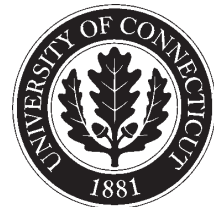


Technology Transfer



U.S. Department of Transportation
Federal Highway Administration

Vol. 19 No. 2

August 2002

Technology Transfer EXPO 2002: Bigger and Better than Ever

Join us for Technology Transfer EXPO 2002 on September 18 at the University of Connecticut's Depot Campus in Storrs, from 9:00 a.m. until 3:00 p.m., rain or shine. The Connecticut Technology Transfer Center is pleased to once again be hosting this annual outdoor exposition with the Connecticut Highway Street Supervisor Association.

With more vendors, more demonstrations, and more educational displays than ever before, this year's event promises to be an exceptional opportunity to learn more about the public works products, services and resources you need.

Participating vendors, public service agencies and professional organizations that will be represented include:

- 3M Traffic Control Materials Division
- Advanced Drainage Systems, Inc.
- Atlantic Broom Service, Inc.
- Bacher Corp. of Connecticut
- BART Truck Equipment Co., Inc.
- Bear Com
- Bobcat of Connecticut, Inc.
- C.N. Wood of Connecticut, LLC
- Carey Wiping Materials Corp.
- Connecticut Construction Industries Association (CCIA)
- Connecticut Highway Street Supervisor Association (CHSSA)
- Connecticut Department of Transportation
- Connecticut Technology Transfer Center
- Connecticut Transportation Institute
- Devine Hydraulics, Inc.
- DPP Associates
- East Coast Sign & Supply, Inc.
- East PBE, Inc.
- EPPCO
- Federal Highway Administration, Connecticut Division
- Flint Trading
- Franklin Paint Co., Inc.
- Freightliner of Hartford, Inc.
- Garrity Asphalt Reclaiming
- Genalco, Inc.
- Gorman Bros., Inc.
- H.O. Penn
- Hudson Liquid Asphalt Company
- Industrial Safety & Supply
- Jamieson Distributors, Inc.
- Kahn Tractor & Equipment, Inc.
- Marcus
- Nicard Enterprises, LLC
- New York Bituminous Products
- Occupational Safety and Health Administration (OSHA)
- R.W. Thompson Co., Inc.
- Reed Systems, Ltd.
- Rock Rubber & Supply, Inc.
- S & D Supply, LLC
- SEACO
- Signal 54 Training
- Superior Equipment and Supplies
- T.T. Technologies, Inc.
- The W.I. Clark Company
- Traffic Safety & Signs, Inc.
- Tri-County Contractors' Supply, Inc.
- Tyler Equipment
- United Rentals
- Vermeer Northeast
- W.H. Rose, Inc.

The Expo will also include more entertaining opportunities to show off your expertise and to learn by doing. This year's skills competition will consist of a public works challenge, open to municipal employees only, where contestants will be required to demonstrate proficiency in several different areas. The T²/CHSSA Expo Challenge will include the ever-popular backhoe competition as well as many other routine tasks that maintenance staff face daily. Prizes will be awarded to the top three overall challenge winners.

Technology Transfer EXPO 2002 is free and open to all. For complimentary tickets, please contact the Connecticut Technology Transfer Center by calling 860-486-5400.



**There's still time to register for the
T²/CHSSA Expo Challenge.
Please call Mary McCarthy at 860-486-1384.**

By the Way...

*Donna Shea, Director
Technology Transfer Center*



Connecticut Construction Career Day

The event will be held from 9:00 a.m. to 1:00 p.m. at the Mountainside Recreational Facility in Wallingford. This event is a unique partnership between government, labor, and business to expose high school age youth to opportunities in the construction industry.

Since March 1999, 61,162 students have participated in these events nationally. In Connecticut, we expect to have 1,200 students participate over the two-day event. The Connecticut Construction Career Day is being sponsored by the Connecticut Department of Transportation, Federal Highway Administration, Connecticut Construction Industries Associa-

tion, Connecticut Technology Transfer Center, Connecticut Bituminous Concrete Producers Association, and several Connecticut trade unions.

The program will include interactive exhibits, trade industry displays, and demonstration projects—all requiring student involvement.

