LTAP MATTERS

Montana's Answers To Technical Education of Roads & Streets
Vol. 33, No. 3

Summer 2015

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MONTANA STATE UNIVERSITY | Local Technical Assistance Program

From Montana LTAP Director

As the summer months come upon us, everyone is extremely busy with street, road and bridge projects. This is the time Montana LTAP reviews and considers what training was effective, what new or modified training is needed for the coming year, and where we will be putting our efforts for 2015-2016. There are a variety of ways we process the incoming requests.

One way we determine what training is needed for agencies is to ask for help from our Advisory Board. These dedicated individuals offer insight as to what is happening in each of their particular divisions and how LTAP can blend our training expertise with their requests. Our Board has representatives from the Montana Department of Transportation, League of Cities and Towns, Montana Association of County Road Supervisors, Montana Federal Highway Administration, Montana Municipal Interlocal Authority, and Montana Association of Counties. Also included on this Board is Steve Albert, Western Transportation Institute Director, giving a view from the transportation research side of life. The Advisory Board members are listed below on this page in the gray area if you wish to contact them. The important goal of all involved is transportation safety and how do we achieve that through our training mission.

Steve Jenkins, MT LTAP Director

Another avenue we review are the classroom evaluations where participants can select a variety of training topics listed at the bottom. These are tabulated and go into the hopper when we start seeing what priorities are coming to the forefront. Face-to-face requests are duly noted also.

Due to our close connection with MACRS, those officers and representatives are making requests throughout the year and those are placed into the equation of priority trainings. This coming year we are setting up the MACRS district meetings a bit different.

At the 2015 spring's conference, each MACRS representative was given ten possible topics to choose from for their particular district. Once the Representative has queried their district, they will let us know what topic was most requested and will be taught. These topics included Winter Maintenance, Winter Survival, Gravel Roads—Motorgrader, Gravel Roads Stabilization/Dust Abatement, Flagger Certification, Work Zone Technician, Truck Driving, Loader Safety, Forklift Certification, and Skid Steer Safety.

For our overall training program, once we have determined what topics are going to be put on the training roster, we then decide in what format they need to be delivered. There are some topics that require face-to-face training, such as winter survival due to the variety of components that are tactile and hands-on as well as work zone classes such as the Traffic Control Supervisor that is a twelve-hour course. Some topics can be covered in our thirty-minute webinars once a month. Other topics can be addressed in our newsletter.

Because we are sending notices out electronically now, I just want to remind everyone to be sure to get on our listserv. Our website also has our training notices and registration forms along with other happenings that may be of interest. We are doing our best to meet your needs and always welcome your comments and requests.

Have a safe summer, Steve Jenkins, Montana LTAP Director ❖

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The LTAP/TTAP Mission is to foster a safe, efficient, and environmentally sound surface transportation system by improving skills and increasing knowledge of the transportation workforce and decision makers.

Local Technical Assistance Program

LTAP Matters is published by the Local Technical Assistance Program. LTAP is located at Western Transportation Institute, College of Engineering, Montana State University,Bozeman, Montana.

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Our website lists upcoming training courses, registration forms, library information, our contact information, newsletters, various links, and MACRS information. Please go to: http://www.coe.montana.edu/ltapv2/index.html

The Local Technical Assistance Program/Tribal Technical Assistance Program (LTAP/TTAP) is a nationwide network of 58 centers - one in every state, seven serving Native American tribal governments and one in Puerto Rico.

MT LTAP Advisory Committee Members

The Advisory Board meets annually to make recommendations and evaluate the effectiveness of the Montana LTAP program.

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WTI Director

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MACo

Kris Christensen
Montana Dept of Transportation

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City of Great Falls

Bob Seliskar
Federal Highway Administration

John Van Delinder
City of Bozeman

Front Page Photo: By MIchele Beck. Old Fort Benton Bridge, "Old Walking Bridge." This is the first bridge to span the Missouri River in Montana. The first span was a swing span to allow passage of steamboats. 1908 flood collapsed it and was replaced by present bridge built in 1921; restored by community and now open to foot traffic.

Vegetation Control for Safety

It's that time of year, summer! One of the major duties for roadway crews is to control vegetation which can otherwise present a safety hazard. Tall grass, weeds, brush and tree limbs obscure or limit a driver's view of the road ahead, traffic control devices, approaching vehicles, wildlife and livestock, pedestrians and bicycles. Maintenance workers need to identify locations where vegetation control is needed to improve traffic and pedestrian safety and also to make themselves aware of safe ways to mow, cut brush and control roadside vegetation.

