

The Bridge

Linking Transportation Research and Practice



Get Ready For 23 CFR Part 634! (Translation: Worker Visibility Law)

Rules regarding high-visibility clothing *require* compliance by November 24, 2008 for EVERYONE working on or near Federal-aid Highways

The Federal Highway Administration published final rules regarding worker visibility as Part 634 of Title 23 Code of Federal Regulation. The rule meets part of the SAFETEA-LU Section 1402 requirements to reduce the likelihood of worker injury and maintain the free flow of traffic when workers are on or in close proximity to Federal-aid highways. Formerly, this compliance was a recommendation in the Manual of Uniform Traffic Control Devices. By November 24, 2008, all workers shall wear ANSI 107-2004 Class 2 or Class 3 apparel while working on or in the rights-of-way of Federal-aid highways.

It's clear that our aging road infrastructure needs an increasing number of workers in the field to build and maintain our roads. It's also clear the increasing traffic volume on our roads means that we can't close every road we work on. This combination means that more and more workers have to spend their days and nights working near more and more vehicles traveling at high speeds. To help protect these workers, construction and maintenance crews follow safe practices and set up work zones; and now all workers, regardless of their affiliation with construction or maintenance, will have to wear clothing that makes them more visible in the workplace.

Which Apparel?

First of all, be sure that you refer to the correct standard when selecting apparel. The ISEA/ANSI 107-2004 and 107-1999 standards appear very similar, but ISEA/ANSI 107-2004 completely replaces the older standard. Many agencies adopted

ISEA/ANSI 107-2004 high-visibility Class 2 or Class 3 apparel when the Federal Highway Administration recommended this apparel in the 2000 and 2003 Manuals of Uniform Traffic Codes, so the transition from a recommendation to a requirement should be smooth. The Michigan MUTCD discusses high-visibility apparel in Section 6E.02 and refers to ANSI standards in Section 1A.11.

The selection of Class 1, 2, or 3 apparel is based on your proximity to traffic, the speed of traffic that is expected to be near you while you work, and whether your work allows you to pay attention to traffic while you work.

Worker Visibility, Continued on Page 5

Classes of ISEA/ANSI 107-2004 High-Visibility Apparel

Typical Class 1 Apparel

Few transportation occupations allow this class, and Class 1 may never be used while working on or near Federal-aid highways.



Typical Class 2 Apparel

The number of retroreflective stripes is not specified in the standard, but the surface area of the stripes and the background materials is, so the only way to identify which class of clothing you are looking at is by reading the label.



Typical Class 3 Apparel

As with Classes 1 and 2, the number of stripes and type of garment is not specified, but the surface area of retroreflective and background material is. Typical Class 3 apparel includes clothing that covers most of the upper and lower parts of the body.



In This Issue:

Worker Visibility Law	1
Publications Available from the LTAP Library	3
Input Welcome on MDOT's Post-Construction BMPs	4
New Life for Worn Turntable Circles	6
Safety Tips for Snow Plow Operators	7
LTAP Workshop Announcements	8

Get ready for winter! The leaves have turned, and mostly dropped here in the UP, and snow is in the forecast, so it's time to get your people and equipment ready for the winter maintenance season. You can find a full-page list of tips for snow plow safety on page 7, which you can tear out or photocopy and pin to the bulletin board. There's a larger, more colorful version of page 7 online for download and printing. Go to <http://www.michiganltap.org/bridge_21.3> to download the poster.

While getting suited up for a plow run or just driving to the remote garage, don't forget about the new *requirement* to wear high-visibility work wear when you are outside doing anything on or near Federal-aid highways. Some of the details of this rule are reported on page 1. The rule comes into effect next year, but it's a good time to start getting everyone used to complying. One point that is often overlooked is the requirement that EVERYONE who works on or near a Federal-aid highway must comply, including surveyors, maintenance workers, inspectors, and even people like roadside cleanup crews and reporters responding to a traffic crash. MDOT has required ANSI Level 2 or Level 3 for work wear for their own workers for

several years, and will be notifying contractors of the compliance requirements as the enforcement date approaches. Even if you don't think you'll be on or near a Federal-aid highway, it's a good idea to use the high-visibility work wear to protect you and your workers. The vests are inexpensive, easy to find, and can save your life, so you might as well wear them.