Supervised by construction professionals, students may participate in hands-on activities, including operating heavy equipment such as bulldozers, excavators and rollers.

Skilled trades people will demonstrate crafts such as bricklaying, concrete finish-

ing, welding, plumbing, electrical installation, materials testing and pipe laying. Technology-based careers associated with construction such as architecture, engineering, estimating and surveying will also be represented.

Jeff Cathcart, Coordinator of the Rhode Island Construction Career Days says, "Students who come to Construction Career Days can expect to spend the day learning by doing—there is no better way to experience what a typical day is like in the construction industry than getting a little dirt under your fingernails and some concrete on your jeans."

The Connecticut Technology Transfer Center is very proud to be a part of this effort and we look forward to a successful first Construction Career Day.

The future of Connecticut's
construction industry
depends on them.

Two Dates:
October 8, 2002 and
October 9, 2002
(a two-day event)

Mountainside
Recreation Facility
Wallingford, CT

9:00 am - 1:00 pm

Connecticut's
landscape is their future...
Be a part of our Career Day
program!

Construction CareerDays

Technology Transfer

Published by the:
**Connecticut Transportation Institute
Technology Transfer Center**

Phone: 860-486-5400

Fax: 860-486-2399

Web: www.cti.uconn.edu

Supported through a cooperative effort of the Connecticut Department of Transportation and the Federal Highway Administration's Local Technical Assistance Program (LTAP) to provide information on the latest transportation technology to Connecticut's state and local government officials.

Director

Donna Shea (shea@enr.uconn.edu)

Web Master

Deborah Barrett (dbarrett@enr.uconn.edu)

Workshop Coordinator

Mary McCarthy (mary.c.mccarthy@uconn.edu)

Information Services Coordinator/Editor

Stephanie Merrall (smerrall@enr.uconn.edu)

Intersection Safety: Myth versus Reality

Traffic engineering decisions about intersection safety are often the product of factors and relationships that are more complex than the casual observer may realize. In many cases, evaluating potential solutions to crash or violation problems may reveal aspects of intersection safety and efficiency that are in conflict with one another. In reality, traffic engineers must always consider a balance between managing safety and improving intersection operations before making their final choice for intersection control.

The driving public has developed a number of misconceptions about traffic control solutions over the years. The following information attempts to expose some of those myths and shed light on the rationale behind certain traffic control decisions.

MYTH 1

Installing signals always makes intersections safer.

Reality

The installation of unwarranted signals, or signals that operate improperly, can create situations where overall intersection congestion is increased, which in turn can create aggressive driving behavior.

When more complex signal phasing causes longer waiting times at intersections, both drivers and pedestrians tend to become impatient and violate red lights, or drivers are tempted to cut through neighborhood streets. This subjects local residents to a greater risk of collisions, worse congestion and more air and noise pollution.

Clearly traffic diversion to side streets is an undesirable side effect of long cycle lengths and congestion. This diverted traffic may increase risk on the side streets, but the cause of this increased safety risk should not be attributed to the new signal.

Additional traffic safety measures are sometimes necessary to offset increased traffic and speeding through neighborhood streets. One way of improving waiting times at an intersection with a new signal is to make sure the minor street waiting times are less than they were before installation of the signal. This improvement will encourage motorists to use signals on main roads instead of neighborhood streets.

On occasion, other traffic control options, such as stop control or the introduction of roundabouts can perform as well as, or even better than, signals in managing both vehicle and pedestrian traffic safety at intersections. This is particularly true when signals are inappropriately placed at locations where traffic volume is relatively low. Intersections with signals that have very low traffic volumes tend to tempt drivers and pedestrians to violate that red light.

MYTH 2

Having a stop sign is always better than no stop sign, OR, more stop signs are always safer than fewer stop signs.

Reality

Unwarranted stop signs create problems at both the intersection and along the roadway by:

- Encouraging motorists to drive faster between intersections in order to save time. Placing stop signs on every low-volume local street promotes speeding between the stop signs as drivers try to offset the delays caused by stopping at every intersection;
- Encouraging violation of traffic laws. As the number of stop signs increase so that nearly every intersection has one, the rate of stop sign violations tends to increase;
- Encouraging the use of alternate routes. Placing too many stop signs in some areas often causes traffic to use other neighborhood routes to avoid a sequence of intersections that may be controlled by stop signs; and
- Increasing the chance that drivers will disregard conflicting vehicle and pedestrian traffic, which raises the risk of collisions.

