

Technology Transfer



U.S. Department of Transportation
Federal Highway Administration



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A New Look for the Connecticut Road Master Program

Effective April 1, 2002, the Connecticut Road Master Program curriculum is being changed. These changes are being made to enhance the quality of the Road Master program and to enable you and your supervisors to make better choices about your individual training needs.

The following is a comparison of the current and revised programs. For your convenience, we have used italics to highlight the changes.

Current Program

7 Required Workshops

- Basics of a Good Road
- All About Asphalt
- Principles of Drainage for Local Roads
- On-the-Job Safety and OSHA Regulations for Local Road Personnel
- Work Zone Safety (CDI Interactive)
- Planning and Managing Local Road Snow & Ice
- Managing, Motivating and Communicating Your Way to Successful Supervision

2 Elective Workshops

You currently choose two (2) from the following list:

- Introduction to Microcomputers
- Managing the Small Highway Department
- Successful Budgeting
- Principles of a Road Maintenance Management System
- Principles of an Equipment Maintenance Management System

Here is a list of upcoming workshops, being offered in 2002 that will count toward the electives you need to graduate from the program:

- Chainsaw Safety — April 23rd - Storrs, CT
- Flagger Certification — June 25, 26, 27 in Storrs, CT
- Principles of a Road Maintenance Management System
- Surveying Methods for Local Roads

Even though the program is changing on April 1, 2002, we will allow any Technology Transfer workshops you have taken during 2002 to count toward your electives. We hope this will make this transition year an easy one for all of our participants. We are very excited about these changes and we feel they will have a positive impact on your future growth and development.

Don't hesitate to call the Technology Transfer Center at 860-486-5400 if you have any questions.

New Road Master Program

7 Required Workshops

- Basics of a Good Road
- All About Asphalt
- Principles of Drainage for Local Roads
- On-the-Job Safety and OSHA Regulations for Local Road Personnel
- Work Zone Safety (Full Day Workshop)
- Planning and Managing Local Road Snow & Ice
- Effective Communication Skills

2 Elective Workshops

You will choose two (2) workshops from any of the Technology Transfer workshops being offered during the time you are participating in the Road Master program. (Excluding those that are already on the required list and special events like the Technology Transfer Expo)

Minimum Maintained Retroreflectivity Guideline Status

Retroreflectivity is the property of a material that returns light to the source. In the case of roadways at night, retroreflective materials may be traffic signs and pavement markings and the source is usually the headlights of a vehicle. Because a driver's eyes are close to a vehicle's headlights, some of the light returned from retroreflective materials reaches the driver's eyes. The amount of light from an object reaching the driver's eyes will have a great impact on how bright that object appears to the driver. Therefore, retroreflective materials that are efficient in returning light to a driver's eyes may appear brighter to the driver than materials that are not as efficient.

This is important because traffic engineers use signs and markings to communicate important information to drivers. At night, if the signs and markings are not illuminated by other means, the retroreflective characteristics are important to increase the chance that a driver receives the information.

There are two basic technologies that make retroreflectivity possible. The first uses very small round glass beads. These tiny glass spheres are applied to white and yellow paints, thermoplastics, epoxies, and other binders to make pavement marking materials retroreflective. Smaller glass spheres are manufactured into sheeting which is then applied to signs and other traffic control devices to make them retroreflective. The second basic technology uses prismatic reflectors consisting of cube-corner elements manufactured into sheeting material that is applied to signs and roadway channelizing devices.

The retroreflective characteristics of traffic control devices gradually deteriorate over time. Because of this, it is important to replace traffic control devices prior to the time when they no longer meet the needs of the nighttime driver.

A major question is not whether the devices should be replaced, but when. How do we know when the device no

longer meets the needs of the driver? FHWA is attempting to establish guidance for public agencies to determine the appropriate level of retroreflectivity needed by nighttime drivers.

In the 1993 Transportation Appropriations Act, Congress included the statement, "The Secretary of Transportation shall revise the Manual on Uniform Traffic Control Devices to include a standard for a minimum level of retroreflectivity that must be maintained for pavement markings and signs, which shall apply to all roads open to public travel." Section 2A.09 in the Millennium edition of the MUTCD is reserved for that purpose. New retroreflectivity guidelines will be added to the MUTCD as an addendum to Section 2A.09 at a later date. The MUTCD 2000 states "Regulatory, warning, and guide signs shall be retroreflective or illuminated to show the same shape and similar color by both day and night, unless specifically stated otherwise in the text discussion in the Manual of a particular sign or group of signs." It also states "Markings that must be visible at night shall be retroreflective unless ambient illumination assures that the markings are adequately visible. All markings on Interstate highway shall be retroreflective." These standards have remained essentially unchanged for 45 years.