We've discovered another great maintenance tip for the shop, reported on page 6. The Iosco County Road Commission found a relatively easy way to fix the problem of notched underbody plow turntables wearing on their holding brackets. The fix is cheap, and can help prevent possible bigger problems down the road. Thanks to Kevin Meske for sending us that tip. Don't forget that we can publish your great ideas here in *The Bridge*, and you don't even have to write the article. Just give us a call or send us an e-mail, and we'll be happy to research your idea, write it up, and make you famous!

— John

The Bridge

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Local Technical Assistance Program

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LTAP Steering Committee

The Local Technical Assistance Program (LTAP) is a nationwide effort financed by the Federal Highway Administration and individual state departments of transportation. It intends to bridge the gap between research and practice by translating the latest state-of-the-art technology in roads, bridges, and public transportation into terms understood by local and county highway or transportation personnel.

The LTAP Steering Committee makes recommendations on, and evaluations of, the activities of the Local Technical Assistance Program based on discussions at the Technology Transfer Interchange and Advisory Committee meeting. This meeting is held annually and is open to all rural and urban agencies, and individuals concerned with the transfer of transportation technology in Michigan.

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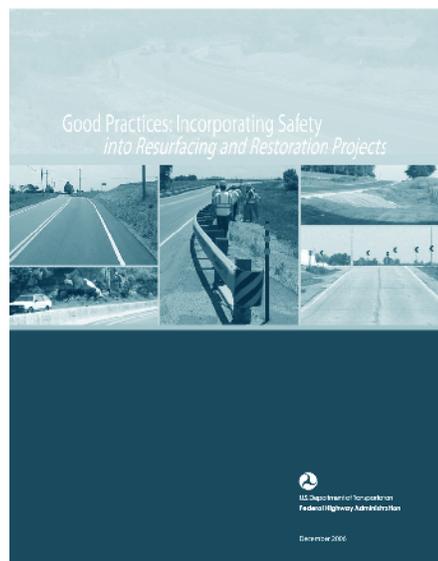
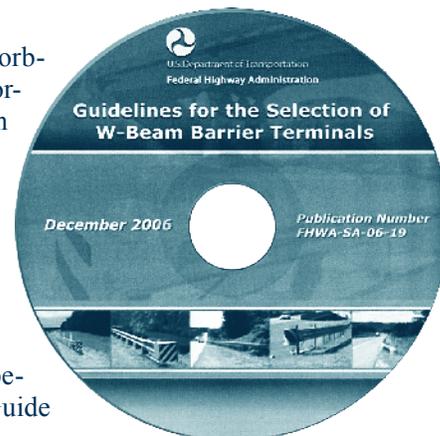
Guidelines for the Selection of W-Beam Barrier Terminals

Terminals for W-beam guardrail are classified as energy-absorbing, non energy absorbing, or buried-in-backslope designs. While each of these types is considered crashworthy, they have different performance characteristics, making some a better choice than others at specific sites.

This presentation has been prepared to provide information to designers and construction/maintenance personnel responsible for selecting and properly installing the most appropriate terminal design at any site. In addition to showing the actual crash performance of each terminal type, this presentation provides guidance on proper site grading and presents real world examples of both appropriate and inappropriate installations.

For more detailed information on recommended roadside design practices and specifically on barrier terminal designs, please refer to the AASHTO Roadside Design Guide and the FHWA Safety Hardware Website.

CD-ROM or on-line presentation at <http://www.michiganltap.org/bridge_21.3/>



Good Practices: Incorporating Safety into Resurfacing and Restoration Projects

Integrating safety improvements into resurfacing and restoration projects is a subject of long-standing interest by Federal, State, and local transportation agencies. A Scan Tour was conducted to identify and subsequently observe good practices in this area. The scan team visited Colorado, Iowa, New York, Pennsylvania, Utah and Washington State. The Scan Team met with each State DOT and county agencies in three States and observed completed projects in all States. Despite wide variations in agency operating environments (e. g., funding levels and flexibility, public expectations, environmental regulations), the report identifies a set of common issues host agencies confronted in developing integrated resurfacing-safety improvement programs, and also observed a set of common success factors.