Here's some things to "DO" for mowing safety:

•Read the operator's manual thoroughly.

•Protect yourself from the sun. Use the canopy on the mower. Wear sun screen and a hat and shirt.

•Strip grass from around the tree, in a circle, to help avoid mower wounds that can kill trees. The radius of the circle should be 1 to 3 feet depending on the size of the tree. Remove low tree branches that can click an eye or throw the operator off balance.

•Mow in the direction of oncoming traffic. This results in less impact if a missile is thrown out and also provides better visibility.

•Ballast or weight the tractor properly.

•Mow slopes steeper than 1:2.5 (Vertical:Horizontal) with a side-mounted mower on a boom if the tractor unit remains on flatter surfaces while mowing.

•Operate side-mounted or boom mower units on the uphill side of the tractor to limit the possibility of overturning the tractor.

•Be sure the mower has a roll-over protection structure (ROPS). Use the seat belt at all times.

•Replace broken or lost chain guards to deflect debris immediately. Using flail type mowers reduces the amount of debris thrown.

•Cover all V-belts, drive chains and power takeoff shafts.

•Raise mowers when crossing driveways or roadways.

•Shut off power before checking any mower unit.

•Block a mower before changing, sharpening or replacing a blade. Any blade being re-installed should be checked for cracks or damage that will lead to failure.

•Check for leaks before leaving the shop.

•Refuel away from waterways.

•Keep spill kits/materials on hand in case of oil or fuel leaks in field.

•Use flashing lights and Slow-Moving-Vehicle emblems and road signal to alert traffic.

•Use MOWING AHEAD or MOWING AREA signs or signs with similar legends to warn traffic. Signs should not be more than one to two miles ahead of the mowing.

Traffic Control for Mowing Operations

Mowing is a moving operation taking place off the roadway. Therefore, it requires different traffic control from other maintenance operations. The most important thing to remember is to make the mower unit highly visible to drivers. That way, drivers will be alert to the mower unit and be able to avoid any potential collisions. Some tips include:

•Operate rotating yellow lights on mower tractors.

•Install Slow-Moving-Vehicle emblems on all mower tractors.

•Install yellow flasher lights on roll bars on the top of tractor cabs and operate these at all times.

•Install an orange flag or pennant on a whip to show the location of the tractor in high grass or over the edge of slopes.

•Operate the tractor with headlights on at all times.

Warning signs such as MOWING AHEAD, ROAD WORK AHEAD and similar signs may be placed along the road. The MOWING AHEAD sign is preferred. The sign is to be used in advance of mowing operations on the right-of-way. Place it on the shoulder so that approaching drivers can read the message easily (2 feet off traveled roadway).

As work progresses, move the signs so there are one to two miles between signs and the actual mowing work. Mount the signs on a breakaway portable support that will not be knocked over or blown down easily. Cover or remove the sign during lunch break or any other times when work is not in progress. Do not cover or remove the signs if you have stopped mowing to repair or adjust equipment because the warning to drivers is important to safety operations.

Roadside Trees

One of the most common causes of fatal and serious injury crashes on rural roads involves vehicles leaving the road and striking a tree. The concept of a clear zone, an area adjacent to the traveled way in which slope, surface and an absence of fixed objects can permit recovery of a vehicle that leaves the roadway, is important to providing a safe roadside. (*The clear zone is more fully described on page 10.)*

Trees are potential hazards because of their size and location with respect to vehicle traffic. Trees larger than 4 inches in diameter can be a hazard to a vehicle. The closer trees are to the travel lane, the more likely a vehicle is to strike them. Isolated trees provide a better opportunity for removal compared to forest conditions where removal involves significant cost. Recognize the sensitivity of removing individual trees. Removal should be based on potential crash frequency and severity. First priority should be on removing trees closest to the road. Trees in critical locations such as curves and intersections should be considered for removal. Trees that have been struck deserve additional attention.

Roadside trees are fixed object hazards for vehicles leaving the traveled way.

Continued on Page 10 . . .

Modified GRS IBS for Fergus County

Fergus County Road and Bridge Supervisor John Anderson needed to replace damaged and inadquate culverts. Having attended a GRS IBS (geosynthetic reinforced soil-integrated bridge system) showcase of the Dupuyer bridge by Montana Department of Transportation at a recent MACRS conference, he decided to use similar components to build a bridge rather than replacing culverts. There was not enough room or cover to put in culverts that would handle the cubic flow at high water. This spot had washed out three of the last four years, and numerous times prior. Anderson discussed this project with Stahly Engineering before beginning. He highly recommends others to visiting with their engineering firm if deciding to use this type of bridge design. Construction started the end of January and in eight days had the bridge built. Following are photos showing the process and materials used for this project.