Current Activities

Several retroreflectivity projects are currently underway, including the following.

FHWA Resource Centers are demonstrating the Sign Management and Retroreflectivity Tracking System (SMARTS), a mobile system that can measure sign retroreflectivity at highway speeds while collecting sign inventory data.

The FHWA All-Weather Pavement Marking Study report is being revised and should be available soon.

In 1999, the Highway Innovative Technology Evaluation Center (HITEC) evaluated six pavement marking

retroreflectometers and began evaluation of six sign retroreflectometers last year. Reports on the pavement marking retroreflectometers are currently available and reports on the sign retroreflectometers should be ready for release in the fall.

There are currently no traceable methods in the United States to determine the accuracy of retroreflectivity measurements because national calibration standards for retroreflectivity do not exist. National Cooperative Highway Research Program (NCHRP) Project 5-16, *National Calibration Standards for Measuring Retroreflectivity*, has been initiated to develop a dedicated reference instrument to provide retroreflectivity standards, thereby improving the accuracy of measurements made by other instruments. The research is expected to be completed in the summer of 2004.

NCHRP Project 4-29, *Selection of Materials to Optimize Sign Performance*, has been initiated with the objective to develop a simple, user-friendly decision-making tool that will aid transportation agencies in the selection of retroreflective materials for traffic signs, based on roadway conditions and other factors that most critically affect sign performance. The research is expected to be complete in the summer of 2003.

FHWA has funded a sign retroreflectivity value validation analysis by Texas Transportation Institute (TTI) to analyze the previous research recommended values issued by FHWA and propose changes, if necessary, due to new sign materials, changes in headlights, more advanced analysis tools, and improved knowledge about driver visibility needs. FHWA has also funded a project by TTI to develop and conduct "Train-the-Trainer" workshops for minimum sign and pavement marking retroreflectivity. The workshop is expected to be a model that the LTAP/Technology Transfer Centers can use to train local agencies.

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Electronic Tools for Sign Management: Are They for You?

Some local transportation agencies use manual, or paper-based, systems for managing information about their traffic control devices. Many agencies, however, have switched to electronic, or computer-based, sign management systems. Would such a switch benefit your agency?

Advantages of Electronic Systems

Manual systems are basically paper records of an agency's sign inventory. Such systems may be adequate for agencies with small inventories. However, electronic systems help agencies with larger inventories manage their signs and other traffic control devices more aggressively and efficiently.

With electronic systems, sign inventory data are stored in a computer database and can be quickly accessed in a variety of ways. Staff responsible for signs can sort the inventory by kind (stop, yield, etc.), location (geographic coordinates and/or address), date purchased/installed/maintained/replaced, material, or other sign characteristics.

This sorting capability allows staff to, for example:

- schedule maintenance/replacement activities based on any of several characteristics, like age of the signs
- locate and schedule the replacement of signs made of materials that no longer meet Manual on Uniform Traffic Control Devices (MUTCD) recommendations
- generate replacement cost estimates and other electronic reports

- generate a list of all traffic control devices at a particular intersection or problem location
- identify high vandalism locations and trends

An engineer or technician working with signs in the field can access and update the electronic files using a portable computer, not only saving time and effort, but also ensuring the system is immediately and continuously up-to-date.

Choosing the Right Software

Good basic sign management system software includes the following features:

- user friendly interface
- easy data entry, retrieval, and sorting
- ability to import, export, and share data with other management systems and other software (like accounting software)

An effective system also allows an agency to document sign inspection and maintenance activities and provides a means of tracking signs from purchase through maintenance activities and replacement.

Some sign management software can be linked to geographic information systems (GIS) software packages and a base map, allowing users to locate signs efficiently on a map.

Enhanced (and usually more expensive) software are

packages may include features such as photographs of traffic control devices.

The FHWA is encouraging agencies' transition to sign management software by offering a free package, Sign Inventory Management System (SIMS), developed by the New Hampshire Technology Transfer Center and available through the Connecticut Technology Transfer Center.

Getting Started

After selecting software, implement your electronic system by:

- collecting sign inventory data
- entering the data into the sign management system
- updating the data regularly

Some data may already exist on a paper inventory, but very likely staff will have to collect additional data. Where no written inventory exists, the price for information gathering can run from \$3 to \$5 a sign. Collecting data, therefore, can be the most costly part of establishing an electronic sign management system.