Good practices are reported within institutional and technical categories. Good institutional practices include commitment to integrate safety into pavement preservation projects, establishing a system that allows for multifunded projects (pavement, safety) and allocates cost items by fund, allowing for flexible project development cycles, strengthening State-local relationships, developing an expedient procedure for acquiring minor rights-of-way, and engaging safety experts in the project

development process. Good technical practices include identifying targeted safety countermeasures, making selective geometric improvements, installing traffic control devices and guidance features, improving roadsides, and improving private and public access points.

CD-ROM or download at <http://www.michiganltap.org/bridge_21.3/>

Chip Seal Road Maintenance

Chip seals done correctly can extend the life of pavements, improve skid resistance, and reduce lifetime ownership costs of your asphalt roads. This CD-ROM contains videos, a PowerPoint presentation, and reference materials to help road managers and engineers understand the proper use and application of chip sealing as a preventive maintenance procedure.

The Texas Engineering Extension Service produced this CD-ROM based on National Highway Institute Pavement Preservation Course No. 131103 materials.

CD-ROM (you may request free copies from LTAP).



Local Input Welcome on MDOT's Post-Construction BMPs

Contributed by the MDOT Storm Water Management Team and its consultant, Tetra Tech

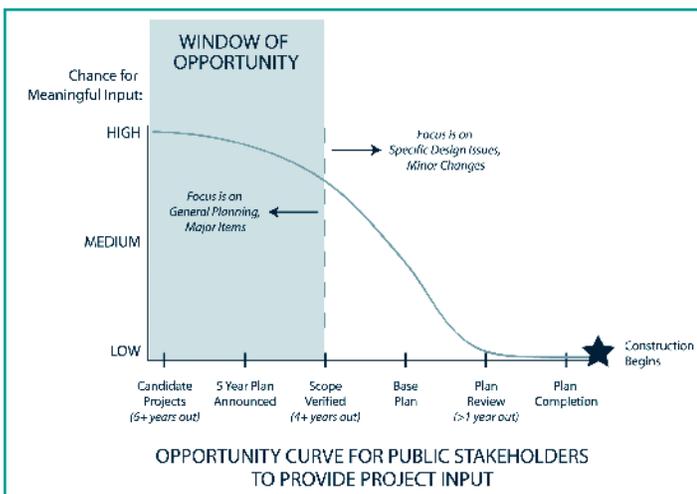
Storm Water Best Management Practices (BMPs) reduce water pollution from storm water runoff. BMPs can be structural, non-structural, action-oriented, or preservation-oriented. Some BMPs are used during construction, some after, and some for both. The focus of this article is post-construction BMPs (PCBMPs).

PCBMPs should treat, store, filter or infiltrate storm water runoff on site before it can affect the water quality of a receiving stream or other body of water. MDOT determines if a site should have a PCBMP by asking the following questions:

1. Is this a new outlet? If so, can MDOT, to the maximum extent practicable, put in a PCBMP to protect water quality?
2. Is this an impaired water body? If so, can MDOT, to the maximum extent practicable, put in a PCBMP to protect water quality?

MDOT fully supports and encourages the use of PCBMPs on State and local road projects. Evaluation of the need for PCBMPs begins three to five years before construction with MDOT's Early Coordination (EC) and Context Sensitive Solution (CSS) processes. These early project processes help identify existing water quality conditions that can be helped by PCBMPs, allowing MDOT to budget and plan accordingly.

MDOT encourages input from local communities and watershed groups during the CSS and EC processes, recognizing that these parties can offer much more specific input on local water quality issues. MDOT will not always have the resources to seek input. Therefore, it is up to local communities and watershed groups to be proactive and contact MDOT Project Managers in the beginning of project development. When local communities and groups share this information with the assigned MDOT Project Manager, there is an even greater chance for making PCBMPs a priority. The opportunity for design input and revisions drops as the process moves closer to plan set creation, as shown in the graphic below.



MDOT's Best Management Practice Goals

As much as practicable, MDOT's BMP goals for all projects include:

- Maximize vegetated surfaces.
- Stabilize disturbed soil areas.
- Minimize the extent and duration of soil exposure.
- Minimize runoff velocities and retain runoff on site.
- Control downstream erosion and sedimentation.
- Minimize adverse downstream effects (quality/quantity issues), keeping post-development runoff equal to or less than pre-development runoff.
- Coordinate with local needs.
- Maintain BMPs to keep them working properly.
- Manage first flush runoff.