2011 flooding over road, showing inadequate culverts

Shows culverts downstream flow, just prior to removal.

Excavated creek bed and placing geosynthetic textile.

Over the top of the geotextile a geogrid was placed , then base gravel fill.

Beginning placement of interlocking blocks.

Continued on Page 5 . . .

Fergus County (cont'd from Page 4)

Finished first structure - see upper right; now repeating construction for second structure.

Filling in with riprap between two structures.

Two structures up, riprap in place; now back fill begins behind structures.

From FHWA Every Day Counts Website: The geosynthetic reinforced soil-integrated bridge system (GRS–IBS) is an innovation for reducing bridge construction time and cost. As an alternative to conventional construction methods, GRS-IBS is an accelerated construction technique for bridge systems that uses alternating layers of compacted granular fill and geosynthetic reinforcement.

GRS-IBS technology allows the designer to place the bridge directly on the substructure to create a seamless and smooth transition between the bridge and roadway without using joints, deep foundations, approach slabs or cast-in-place concrete. The closely spaced reinforcement and granular soil create an efficient composite material that is internally stable and capable of carrying bridge loads with predictable performance. The smooth transition from the roadway to the bridge helps alleviate the bump-at-the bridge problem caused by uneven settlement between the bridge and approaching roadway.

Because of the ease of construction and the use of typical construction equipment and generic materials, GRS-IBS projects can be built in weeks instead of months, which translates into less congestion around work zones. Go to this link for more info: http://www.fhwa.dot.gov/everydaycounts/edc-3/geosynthetic.cfm

Continued on Page 8 . . .

Calendar of Events • July 2015 - December 2015

July 2015

S	M	T	W	Th	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

3: Fourth of July Holiday - Offices Closed
14: MT LTAP Webinar: First Aid-7:30-8:00am
20-23: National LTAP/TTAP Summer Conference, Savannah, Georgia

Training on Request:
Summer Survival
Hand Safety
Slips, Trips, & Falls

August 2015

S	M	T	W	Th	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

12-14: SafetyFest - Havre (www.safetyfestmt.com/)
18: MT LTAP Webinar: Noise Safety - 7:30-8:00am

Training on Request:
Forklift
Sign Safety
Road Audits

September 2015

S	M	T	W	Th	F	S
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27	28	29	30			

2 & 3: 26th Annual Equipment Safety Training and Snow Rodeo - Great Falls, MT (MT LTAP) *Brochure available in July*
7: Labor Day Holiday - Offices Closed
20-24: MACo 106th Annual Conference, Holiday Inn, Missoula, MT
www.mtcounties.org or MACo's Karen Houston 406-449-4360
22: MT LTAP Safety Webinar: Health Safety 7:30am-8:00am

October 2015

S	M	T	W	Th	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

MACRS Fall District Meetings:
5: Havre 6: Missoula 8: Townsend 14: Miles City 15: Billings
7 - 9: 84th League of Cities & Towns - Bozeman, MT
7: Public Works Directors Meeting - Bozeman, MT
10: Put The Brakes On Fatalities Day - 15th Anniversary (go to: www.brakesonfatalities.org)
12: Columbus Day - Observed (Montana LTAP Offices Open)
20: MT LTAP Safety Webinar: Gravel Pit/Trenching - 7:30am-8:00am
21 - 22: 30th Regional Local Road Coordinators Conference, Rapid City, SD

November 2015

S	M	T	W	Th	F	S
1	2	3	4	5	6	7
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15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

11: Veterans' Day - Offices Closed
16-20: Safety Fest, Billings - http://www.safetyfestmt.com/
17: LTAP Leadership - Great Falls - 8am - noon
17 & 18: MACRS Planning Meeting, 1-5pm (17) and 8am -noon (18); Great Falls
24: MT LTAP Safety Webinar: TBA 7:30am - 8:00am
26 - 27: Thanksgiving Holiday - Offices Closed

Some dates and locations are subject to change.
Call Genevieve Houska, LTAP, 1-800-541-6671 to confirm.

December 2015

S	M	T	W	Th	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

15: MT LTAP Safety Webinar: 7:30am-8:00am
24 & 25: Christmas Holiday - Offices Closed

Safety Meeting Webinars from Montana LTAP
July 14, 2015: First Aid
August 18, 2015: Noise Safety
September 22, 2015: Health Safety
Monthly Thirty-Minute Safety Webinars held at 7:30am on Tuesday Mornings
Call Montana LTAP at 1-800-541-6671 for more information!