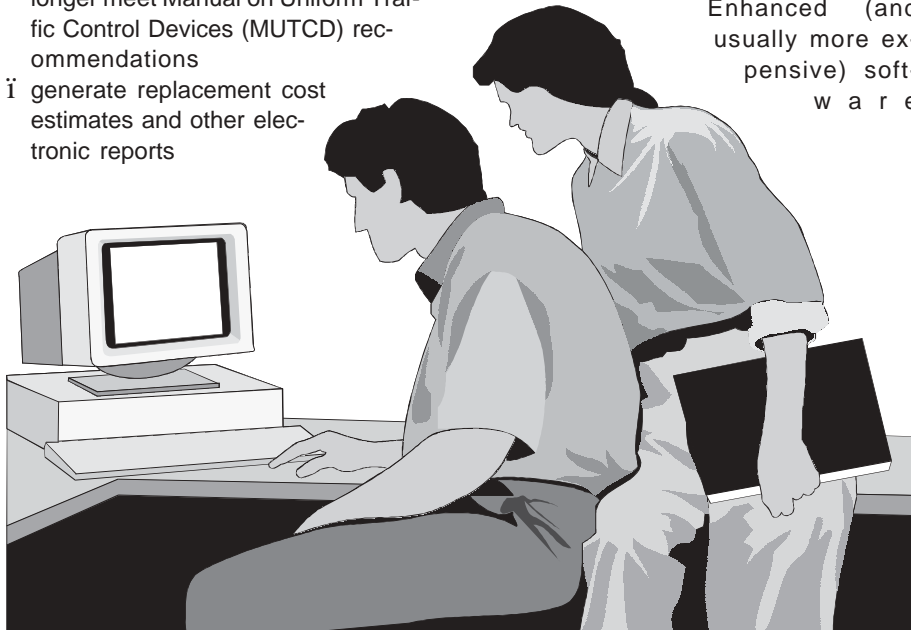
Between purchasing software and collecting and entering data into the system, getting an electronic system up and running can be expensive. However, the ability to update data quickly and track and manage the inventory proactively can make the investment worthwhile.

The ultimate purpose for using electronic sign management systems, of course, is to improve traffic control signage and thereby increase road user convenience, reduce crashes, and limit agency exposure to tort liability. Sign management staff must evaluate the benefit/cost of implementing such a system in their own jurisdiction.

For More Information

To find out more about sign management systems or to obtain a copy of the free SIMS software, contact the Connecticut Technology Transfer Center by phone at 860-486-5400, by fax at 860-486-2399, or through the Connecticut Transportation Institute's web site at www.cti.uconn.edu

From *Technology News*, Iowa Local Technical Assistance Program, December 2001.



RETROREFLECTIVITY

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Rulemaking Status

FHWA plans to draft sign retroreflectivity guideline rulemaking for the Federal Register after reviewing the American Association of State Highway and Transportation Officials (AASHTO) resolution and other input it receives. This rulemaking will only address sign retroreflectivity. Rulemaking on pavement markings will follow at a later date after research is complete and AASHTO has provided a recommendation dealing with pavement markings. FHWA's rulemaking will allow all interested parties to comment on proposed guidelines.

Excerpted from information provided on the FHWA Safety CBU web site at safety.fhwa.dot.gov/fourthlevel/retrost.htm



FHWA's SMARTS Van. See it at our Technology Transfer Expo, September 18 at the University of Connecticut in Storrs

Sign Inventory Management System (SIMS)

The Sign Inventory Management System (SIMS) provides effective computer-based electronic sign management. The management system is easy to understand and the software is easy to use.

SIMS has three guiding principles:

1. The most important responsibility of a government entity that maintains roads is to ensure that motorists can safely travel on its roadways.
2. Effective management of traffic signs is essential to ensure motorist safety.
3. Effective maintenance is the best defense against claims involving traffic signs.

The management system and its supporting software contain the following components to help highway agencies effectively manage their traffic signs:

i Inventory. Record data about each sign: its type, location, construction, and support. Users enter sign types using MUTCD designations for signs commonly found on local roads.

i Condition Assessment and Repair Decisions. Sign, support, and obstruction condition are assessed in terms of required action. Signs are also assessed on conformance to applicable regulations. Users assess conditions simultaneously with inventory data collection.

i Priority Analysis. SIMS enables correction of the most serious threats to motorist safety before the least important. SIMS priority-setting involves two variables: the worst condition (sign, support, or obstruction) and the sign's function relative to motorist and pedestrian safety. Users can modify the default condition and function values.

i Initiate Repair Action. Users can, using tools in the software, identify specific work items and schedule repair and maintenance.

i Record Actions. Users can document actions through SIMS work orders, which enables sign maintenance budget preparation. SIMS also includes an alert log to record citizen, police, and other reports of missing or damaged

signs and to generate a work order for repair. Both work orders and the alert log record actions to defend a highway department in a liability claim.

i Parts Management. SIMS enables users to keep track of parts-on-hand, to know when parts should be reordered, and to update records when parts are received.