There is no evidence to indicate that stop signs decrease the overall speed of traffic. Impatient drivers view the additional delay caused by unwarranted stop signs as "lost time" to be made up by driving at higher speeds between stop signs.

Unwarranted stop signs breed contempt in motorists who tend to ignore them or only slow down without stopping. This can sometimes lead to tragic consequences.

Stop signs should never be installed as a routine, cure-all approach to curtail

speeding, prevent collisions at intersections, or discourage traffic from entering a neighborhood. Stop signs should be installed only after an engineering study determines that there is a need. Stop signs are not a solution to intersection safety problems caused by poor sight distances and deficient road design.

MYTH 3

Installing stop signs on all approaches (four-way stop) to an intersection will always result in fewer accidents.

Reality

Four-way stop signs do not necessarily improve pedestrian or vehicle safety. In fact, pedestrians in stop sign-congested neighborhoods often have a false sense of security about crossing local streets with four-way stop signs. The application of traffic control devices, to the casual observer, often creates this sense of security, but in reality may actually increase safety risk. If control devices are improperly applied, they can create confusion between the pedestrian and the driver as to who has the right-of-way, thereby increasing the risk that one of the two will make an improper decision resulting in serious consequences.

Placing four-way stop signs on roads of very unequal design, speed and traffic volume will tend to promote stop-sign violations by drivers, especially on main roads. Driver expectancies are violated in situations like this and when this occurs, improper actions result that can increase safety risk at intersections.

Placing four-way stop signs at every intersection where there were formerly only two-way stop signs also usually increases congestion. Four-way stop signs should only be considered after an engineering study and a capacity analysis are performed.

Generally, every state requires the installation of traffic control devices, including stop signs, to meet state standards of the department of transportation.

The state standards are based on the *Manual on Uniform Traffic Control Devices* (MUTCD). The MUTCD is the national standard for traffic control devices. It prescribes standards for the design, location, use and operation of traffic control devices.

An on-line downloadable version of the MUTCD is located at the FHWA web site mutcd.fhwa.dot.gov. Loan copies of the MUTCD are also available from the Connecticut Technology Transfer Center. If you would like to borrow the manual, please call the Center at 860-486-5400.

MYTH 4
Signals are always better than stop signs.

Reality

Installing stop signs instead of signals when there is no intersection traffic control, increasing the size or visibility of existing stop signs, or placing them in a better location often increases both vehicle

and pedestrian safety without the initial expense and later maintenance costs of signals. While waiting for signals to qualify for installation, the substantial amount of money saved can be used to make roads safer.

From "Intersection Safety Briefing Sheet No. 10," Federal Highway Administration, 2002.

Basic Countermeasures to Make Intersections Safer

Collisions occur at intersections because motor vehicles are in conflict with each other when crossing or turning in traffic. Improving the engineering of intersections is the first step toward reducing accidents because vehicle conflicts—combined with flawed highway or street design and poor signage—often result in collisions of vehicles with roadside objects, pedestrians and other vehicles.

Types of Collisions at Intersections

There are four major types of vehicle crashes at intersections.

Crossing collisions are when one vehicle strikes the side of another; these are the most severe types of crashes. They can result from vehicles attempting to drive straight through or turning within an intersection.

Rear-end collisions are common at intersections. They can be the result of poor street design or inadequate traffic engineering measures; but usually are the result of dangerous driver behavior, such as speeding, following too closely, and braking too late.

Vehicles changing lanes improperly or crossing a road's center line are less common at intersections than crossing and rear-end collisions.

Pedestrian and bicycle collisions occur most frequently in urban areas, particularly with older and younger age groups. In 2000, 34 percent of pedestrian deaths among people aged 65 and older, and 10 percent of pedestrian deaths among children age four and younger occurred at intersections. Only two percent of motor vehicle-related deaths involved bicyclists, but 33 percent of these deaths occurred in intersections. ¹

Intersection Crashes have Multiple Causes

Poor physical design of both the intersections and their approach roadways. A major aspect of safety design is restricted sight distances. With restricted sight distances, drivers do not have enough time to stop or avoid hitting a pedestrian or another vehicle.