Calendar of Events • January 2016 - June 2016

January 2016

S	M	T	W	Th	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
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24	25	26	27	28	29	30
31						

1: New Year's Day - MT LTAP Offices Closed
10-14: 95th Transportation Research Board, Washington, DC
18: Martin Luther King Day - Offices Closed
19: MT LTAP Safety Webinar-TBA 7:30am-8:00am
25-27: 14th Annual Safety Congress - Great Falls, MT (MT LTAP):
25am: Work Zone Tech
25pm: Traffic Control Supervisor
26: Traffic Control Supervisor
27: Roadway Safety Training

February 2016

S	M	T	W	Th	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29					

4: Asphalt Institute - Helena, MT (MT LTAP)
8-12: Montana Safety Fest - Missoula - http://www.safetyfestmt.com/
15: President's Day - Observed (Montana LTAP Offices Closed)
23: MT LTAP Safety Webinar - TBA- 7:30am-8:00am

SAVE THE DATES:
MACRS 2016 Spring Conference
March 28 - 31, 2016

March 2016

S	M	T	W	Th	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

14-17: MSU Spring Break
14: Work Zone Technician - Missoula (MT LTAP)
15: Work Zone Technician- Great Falls (MT LTAP)
16: Work Zone Technician- Miles City (MT LTAP)
17: Work Zone Technician- Billings (MT LTAP)
18: Flagging Certification Course - Billings (MT LTAP)
22: MT LTAP Safety Webinar -TBA - 7:30am-8:00am
28 - 31: MACRS 36th Annual Conference-
Heritage Inn, Great Falls, MT (MT LTAP)

April 2016

S	M	T	W	Th	F	S
					1	2
3	4	5	6	7	8	9
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17	18	19	20	21	22	23
24	25	26	27	28	29	30

11-15: National Work Zone Awareness Week (ATSSA)
http://www.atssa.com/Events/NationalWorkZoneAwarenessWeek.aspx
TBA: APWA North American Snow Conference
More info: http://www.apwa.net/Snow
19: MT LTAP Safety Webinar: TBA 7:30-8:00am
24-28: NACE Annual Conference 2016, Tacoma, WA

May 2016

S	M	T	W	Th	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

3: Gravel Roads Maintenance & Design - Missoula
4: Gravel Roads Maintenance & Design - Great Falls
5: Gravel Roads Maintenance & Design - Billings
10: Work Zone Tech/Flagger Certification - Great Falls
11: Work Zone Tech/Flagger Certification - Havre
15-21: National Public Works Week(APWA)
http://www.apwa.net/discover/National-Public-Works-Week
24: MT LTAP Safety Webinar: TBA 7:30-8:00am
30: Memorial Day - Offices Closed

June 2016

S	M	T	W	Th	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

7: Work Zone Flagger Certification - Bozeman
8: MACRS Executive Meeting, 1-5pm - Bozeman
9: MT LTAP Annual Advisory Board Meeting, 9am-12pm - Bozeman
21: MT LTAP Safety Webinar - TBA - 7:30am-8:00am

Some dates and locations are subject to change.
Call Genevieve Houska, LTAP, 1-800-541-6671 to confirm.

Training Opportunities at Montana LTAP Website:
http://www.coe.montana.edu/ltapv2/training/index.html

If you injure or kill someone while DUI, you can be convicted of vehicular homicide while under the influence. Expect a prison term up to 30 years and fines up to $50,000, or both. DON'T DRINK & DRIVE! § 45-5-106, MCA

Fergus County (Cont'd from Page 5)

After installing the bridge deck supports and completing the back fill, gravel road materials and bridge deck were placed to complete bridge project.

Anderson said the cost of this project was around $44,000. This included about $16,000 for labor, $16,000 equipment, $4,000 for blocks and rip rap, $9,000 for gravel and rental equipment, and $1,000 for geogrid and geotextile fabric. A big advantage was already having a bridge deck that was taking up space in his yard. It happened to be a small bridge and was an ideal fit for this spot.

Partial back fill completed; bridge deck support in place.

The quick turn around of eight days from start to finish also was a bonus getting traffic back on this road. Not only was the local rancher happy about the installation, the county commissioners also liked the way it finished up and the cost was within the parameters of the budget. Anderson had looked at an aluminum box culvert but the cost was prohibitive. He also noted the next time he builds this type of structure he would not do it in the winter due to weather constraints.

Although it would add somewhat to the cost when constructing another bridge like this, Anderson would chose the blocks that look more like a block wall instead of the cements ones.