Users can apply retroreflectivity measurements, record reflectance readings and make decisions about sign condition. Plans for future versions include direct recording of readings and applicable condition.

With the SIMS software, users can organize and access the data by index, find, and query software tools, which will generate customized reports.

From information on the New Hampshire Technology Transfer Center web site at www.t2.unh.edu/pwms/sims.html

Celebrate National Transportation Week May 12-18, 2002

Each year the nation sets aside a week to highlight the importance of transportation and honor those who work in it. National Transportation Week (NTW) is an opportunity to showcase the many contributions that our transportation systems make to our economic well being, quality of life, and national security, and to emphasize the exciting career opportunities within the transportation industry.

Over the years the range and intensity of NTW activities has grown substantially, which is impressive considering that virtually all of the work that has gone into organizing events has been done by volunteers. That is fitting, since NTW started as a volunteer effort.

In 1952, a \$500 scholarship was established, to be given to a student at the University of Houston for the study of transportation. When no one applied, Charlotte Woods and the Women's Transportation Club decided to remedy the situation. They made inquiries to see if a day, week or month was set aside

to honor the transportation industry. Finding nothing they decided to do something. They organized the first NTW observance in Houston in 1953. After contacting other Texas cities and towns, nine additional communities observed Texas Transportation Week in 1954.

At the 1954 Education Congress of Traffic Clubs International (TCI), Charlotte Woods was elected to her first term as director of TCI. During her tenure she sold the membership on the idea of sponsoring National Transportation Week.

In 1962, President John F. Kennedy declared that National Transportation Week would always include the third Friday in May and the following Sunday and Maritime Day. Since his declaration, NTW has enjoyed a permanent place on the national calendar every third week in May.

Today, transportation organizations across the country celebrate the role our transportation systems have played

in the security and development of our nation.

Whether your organization has five employees or 500, you can participate in NTW activities. This could involve:

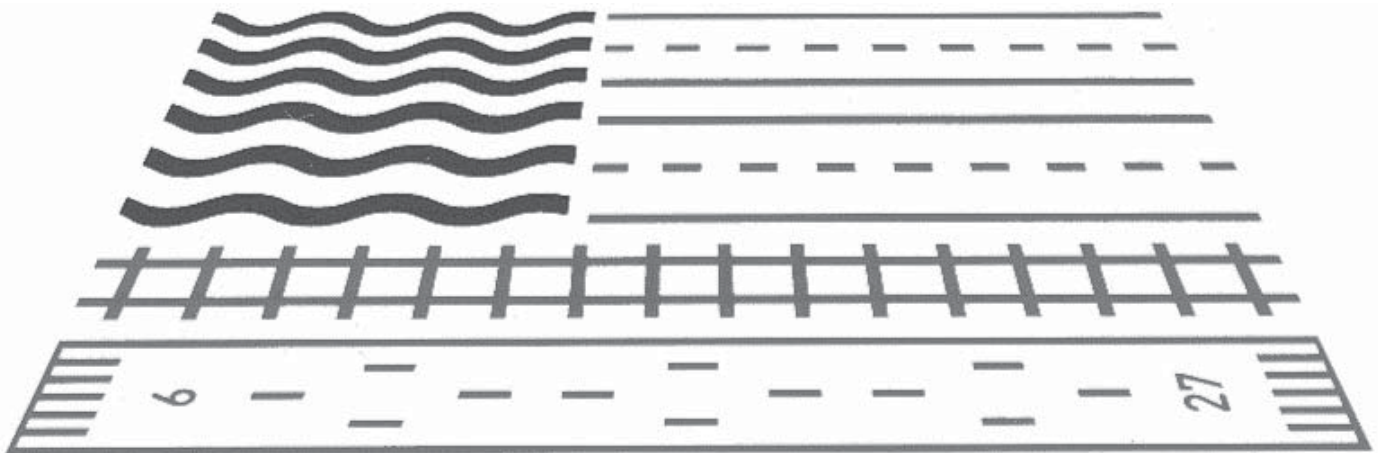
- i talking to students about transportation careers
- i organizing a civic function recognizing NTW and transportation's role within your community
- i promoting NTW at a conference
- i incorporating NTW material in an exhibit
- i supporting one of NTW's national activities
- i adding a www.ntweek.org link to your organization's web site

It's up to you.