Inadequate traffic engineering. In some cases, traffic control devices—such as signs—are improperly used, placed in the wrong locations, too small to be seen, or have suffered damage or deterioration. In other instances, the growing number of cars on the road has outpaced what used to be acceptable traffic engineering measures.

Driver licensing and education often fails to train drivers to safely negotiate intersections. Some drivers do not know the basic traffic laws, they fail to understand

what certain signs and pavement markings mean, or they do not respect the rights and safety needs of pedestrians.²

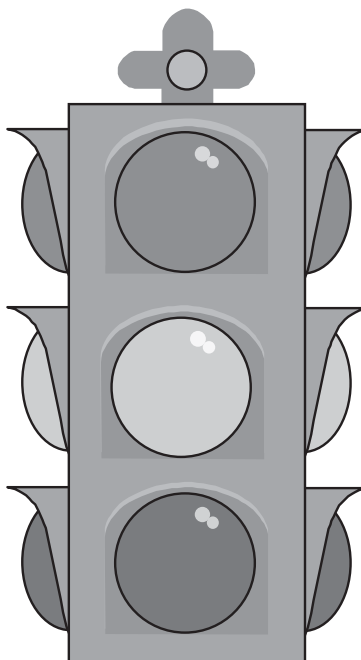
Drivers disregard traffic control at intersections. Even knowledgeable drivers sometimes disregard the clear messages of traffic control devices—including stop signs, signals and pavement markings—and repeatedly violate traffic laws. Combined with speeding, disregard for traffic control at intersections is a major source of serious crashes. Driver distractions, such as cell phone use and inattention and drug and alcohol use, are additional human factors that cause accidents with death and injuries.

Countermeasures to Improve Intersection Safety

Safety problems must be identified by an engineering review. The most important thing to remember when improving safety at intersections is that countermeasures that improve vehicle traffic flow or reduce vehicle crashes should not compromise pedestrian safety. There are three strategic decisions to consider when improving intersection safety design and operation:

- Eliminate vehicle and pedestrian conflicts when possible;
- When not possible, reduce unavoidable vehicle and pedestrian conflicts to lower the chances for collisions; and
- Design intersections so that when collisions do occur, they are not as severe.

Traffic engineering strategies to improve movement of vehicles and pedestrians are crucial to improving intersection safety. These consist of a wide range of devices and operational changes such as:



- **Addition of turn lanes at intersections.**

Turn lanes are used to separate turning traffic from through traffic. Studies have shown that providing turn lanes for left-turning vehicles can reduce accidents by about 32 percent. Personal injury accidents involving left-turning vehicles can be decreased by as much as 50 percent. Separating right-turning vehicles from other vehicles can significantly affect operations at an intersection. By adding a separate right-turn lane at an intersection with a signal, the delay experienced by drivers on an approach can be reduced. At intersections without a signal, right-turn lanes can safely remove turning vehicles that are slowing down in through traffic lanes. Turn lanes at major driveways can also improve safety, especially on high-volume or high-speed roadways.

- **Signals.** Increase the size of signal heads from 8 to 12 inches to increase their visibility; provide separate signals over each lane; install higher intensity signal lenses; and change the length of signal cycles, including the yellow clearance interval and the all-red phases.

- **Non-traditional intersection design.** Consideration of non-traditional intersection designs such as roundabouts or traffic circles.

- **Pavement condition.** Upgrade pavement quality to better drain the road and resist skidding.

- **Improve drivers' sight distance.** Restrict parking near intersections and move stop lines back from intersections.

- **Upgrade and supplement signs.** Enforcing laws that prohibit dangerous intersection driving is a necessity to even well-designed and regulated intersections. Enforcement must be consistent because motorists who tend to violate traffic control are aware that the chances of receiving a citation are low. Sustained enforcement efforts have been proven to lower both intersection violations and crash rates, sometimes to a dramatic extent.

¹ FARS, 2002

² Federal Highway Administration, "Stop Red Light Running Facts," May 2002

From "Intersection Safety Briefing Sheet No. 2," Federal Highway Administration, 2002.