"My crew did an outstanding job and they were pleased with the outcome also," Anderson said. "The bridge fits in with the surroundings and the gravel road. It is very driveable and we improved the road coming in from the ranch side. I definitely would look at building another bridge using this same kind of design."

Keep Low-Volume Roads & Paths in Service

*Reprint permission granted by Wisconsin LTAP, **Crossroads**, Spring 2014 Issue, http://tic.engr.wisc.edu/crossroads/*

RECREATIONAL TRAILS and bicycle paths are increasing by the mile and are popular year round with joggers, walkers, bicyclists, skateboarders, inline skaters and other users. Keeping low-volume pavements like these in good shape raises the question of how local governments can maintain them cost effectively at a high level of service for all users.

Most strategies for extending the life of asphalt surfaces on streets and highways apply to bicycle and pedestrian trails, but there is growing interest in ways to modify preservation treatments like fog seals and chip seals for use on trail pavements.

An ongoing study on preventive maintenance for recreational trails by the Minnesota Department of Transportation Office of Materials and Road Research examines these and other surface treatments to identify practices that will extend the useful life of trails and paths. A study report, published by MnRoad in 2009, includes recommendations to help local road agencies adopt the ones that fit their needs.

Start at Construction

Study author Thomas Wood, a Research Project Supervisor with MnDOT, says that as public agencies respond to the demand and open more recreational trails, they do not always make preventive maintenance part of the package. "Yet it is an important consideration for extending pavement life if they want to maintain those trails at the lowest cost."

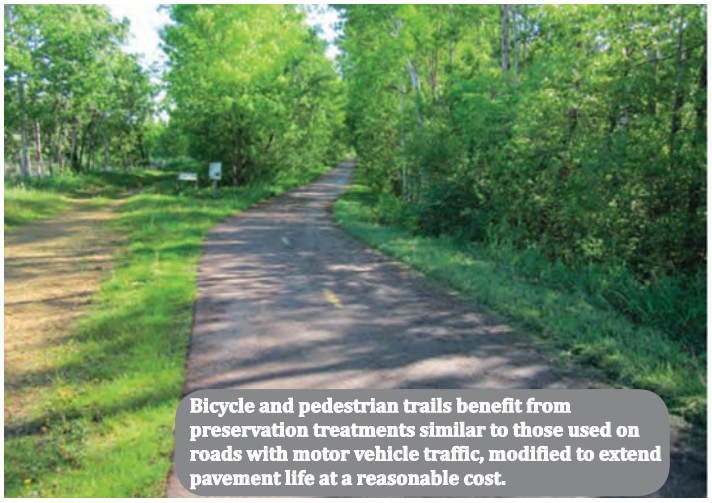
Wood pinpoints one important principle the MnRoad team tested that is producing positive results: Incorporate maintenance treatments into the construction process and continue them at regular intervals. The team applied a simple fog seal to newly paved trail sections with the goal of filling voids in the asphalt material and preventing it from early deterioration due to moisture. The approach highlights the difference between building a typical roadway and constructing a trail.

"Road builders depend on the movement of vehicle traffic to complete compaction and increase the density of the fresh paving material," explains Wood. "Since recreational trails don't see that kind of traffic, they can become pervious quickly if not sealed as part of construction."

Results after six years show that early application of the fog seal on the test sections is doing its job of keeping out water. Trail owners did a second application at the six-year mark, using a fog seal with CCS-1h.

Chip Seal and Crack Treatments

Existing surfaces tested in the study were good candidates for chip seal, a pavement preservation method that protects against moisture and oxidation, increases surface friction and seals cracks. A treatment that performs well on highways, Wood recommends using a finer size aggregate (1/8 inch) for chip sealing trails and paths. People cycling, walking or skating on these pavements are more sensitive to surface roughness. Indestructibility is not the goal, he says, but finding an option that satisfies users' needs.



Bicycle and pedestrian trails benefit from preservation treatments similar to those used on roads with motor vehicle traffic, modified to extend pavement life at a reasonable cost.

Crack treatments are another low-cost tool that slows wear on both high- and low-volume roads. The MnRoad report lists three effective solutions on trails. Crack sealing or crack filling for fine to moderate cracks, and rout and seal, which involves routing out a reservoir along the crack and filling it with sealant. For recreational trails and bicycle paths, the report recommends using the rout and seal method on transverse cracks only since longitudinal routing creates a hazard for narrow-tire bicycles and inline skates. In all cases, says the MnRoad report, use sealant of minimal width and a flush fill with little or no overband.

Wood emphasizes that crack treatments do not deal with underlying distresses like vegetation penetrating the asphalt surface or sub-grade movement. Road officials need to watch for those problems when planning future reconstruction.