Some specific post-construction BMPs to help achieve these goals include the following:

- Energy dissipaters
- Infiltration trenches
- Detention basins
- First flush basins
- Vegetative buffer strips
- Pipe drops
- Frequent Street Sweeping

For more information about these BMPs, refer to the MDOT Drainage Manual (Chapter 9) found on-line at: <<http://www.michigan.gov/mdot/>> (search for "Stormwater Best Management Practices")

To increase the likelihood that PCBMPs meeting your goals will be included on MDOT projects, follow these steps:

1. Meet with your local MDOT Transportation Service Center Manager to identify upcoming projects in your region as outlined in MDOT's Five-Year Transportation Program, which is updated annually. You can also review the Five-Year Program by searching for "MDOT Five-year program" on-line at <<http://www.michigan.gov>>
2. Determine if any water bodies you are trying to protect could be helped by adding post-construction BMPs to MDOT projects. If possible, try to determine any specific water quality issues that could be addressed.
3. Work with the assigned MDOT Project Manager to see if PCBMPs can be incorporated into the project during the next Five-Year program update. If a PCBMP is included in the project, the next step will be to discuss technical details and an operations and maintenance agreement with MDOT.

Also consider implementing a similar early planning process for your own projects. Review what construction is planned 3-5 years from now and determine how it might impact sensitive areas. Ask what steps can be taken to protect water quality. The sooner you start, the easier it is to incorporate effective solutions.

Adding context-sensitive, PCBMPs to MDOT projects (or any project) may not be a quick process, but improving water quality is definitely worth the extra effort. For more information about Post-Construction BMPs, visit: <<http://cfpub.epa.gov/npdes/stormwater/menuofbmps/>>

Together, Better Roads and Cleaner Streams.

Worker Visibility, Continued from Page 1

Class 1 Apparel

Class 1 apparel is not permitted for workers on or near Federal Aid Highways. You can recognize a Class 1 garment by inspecting the label, which should be clearly marked. This class of apparel is for workers exposed to traffic traveling less than 25 MPH. The main difference between Class 1 and Class 2 apparel is the amount of fluorescent background material and retroreflective material. Typical occupations that require Class 1 apparel include parking lot attendants, warehouse workers, sidewalk maintenance personnel, and shopping cart retrievers. Even if you have employees who might perform these kinds of tasks, most transportation-agency workers are likely to also perform other tasks that require Class 2 or Class 3 apparel, so purchasing Class 1 apparel isn't recommended.

Class 2 Apparel

Class 2 apparel offers many workers adequate visibility to motorists traveling at 25 MPH or more and in inclement weather. Class 2 is for workers whose attention might be distracted from approaching traffic and work in close proximity to moving vehicles. The most common Class 2 garments are shirts, jackets, or sleeveless vests. This apparel provides 360 degrees of torso visibility with horizontal and vertical retroreflective stripes. Typical occupations for workers who must wear Class 2 apparel are:

- Forestry operations
- Ship cargo loading operations
- Roadway construction, utility and railway workers
- School crossing guards
- Delivery vehicle drivers
- High-volume parking and toll gate personnel
- Airport baggage handlers/ground crew
- Emergency response and law enforcement personnel
- Trash collection and recycling operations

Some "safety" vests look similar to Class 2, and the only way to be sure you are wearing the right apparel is to inspect the tag. There are many other design features besides visibility that differentiate the classes and separate "genuine" ANSI 107-2004 apparel from other "safety" apparel. If the tag on your high-visibility garment is missing or not clearly marked, then don't wear it and discard it. Remember that an inspector will check the tag to see if you are in compliance, so the only thing protecting you from being cited for a violation is the proper tag.