About the Intersection Safety Briefing Sheets

The Federal Highway Administration, in cooperation with Advocates for Highway Safety and the Institute of Transportation Engineers, has developed a toolkit containing a series of briefing sheets on various intersection safety-related topics.

The purpose of the toolkit is to enhance communications with the media, decision-makers, the general public and others about intersection safety. The primary audiences are decision makers and officials who are called upon to comment or make decisions on intersection issues, including:

- Chief Administrative Officers of departments of transportation;
- Mayors and other local officials;
- Traffic and safety engineers at the federal, state and local levels; and
- Law enforcement officers, predominantly at state and local levels.

The briefing sheets could also be used by a far wider audience or people and organizations who want to promote intersection safety within their area of influence.

The topical areas that are included within the intersection safety communications toolkit include:

- The National Intersection Safety Problem
- Basic Countermeasures to Make Intersections Safer
- Pedestrian Safety at Intersections
- Human-Factors Issues in Intersection Safety
- Intersection Safety Enforcement
- Traffic Control Devices: Uses and Misuses
- Red-Light-Running Issues
- Red-Light Cameras
- Workzone Intersection Safety
- Intersection Safety: Myth versus Reality
- Intersection Safety Resources

The intersection safety briefing sheets are available in print form from the Connecticut Technology Transfer Center (contact us by phone: 860-486-5400, fax: 860-486-2399, or use the enclosed form or our on-line information request form at www.cti.uconn.edu/Technology/Info_request.htm). They are also available in electronic format from the Federal Highway Administration web site at safety.fhwa.dot.gov/fourthlevel/interbriefing and from the Institute of Transportation Engineers web site at www.ite.org. The briefing sheets are available for other organizations to use and post on their web sites. The goal is to provide this information to the widest audience possible within the education, law enforcement, and engineering communities and to the general public.

Drive as Though Your Life Depends on Itó Observe Put the Brakes on Fatalities Day

October 10, 2002 is the second annual Put the Brakes on Fatalities Day. The campaign asks that we all focus on our own individual behavior when using America's roadway—as pedestrians, bicycle and motorcycle operators, motor vehicle operators and passengers. Everyone is urged to take an extra measure of care to ensure their safety and the safety of others by sharing roadways in a safe manner.

Traffic crashes cause an average of 115 fatalities every day—that's one death every 13 minutes. After a steady 20-year decline in the number of traffic fatalities, that number has stagnated at about 42,000 per year. While last year's campaign resulted in a 29% reduction in fatalities on October 10, 2001, we have to go further. Imagine a day with no traffic deaths, and put the brakes on fatalities!

The goal is to unite the country in achieving one full day of zero traffic deaths by encouraging the public to reduce the tragic toll of motor vehicle crashes by taking pro-active steps such as:



**DAY
OCTOBER 10, 2002**

- Driving as if your life depends on it—that means courteously and defensively
- Not driving while impaired, distracted or in an aggressive manner
- Buckling up on every trip, every time
- Using properly installed child safety seats for children age 8 and under
- Not speeding
- Slowing down to posted speed limits in construction zones

- Keeping vehicles and tires properly maintained
- Wearing appropriate protective gear when bicycling, skating or riding a motorcycle or scooter
- Always stopping, looking left, right, left before crossing streets
- Working with local officials to improve roadway safety

America's roadway system is among the world's best. Through the development of safer vehicles and specialized safety equipment, upgraded laws, better roadways, and educational programs to address safety behaviors, we have come a long way in reducing fatalities on the nation's roadways. But all of our progress in these areas can bring us just so far. In the end, each roadway user is the key to safety.

For additional information on how you can promote and observe Put the Brakes on Fatalities Day, visit the web site at: www.brakesonfatalities.org.

How to be a Master and a Scholar

If you are a Road Master Program graduate, beginning September 1, 2002 you will be eligible to participate in the Connecticut Technology Transfer Center's new Road Scholar Program.

The Road Scholar Program is a series of advanced training courses designed for individuals currently in, or interested in pursuing, supervisory positions.

In order to complete the certificate program, participants must attend the four required workshops—Supervisory Skills, Asset Management, Safety/Risk Management, and Communication Skills II—as well as two elective workshops that will be offered on various topics each year.