Add to Ratings Process

Public road agencies should evaluate the condition of recreational trails routinely to spot and address problems early. Trails must weather the seasons and the impact from some of the same maintenance practices as streets and highways. They belong on a similar schedule for road condition ratings.

Wood reports that at least one Minnesota community is using a web-based rating system to rate its trail pavements that is comparable to the PASER (Pavement Surface Evaluation and Rating) system Wisconsin road officials know. He suggests that using PASER to evaluate trail surface condition is a workable option. At a minimum, says Wood, walking the network of trails to check for trip hazards and distresses is a good way to track the condition of these low-volume pavements and gather information to develop preventive maintenance plans.

Evaluation of the MnRoad test sections after six years revealed no visible problems. It is evidence, Wood says, that steps taken during construction and regular preventive maintenance made a difference. He expects the trails to last 25 to 30 years.

Continued on Page 10 . . .

Low-Volume Roads & Trails (cont'd from page 9)

Limits of Design

Another issue for low-volume roads is how they hold up to recommended maintenance practices. Builders often design them at an asphalt thickness, aggregate base thickness and width meant for smaller and lighter loads, which can limit maintenance options. Traditional maintenance equipment for snow and ice control, and other maintenance operations could damage the pavement or be difficult to maneuver. Pickup trucks and small tractors are among plowing options many street and highway departments deploy on trails and paths during snow events.

To protect the structural integrity of a trail when doing a fog seal treatment, Wood recommends carrying less than a full tank of emulsion to minimize the weight of the truck.

Develop Program

Early and regular preventive maintenance, including steps that start at construction, make good sense on recreational trails and bicycle paths. Incorporating trail preservation in their larger pavement maintenance programs, road agencies meet the needs of avid users and protect local investments in a popular and economically important transportation network.

Local governments can refer to the resources listed here to learn more about the methods and results from Minnesota's trail maintenance project and find maintenance checklists useful for developing a preservation program of their own to keep low-volume roads and paths in service.

Resources

www.lrrb.org/media/reports/2011RIC05.pdf
MnRoad Preventive Maintenance for Recreational Trails 2009 study report from MnDOT.

www.lrrb.org/media/reports/200925.pdf
Minnesota Local Road Research Board publication ***Maintenance of Recreational Trails,*** published in 2011, details a range of trail maintenance activities, including steps to slow pavement deterioration.

Contact

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of Transportation
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Vegetation Control (Cont'd from Page 3)

Clear Zone Description

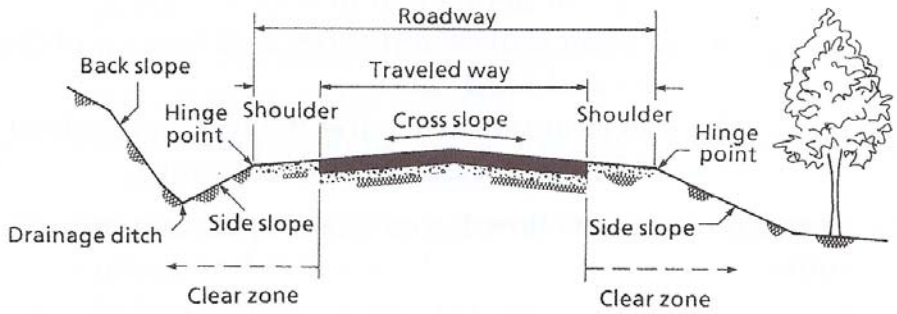
The concept of clear zone is an approach to minimize the number and severity of crashes involving vehicles running off the road. Simply stated, it is a traversable area that starts at the edge of the traffic lane and extends laterally a sufficient distance to allow a driver to stop or return to the road before encountering a hazard or overturning. The traversable area would be considered safe, if there were no fixed objects, unless they are breakaway, and if the roadside geometry (either the fore slope, back slope, or ditch) was flat enough that a vehicle could safely traverse the area without tipping and rolling over. Roadside safety features include breakaway sign and light posts, and traversable drainage structures. Curbs are not considered a roadside safety feature since they can be easily mounted by errant vehicles; hence, their presence does not alter how clear zone is measured.

A safe traversable slope can be either a recoverable slope or a non-recoverable slope with a clear run-out area at the bottom. A recoverable slope is a slope on which a motorist may, to a greater or lesser extent, retain or regain control of a vehicle and recover or stop. Slopes 1:4 (Vertical:Horizontal) or flatter are generally considered recoverable. A non-recoverable, traversable slope is a slope which is considered traversable but on which an errant vehicle will continue to the bottom. Embankment slopes from 1:3 and 1:4 may be considered traversable but non-recoverable if they are smooth and free of fixed objects.