Class 3 Apparel

The main difference between Class 2 apparel and Class 3 apparel is the larger area of your body that Class 3 apparel covers. There are no sleeveless vests that, when worn alone, provide Class 3 protection. Class 3 apparel is for workers who are constantly exposed to high-speed traffic and who cannot pay attention to approaching traffic. If you aren't sure which class of apparel to wear, choose Class 3. Typical workers who must wear Class 3 apparel include:

- Roadway construction personnel and traffic regulators
- Utility workers
- Survey crews
- Emergency response personnel

Law Enforcement and Firefighters

Firefighter apparel must meet different visibility and protection requirements than construction and law enforcement apparel. Law enforcement personnel have different rules for when they must wear ANSI clothing, but Class 2 apparel meets the visibility requirements for these workers when they are present on Federal Aid roads and are not exempt from the rule.

Other Applications

Class 1 and Class 2 apparel are excellent for those evening runs and walks. Class 2 and Class 3 apparel is also GREAT for accompanying Trick-or-Treaters, and will earn you lots of compliments from envious parents. Plus, you're likely to collect some treats since you are "in costume!"

References

For specific information regarding when, what, and where to use ANSI Class 2 or 3 apparel in Michigan, contact Jim Gaus, Occupational Safety, MDOT Safety & Security Administration, 517-241-4188, <Gausj@michigan.gov>.

mmm.com: ANSI/ISEA 107-2004 MADE EASY: A Quick Reference to High-Visibility Safety Apparel.

Federal Register: November 24, 2006 (Volume 71, Number 226). Page 67792-67800. From the Federal Register Online via GPO Access <http://wais.access.gpo.gov>. DOCID:fr24no06-4. DEPARTMENT OF TRANSPORTATION, Federal Highway Administration. 23 CFR Part 634. FHWA Docket No. FHWA-2005-23200. RIN 2125-AF11

XYZ Manufacturer
ANSI/ISEA 107-2004
100% Polyester
Reflective Material
Model #: abc
Size: Large



Class 2
Level 2

Washing Instructions



Wash warm - max 25 x
Do not bleach
Tumble dry low
Do not iron
Do not dry-clean
(mmm.com)

Must be marked
ANSI/ISEA 107-2004
to comply with new
regulations

Must show **Class 1, Class 2,**
or **Class 3.** Select the
correct class according
to where and when you'll
work.

Sample ANSI/ISEA 107-
2004 Garment Label. If
the garment isn't marked
ANSI/ISEA 107-2004,
then you shouldn't wear
it. The label must also
clearly show the Class
compliance.

New Life for Worn Turntable Circles

Submitted by Kevin Meske, Fleet Manager, Iosco County Road Commission



Figure 1. Turntable circle before repair. The notches seen in this picture increase wear on the hanging plate and block seen in Figure 3.



Figure 2. Turntable circle after repair. The notches are covered by the bar stock, which has been shaped by the vehicle hydraulics and welded in place.

Problem

Iosco County Road Commission maintenance staff faced a problem of accelerated wear and loosening fixtures on some of their underbody blade turntables. Older turntable circles mounted on single- and tandem-axle trucks had notches on the outside edge for holding the blade at a fixed angle with a shear pin. This mechanism has been replaced by hydraulics on most trucks. The leftover notches (see Figure 1) accelerate clamp wear, which places additional strain on the securing bolts (see Figure 3), causing the bolts to loosen, and potentially allowing the turntable to move out of alignment or jam. The Iosco mechanics shared a repair method with *Bridge* readers to help others prevent this type of wear on their own equipment.

The Solution

The Iosco team of mechanics put their heads together to develop a repair method that limits clamp wear. The repair protects the clamp by covering the turntable notches with a wear strip. By welding a narrow strip of bar stock to the outer edge of the turning circle, the gap between the turntable circle and hanger blocks is narrowed, giving additional support to the circle and reducing load and binding forces on the hanger clamp bolts.

The Procedure

Modifying the turning circle requires a welder, 1.5 inch bar stock, and a mounted turning circle on a vehicle with hydraulics and controls in good working order. You will use the vehicle hydraulics to help bend and hold the bar stock in place. Remember to observe appropriate safety procedures and wear eye, ear, skin, and respiratory protection when welding and grinding.

1. Remove the hanging plate and the spacing block of the circle clamp on one side of the turntable (Figure 3).
2. Rotate the spacing block away from the turntable circle. This will provide the clearance needed to add the bar stock. After turning the spacing blocks, install a new hanger plate if the current one is excessively worn. If the small style circle hanger is being used (Figure 3), simply turn the hanger plate over and use the other side.

