Zone Traffic Control – Level I

- Flagging
- MDT Guidelines Handbook – slide series
- Montana WZ Statistics
- North Carolina Film
- Introduction
- Basics
- 5 Parts
- Montana Standard Maintenance Sheets

Work Zone Supervision – Level II

- One year of 2000 hours
- Typical Applications
- Set-up and Take-Down
- Devices
- Crash Test
- New Standards MUTCD
- Hands On
- TCP-Drawing and Review
- Test including true/false and multiple choice
- Working with Media
- Emergency Personnel

Gravel Road Maintenance

- Cover engineering basics, Road Readin', good surface materials, dust palliatives / base stabilizers, equipment & methods to maintain a good gravel road.

Loader Operations

- Cover basic equipment operation, walk-around inspection, safety, start up and shut down procedures, effective truck loading and stockpile management and modern equipment.

Forklift Operations

- Study of surface conditions, load stability, lifting a load, putting down a load, working with stacks, traveling tips, special hazards and operating safety.

Forklift Fundamentals

- Design of the forklift, parts of a forklift, forklift vs. cars, controls and instruments, pre-use inspection, forklift stability and stability in practice.

Technical Leadership

- For Commissioners, Road Supervisors, City Street Superintendents and other technical leaders. This course is designed to help communication, expectations and professionalism. Leaders will learn the difference between leadership and management as shown in the award winning Cove Leadership film, "Max and Max."

Winter Travel/Survival

- Overview of winter travel hazards faced by vehicle and equipment operators. Skills taught will include, simple survival techniques, survival kits, equipment needed, treatment of hypothermia, and preventing carbon monoxide poisoning

Sign Vandalism

- Study of the types of sign vandalism and of the overall effect of sign vandalism from the cost to society to the dangers it presents in every day driving conditions. Also covered are the various state-level programs that have been implemented to combat sign vandalism.

IMSA: Signing, Work Zone, Signalization

- International Municipal Safety Association – provides training and certification for workzone signing, permanent signing and signalization.

LTAP Course Descriptions

continued from page 8

Welding

- Demonstrate new and traditional welding techniques, give participants hands-on opportunities and discuss safety concerns for welders.

Use of Roto-milling

- A current maintenance practice by MDT is to mill the surface of Interstate roads down to a smooth surface and repave. Counties and Cities have successfully used these milling to surface unpaved roads. The details of preparation, material use and application of rejuvenating agents are discussed.

Winter Maintenance

- Winter road maintenance, when to use salt and sand, anti-icing, winter snow removal operations and winter travel hazards.

Signing & Sign Management

- Signing basics out of the new MUTCD are covered in addition to an introduction of how to keep track of in-place signing. Inventories can be manual or computerized.

Paved & Unpaved Road Management (Paser)

- "How to break pavement network into manageable segments," "How to set up a Pavement Condition Survey," "How to develop a pavement management presentation to a City or County policy board."

Culvert Placement Trenching

- Basic hydraulic design, culvert selection, culvert placement and backfill and maintenance of culverts are all touched on in this class. Safety in and around trenches is also emphasized.

Safety Management

- Design, construction operations and maintenance practices that lead to better safety on rural roads and streets.

Is it Really a Crisis?

by Hazel Shorter, MD

In the final analysis, combating and eliminating stress must begin with the individual gaining perspective.

So many people take themselves so seriously. They think that everything is life-threatening, so they create a crisis environment in which to work - maybe because it makes them feel important, or it makes them feel alive.

After having practiced medicine and dealt with life and death situations for many years, I know what a crisis is, and I know what a crisis is not. And 99.9% of the stuff that goes on in our lives is not a crisis.

At the end of the day put everything back into your desk, lock it up, go home, and forget about it. Believe it or not, it will still be there the next day.

MUTCD Manuals

We have received our MUTCD manuals.

- Bound Manual: \$52.50 plus \$5.00 shipping
- Chapter Separate: \$70.00 plus \$5.00 shipping

Please contact Donnetta at the LTAP office to order your manuals today at 406-994-6724.

1st Annual Safety Congress Agenda

Who Should Attend

Those who are involved in permanent or temporary signing would benefit from this course. Sixty (60) agencies throughout Montana will receive a signing package. One representative from each county or larger city who is willing to take the information back to other work associates should attend. These people should have a basic knowledge of signing and work zones or have a desire to learn.