A clear run-out area is the flatter area at the toe of a non-recoverable slope available for safe use by an errant vehicle. Slopes steeper than 1:3 are not considered traversable and should not be found in the clear zone.

The objective of roadside safety is to provide and maintain as much clear zone as practical. The design clear zone is the minimum width to be provided on a project and is dependent upon speeds, the roadside geometry, and traffic volumes. Further details on clear zone can be found in the ***Roadside Design Guide.***

This information from ***Vegetation Control for Safety*** *by FHWA, available from Montana LTAP Library or at this link: http://safety.fhwa.dot.gov/local_rural/training/fhwasa07018/#safe*



Hinge Point	Point where the slope rate changes.
Clear Zone	A traversable area that starts at the edge of the traffic lane, includes the shoulder, and extends laterally a sufficient distance to allow a driver to stop or return to the road before encountering a hazard or overturning

Montana LTAP Library

Welcome to the LTAP Lending Library where publications, videos, DVD's, and software may be borrowed for a two-week period. We have a limit of three videotapes or DVD's for a rent-free two-week period. Some publications are free or for a nominal charge upon request.

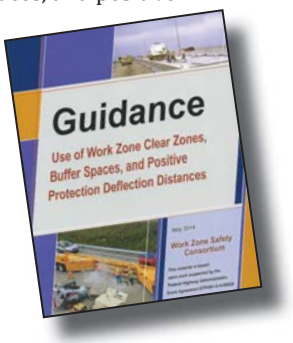
For information or checkout procedures, please call Genevieve Albert or Michele Beck, LTAP, 1-800-541-6671. If you have computer access, please e-mail us:
mtltap(at)coe.montana.edu.

We have new lists for the library publications, software, DVD's, and videos at our web site, just click on Resources: **http://www.coe.montana.edu/ltapv2/ (Note: Many of our publications are electronically available.)**

At this web site, you can also keep track of upcoming workshops, past and present newsletters, and workshop announcements.

Our 2014-2015 Needs Assessment Survey is available at this web site. Thank you in advance for taking time to complete it.

p-973 Guidance: Use of Work Zone Clear Zones, Buffer Spaces, and Positive Protection Deflection Distances (FHWA May 2014) This document summarizes available guidance on the use of work zone clear zones, buffer spaces, and positive protection deflection distances.(11 pages)
https://www.workzonesafety.org/files/documents/training/courses_programs/rsa_program/RSP_Guidance_Documents_Download/RSP_Clear_Zones_Guidance.pdf



p-974 Guidelines on Improving Work Zone Safety Through Public Information and Traveler Information (FHWA 2011) This document summarizes available guidance on public information and traveler (or motorist) information. It describes effective strategies and techniques that can be used to implement these control measures and offers recommended practices.(14 pages)
https://www.workzonesafety.org/files/documents/training/courses_programs/rsa_program/RSP_Guidance_Documents_Download/RSP_Traveler_Information_Download.pdf

p-976 Guidelines on Motorcycle and Bicycle Work Zone Safety (FHWA 2011) This document describes work zone conditions that can cause safety concerns for motorcyclists and bicyclists. It offers recommended practices and describes effective strategies and techniques that can be used to help mitigate those concerns. (8 pages)
https://www.workzonesafety.org/files/documents/training/courses_programs/rsa_program/RSP_Guidance_Documents_Download/RSP_MotorcyclesGuidance_Download.pdf

p-1208 Bicycle Road Safety Audit Guidelines and Prompt Lists (FHWA May 2012) The purpose of these Guidelines and Lists is to provide transportation agencies and RSA teams with a better understanding of the safety of cyclists in the transportation system when conducting an RSA. These Guidelines present the RSA team with an overview of basic principles of the safety of cyclists and potential issues affecting cyclists. They also provide information on how to conduct an RSA and effectively asses the safety of cyclists. (87 pages)
https://www.workzonesafety.org/files/documents/training/courses_programs/rsa_program/RSP_Guidance_Documents_Download/RSP_MotorcyclesGuidance_Download.pdf ❖

West Region Transportation Workforce Center
CONNECTIONS for Tomorrow's Transportation Workforce

West Region - Transportation Workforce Center

Looking for workforce development resources and partners? The West Region Transportation Workforce Center (WRTWC) serves as a resource to support, grow and maintain a skilled and career-ready transportation workforce in the western region. WRTWC efforts will provide:
•Better Data: on transportation job needs and priorities within the region
•A One-Stop Portal: to transportation training and education programs in the region for all levels from middle school through professional development;
•Better Alignment: of education and training to workforce skills gaps;
•Direct Connections: between industry, education, economic development and workforce communities;
•Better Workers: A sustainable talent pool of skilled and diverse workers.