The first of our Road Scholar Program workshops will be a one-day course on Supervisory Skills, October 8 in Storrs, Connecticut. To register, call 860-486-5400 for a brochure or visit the Technology Transfer Center's Workshops Schedule page on our web site at www.cti.uconn.edu.

For more information regarding the Road Scholar Program, please call Mary McCarthy at 860-486-1384.



National Organization Honors State for Local Area Bridge Project

Last November, Connecticut received the State Award from the National Partnership for Highway Quality for the Thread City Crossing project in Windham, Connecticut.

Thread City Crossing, known locally as the Frog Bridge, is a four-lane structure over the Williamantic River. The new structure, which replaces an existing stone arch structure that was too narrow and had restricted vertical clearance, enables safer and more efficient traffic flow through the downtown historic area. Adorning the ends of the bridge are 10-foot bronze frogs inspired by a 350-year-old legend that gives the town its nickname "Frog City." The project was completed at a cost of \$14.6 million and nearly a year ahead of schedule.

The National Partnership for Highway Quality (NPHQ) is the successor name of the former National Quality Initiative. NPHQ is dedicated to continuous quality improvement in the planning, design, construction, and maintenance operations of the nation's highway. NPHQ is the only nationally formed organization

that combines public- and private-sector highway expertise to promote keeping the nation's highway system in the highest possible quality condition and to improve its safety and service to the public.

NPHQ award winners were selected on the basis of the following criteria: quality

process and results, customer focus, teamwork, innovation and value, and long-term improvement.

Excerpted from "Highway Quality Awards" article in *Public Roads*, Federal Highway Administration, March/April 2002.



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

Gravel Roads Maintenance and Design Manual, Federal Highway Administration Professional Development Services Business Unit.

This manual provides clear and helpful information for doing a better job of maintaining gravel roads. Presents guidelines to help answer questions about the maintenance of gravel roads. Designed for the benefit of elected officials, managers, and grader operators who are responsible for designing and maintaining gravel roads.

VIDEOTAPES

It's About Time: Traffic Signal Management – Cost Effective Street Capacity

and Safety, Federal Highway Administration Operations Core business Unit, 13 minutes.

This video demonstrates the importance and benefits of maintaining optimized and current traffic signal timing plans, and investing resources in traffic signal systems. Local officials describe the benefits of traffic signal management and improvements. Describes techniques used, types of signal systems and how to implement plans.

Road Maintenance Video Set, USDA Forest Service, 83 minutes total running time.

This is a five-part video series developed for USDA Forest Service equipment

operators. It focuses on environmentally sensitive ways of maintaining low volume roads.

- Video 1, *Forest Roads and the Environment* (16 minutes)
- Video 2, *Reading the Traveled Way* (18 minutes)
- Video 3, *Reading Beyond the Traveled Way* (17 minutes)
- Video 4, *Smoothing and Reshaping the Traveled Way* (16 minutes)
- Video 5, *Maintaining the Ditch and Surface Cross Drains* (18 minutes)

Conference/Event Calendar

T²/CHSSA Technology Transfer Expo 2002

• September 18 in Storrs

Surveying Methods for Local Roads

A Connecticut Road Master Program Elective Workshop

• September 24 in Storrs • September 25 in Storrs

Supervisory Skills

A Connecticut Road Scholar Program Required Workshop

(Preference will be given to individuals who have graduated from the Connecticut Road Master Program)

• October 8 in Storrs

Connecticut Construction Career Day

• October 8 in Wallingford • October 9 in Wallingford

Fundamentals of Analyzing and Solving Local Traffic Problems

A Connecticut Municipal Legal Traffic Authority Required Workshop

• October 15 in Stamford • October 16 in Hartford • October 17 in Storrs

Planning and Managing Local Road Snow and Ice Control Activities

A Connecticut Road Master Program Required Workshop

• November 4 in Storrs • November 5 in Storrs • November 6 in Hartford

For more information on these programs, call the Connecticut Transportation Institute at 860-486-1384.

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

STORRS, CT 06269-5202
BOX U-202
179 MIDDLE TURNPIKE

UNIVERSITY OF CONNECTICUT
Technology Transfer

CONNECTICUT TRANSPORTATION INSTITUTE

PRSR1 STD
U.S. POSTAGE PD.
PERMIT 37
WILLIMANTIC, CT
06226