Work Zone Package

Signs

- Road Work Ahead
- Be Prepared to Stop
- Flagger Symbol
- End Road Work
- Right Lane Closed 1/2 Mile
- Land Closure
- One Lane Road Ahead

Chanelizing Devices

- 28' Cones

Sign Supports

- MDT All Terrain-Spring Loaded

Flagger Paddle

Vests

Schedule of Events

Great Falls - Civic Center

2 Park Drive S.

February 19, 2002

- Work Zone Package Training and Certification - 4 hours
 - Al Goke, MDT
 - Steve Jenkins, LTAP
 - Sam Gianfrancisco, LTAP
- Work Zone Flagging Certification - 4 hours
 - Steve Jenkins, LTAP
 - Sam Gianfrancisco

February 20, 2002

- Stemple Pass - Speed Zone Investigation - 4 hours
 - Harry Lauer
 - Eric Griffin, Lewis & Clark County
- Sign Vandalism - 2 hours
 - Ken Kailey, Missoula County
 - Steve Jenkins, LTAP

- Blaine County Bridge; Liability - 2 hours
 - Steve Jenkins, LTAP
 - Don Galus, Blaine County

February 21, 2002

- MUTCD; Millennium Edition - 6 hours
 - Lloyd Rue, FHWA
 - Steve Jenkins, LTAP
- Basic Signing; Low Volume Roads
 - Steve Jenkins, LTAP

Work Zone Distribution from 3-5:00 pm daily.

- Steve Jenkins, LTAP
- Sam Gianfrancisco, LTAP

Registration

Pre-registration is required. The cost of attending is \$100 which includes lunch on each day. Registration is limited to 1 to 2 people per agency. To register call the LTAP office at (800) 541-6671, (406) 994-6100 or fax (406) 994-1697.

Hotel Information

Below is the suggested lodging for this meeting.

Townhouse Inn
1411 10th Ave. S.
(406) 761-4600

Days Inn
101 14th Ave. S.
(406) 727-6565

Holiday Inn
400 10th Ave. S.
(406) 727-7200

New Videos and Publications

New Publications

P-23 New Mexico Quality Deck Workshop- Plastic Shrinkage Cracking can and should be prevented; Drying Cracking can not be prevented, but can and should be controlled; Structural Cracking can and should be prevented. Specifications and Design Features.

P-205 Highway Design Handbook, For Older Drivers and Pedestrians – Vol. I Guidelines/ Recommendations–Vol. II -The information in this Handbook should be of interest to highway designers, traffic engineers, and highway safety specialists involved in the design and operation of highway facilities.

HWA-RD-99-167 Deep Mixing Methods as used in Geotechnical Applications –Vol. III -This report focuses closely on the properties of soils treated by DMM and aspects of quality control, quality assurance and verification.

P-430 Prediction of Chloride Penetration in Concrete -This report presents the results of a study conducted for the Federal Highway Administration to identify or develop a test method to predict the chlorine penetration resistance on concrete in a short time frame.

P-381 Fundamental Properties of Asphalts/ Modified Asphalts –Vol. I & Vol. II - Volume I report presents the results of a comprehensive investigation of physical and organic chemistry, and the chemical reactions of a wide variety of petroleum asphalts. Volume II report presents 10 new test methods developed during a comprehensive study of the physical and organic chemistry of petroleum asphalts.

P-475 (Delete) - Field Guide for Unpaved Rural Roads Refer to P-219 in publication list.

P-856 European Road Lighting Technologies - Information pertaining to European transportation ministries and lighting professionals regarding cutting-edge technologies in highway and roadway lighting systems, including tunnel illumination, sign lighting, and all methods used to design roadway lighting systems.

New Videos

SG-190 Disaster Preparedness (20 minutes)

Request for Videotapes & Publications

The publications and videotapes in the LTAP library are available free or for a nominal charge upon request. Publications and software marked *Lending Library may be borrowed for several weeks, but must be returned to LTAP. Anyone may borrow up to three videotapes at a time rent-free for two weeks.

You may order any videos or publications by calling toll-free (800) 541-6671. Contact Donnetta Bohrman if you have any questions or concerns.



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The Local Technical Assistance Program Newsletter is published quarterly. Funding for this program is provided by the Federal Highway Administration through the Montana Department of Transportation, Montana State University and a portion of Montana's gas tax revenues. This newsletter is designed to keep you informed about new publications, new techniques and new training opportunities that may be helpful to you and your community. Individuals wishing to receive future copies of the newsletter at no cost may send their request to LTAP, 416 Cobleigh Hall, PO Box 173910 Montana State University-Bozeman, Bozeman, MT 59717-3910, or call 1-800-541-6671.

Contributions Welcome

LTAP welcomes contributions to LTAP MATTERS. Those wishing to submit relevant material to be published in the next newsletter can submit their ideas/articles to:

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