The WRTWC will facilitate communications across states and agencies to share best practices, leverage scarce resources, and to create new strategic partnerships to enhance the transportation workforce at all levels. The WRTWC invites transportation professionals, organizations and service providers at the regional, state, and local levels to participate as strategic partners in this important effort.

Join the network today and become part of the solution! To join, visit the Center website at: www.wrtwc.org and click JOIN.

To provide for a more strategic and efficient approach to transportation workforce development, the Federal Highway Administration has established the National Network for the Transportation Workforce (NNTW) to consist of five Regional Surface Transportation Workforce Centers. The West Region Transportation Workforce Center (WRTWC), housed at the Western Transportation Institute at Montana State University in partnership with North Dakota State University, will serve a ten-state Western region: Nebraska, South Dakota, North Dakota, Montana, Wyoming, Idaho, Washington, Oregon, Alaska, and Hawaii.

WRTWC .org

Editorial 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 and articles to: Michele Beck, Local Technical Assistance Program,
PO Box 173910, Bozeman, MT 59717-3910
(800) 541-6671 or (406) 994-6100 Fax: (406) 994-5333
email: mbeck(at)coe.montana.edu

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This newsletter is designed to keep you informed about new publications, techniques, and new training opportunities for you and your community.
•Present and past issues are available at
http://www.coe.montana.edu/ltapv2/newsletter/index.html
or by calling 1-800-541-6671.
•Approximately 100 copies of this public document were published at an estimated cost of $2.19 per copy for a total cost of $218.82 for printing. Several copies have been distributed but the majority are now electronically disbursed to over 350 agencies and available on our website.
•LTAP attempts to provide accommodations for any known disability that may interfere with a person participating in any service, program or activity. Alternative accessible formats of this document will be provided upon request.
•Please send us any comments or concerns you may have regarding this newsletter with your name and address in order that we may respond in a timely manner.

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Parting Shot . . .

In order to share their wisdom, this special column is dedicated to those who are retiring, or recently retired, and wish to pass on some gems from their years dealing with county roads or city streets. The following comments are from Dave Fowler, recently retired Gallatin County Road and Bridge Superintendent.

During my school years, I began working at various jobs. This taught me good work ethics. After high school, I began working at an automotive parts supply store. Then I worked as a mechanic on cars, trucks, and semis, learning the "in's and out's" of repairing vehicles. This job also included going on many wrecker calls during the days, nights and on weekends. Back then it was the only large wrecker service in the Bozeman, Yellowstone, and Big Timber area.

My next job took me to a ready mix sand and gravel company. There I learned about fleet maintenance and rock crushing for concrete material and road mix. Sam Gianfrancisco and I both worked at this company until he was hired as the Gallatin County Road and Bridge Superintendent. He encouraged me to come and work at the county road department as shop foreman and I was hired in May 1988. I worked in this position until toward the end of my time with the county until I transitioned into the Road and Bridge Superintendent in 2012. My retirement date was December 31, 2014.

My experience at these jobs helped me with the responsibility at the County Shop when it was located at the Bozeman Fairgrounds. My job was to maintain the graders, trucks, snow plows, the crusher and the motor pool vehicles. With the shop facility being inadequate, I became involved in the budget process. As the years passed, I was frugal with the tax money and played an important part of saving enough money to help purchase the land and build a new county shop now located west of Bozeman.

Dave Fowler, Retired Gallatin County Road and Bridge Superintendent

My first MACRS Conference was in 2001. I served as a District Representative for District #2 for two years and helped Steve Jenkins, MT LTAP, with a couple of local workshops. Because of my expertise on equipment maintenance, I have been a guest speaker twice at the MACRS conferences.

I truly believe in MACRS and the LTAP program. Their workshops, library, and annual conferences gave me knowledge and confidence that helped me do my job. The interaction with the vendors, commissioners, and other county employees gave me insight to other counties with similar problems. We realized we solved them in different ways but with the same results. I would encourage county commissioners and road and bridge employees to attend as many workshops and conferences as they are allowed. Be sure to get involved, it is a sure way to network with others.

During my time at the county I tried to be a team player and encouraged others to do the same. I always considered "the Public" a customer and treated them with respect and lent them my "ear."

I am very appreciative to have had the opportunity to work for Gallatin County for twenty-six years. I thank each and everyone for their help, kindness, and friendship.

Sincerely, Dave Fowler

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