3. Once the circle clamp is back together, swing the scraper blade so that the clamp is to the rear of the truck.
4. Insert a piece of mild steel bar stock that is approximately 60 inches long x 1½ inches x the circle thickness into the opening between the circle and the newly rotated spacer block. Using a 60 inch long piece of bar stock should leave a short piece of bar at the end of the circle to finish the weld and help pull the last few inches against the circle.
5. With the bar inserted, start welding it to the worn circle.
6. When the circle clamp gets in the way, start the truck, move the scraper forward a few inches, then weld some more. The hydraulic system on the truck usually has the power needed to bend the bar to the circle. Be sure to keep an eye on the bar to make sure it doesn't slip out of place.
7. Keep repeating this procedure until the truck cannot bend the bar any further. To weld the last few inches, you may need a come-a-long to snug the bar against the circle. Trim off any excess bar.

The resulting modified turntable should look something like the turntable in Figure 2. It usually takes about six hours to repair both sides of the circle. Iosco county has been making this repair for well over a year and is very happy with the results. For further details or discussion contact Kevin Meske at 989-362-4433 extension 14.

Figure 3. Turntable circle with hanging plate and block. The notches in the turntable circle accelerate wear on the hanging plate and block, causing the bolts to loosen, leading to possible binding or loosening of the circle.



Snow Plow Safety Tips

Contributed by the Rhode Island LTAP.

It's almost plowing season (at least in the UP), and time to think about what it takes to be safe while getting your job done. Driving a snow plow is hard work. It requires driving for long hours in conditions that many other drivers consider too bad to go out in. While you are concerned with providing safe and clear travel for motorists, you must not overlook your own safety.



Here are a few tips to make snow plowing safer:

- Start work physically and mentally rested and properly clothed.
- Check all equipment before each use. Inspect the lights, brakes, windshield wipers, defroster, plow bolts and chains, spreader and auger, flares and other safety equipment.
- Know your route. Perform pre-storm route inspection observing landmarks and the locations of possible hazards (guardrails, curbs, railroad tracks, bridge joints, mailboxes, manhole covers, etc.) which may be hidden by falling or plowed snow.
- Choose the speed appropriate for conditions. Resist the urge to get the job done in a hurry.
- Be considerate of motorists having trouble driving in the snow. Keep your temper and patience when vehicles pass or tailgate.
- Be brief when using the radio. Report stranded motorists and other emergencies when possible.
- Observe all traffic laws and signal your intentions clearly. Always wear your seat belt.
- Before leaving the cab, set the brakes and disengage the power to the spreader and snowplow.
- Watch for signs of fatigue. Staring for hours at the driving snow can have a hypnotizing effect on drivers. The long hours and stress can take their toll as well. If you feel the onset of fatigue, take a short break – get out and walk around the truck and take some deep breaths.

Take care of yourself by observing these few tips and keep your shift a safe one.

LTAP Workshop Announcements

Michigan Seminar on Maintenance of Asphalt Pavements: What, Why, When and How

January 8 & 9, 2008, Mt. Pleasant, MI

Learn about the principles of asset management, the risks and payoffs of various maintenance treatments, and how to select a treatment. Technical sessions describe the types and applications of maintenance treatments, including:

- Seal Coat
- Slurry Seal and Micro
- Non Structural Overlay
- Fog Seal
- Crack Seal
- Whitetopping

The Transportation Asset Management Council will be providing some scholarships to public agencies.

Mark the Date: Michigan County Engineers Workshop

February 5-6, 2007, Marquette, MI

The 42nd Michigan County Engineers Workshop takes place in Marquette, and is followed by the UP Road Builders' Conference at the same facility.

The format is shortened by 1/2 day to allow attendance at both CEW and UP Road Builders, but we will still offer two half-day workshops on Tuesday, followed by the awards banquet, and a full day of presentations on Wednesday.

Make your reservations at the Marquette Holiday Inn and ask for the CEW group rate. The Holiday Inn's reservation desk number is 888-465-4329 or 906-225-1351.

Contact the Michigan LTAP office to sign up for these or other workshops.

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