For more information including sample activities, promotional materials, and talking points, visit the NTW web site at www.ntweek.org

Excerpted from *National Transportation Week* brochure, 2001.

It Keeps America Moving!



National Transportation Week

Check Out What's On Line for You

Electronic versions of the Millennium Edition of *Standard Highway Signs* as well as the Millennium Edition of the *Manual on Uniform Traffic Control Devices* are now available on the Federal Highway Administration's MUTCD web site at mutcd.fhwa.dot.gov

The latest performance evaluations of new products and technologies designed for the highway community, including pavement marking reflectometers, are available on the Highway Innovative Technology Evaluation Center web site at www.cerf.org/hitec

The Federal Highway Administration's 1997 Summary Report on *Minimum Sign Retroreflective Guidelines* is available in PDF at safety.fhwa.dot.gov/fourthlevel/pdf/RetroRef_Guide.pdf and in HTML at www.tfhr.gov/humanfac/rd97-074.htm

The Federal Highway Administration's guide on *Maintenance of Signs and Sign Supports for Local Roads and Streets* is available in PDF at safety.fhwa.dot.gov/media/pdf/sign_support.pdf and in HTML at safety.fhwa.dot.gov/media/sign_support.htm

Our New MUTCD Loan Program

The Connecticut Technology Transfer Center is pleased to announce that we have several copies of the Millennium Edition of the Manual of Uniform Traffic Control Devices (MUTCD 2000) available for loan to Connecticut's municipalities.

Through the loan program, borrowers can use the convenient loose-leaf binder version of the MUTCD 2000 on a temporary basis and examine the new format and revisions.

If you would like to receive additional information on the program or borrow a copy of the Manual for a renewable three-week loan period, please contact Stephanie Merrill by phone: 860-486-5400 or e-mail: smerrall@engr.uconn.edu.

From Our Resource Library

To request any of the following materials, please contact us by phone at 860-486-5400, by fax at 860-486-2399, or use our new on-line information request form at www.cti.uconn.edu/ti/Technology/Info_request.htm. Publications are free while supplies last. Videotapes may be borrowed free of charge for two weeks.

PUBLICATION

Retroreflective Sheeting Identification Guide, Federal Highway Administration Safety Core Business Unit.

This double-sided laminated chart depicts all retroreflective sheeting types current as of November 2001.

VIDEOTAPES

Night Lights: How Retroreflectivity Makes Our Roads Safer, Federal Highway Administration and American Traffic Safety Services Association, 10 minutes.

This video takes a non-technical look at how retroreflectivity saves lives. A range of driving scenarios is presented

to help illustrate the necessity of this important roadway feature. The video is an ideal educational tool for use with local community groups and law enforcement and emergency assistance agencies.

Sign Maintenance and Installation, Federal Highway Administration, 27 minutes.

This video emphasizes how proper sign installation and maintenance programs can create safer driving conditions and help agencies defend themselves against tort liability. The video describes a procedure for keeping track

of signs and setting maintenance priorities, proper use of traffic control devices, and typical field installations.

Traffic Sign Inspection and Maintenance, Federal Highway Administration and International Road Federation, 21 minutes.

This videotape covers sign maintenance facilities, field equipment, and materials. It also discusses how to measure whether signs are performing at the proper level and describes a sign inventory system and an inspection program.

Conference Calendar

Basics of a Good Road

A Connecticut Road Master Program Required Workshop

ï June 11 in Storrs ï June 12 in Stamford ï June 13 in Hartford

Contact the Connecticut Transportation Institute, phone 860-486-1384

Flagger Certification

ï June 25 in Storrs ï June 26 in Storrs ï June 27 in Storrs

Contact the Connecticut Transportation Institute, phone 860-486-1384

All About Asphalt Pavements

A Connecticut Road Master Program Required Workshop

ï July 23 in Hartford ï July 24 in Storrs ï July 25 in Torrington

Contact the Connecticut Transportation Institute, phone 860-486-1384

Principles of a Road Maintenance Management System

A Connecticut Road Master Program Elective Workshop

ï August 13-14 in Hartford ï August 15-16 in Hartford

Contact the Connecticut Transportation Institute, phone 860-486-1384

**Take advantage of our on-line workshop registration form at
www.cti.uconn.edu/ti/Technology/Registration.htm**

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