NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

On the Move

on the web at www.nhdot.com

Winter 2005-2006

New Remote Weather Stations Promise More Timely and Accurate Information

Air and Pavement Data Will Help Decision-Making for Both Maintenance and Motorists

Knowledge is power, and that's especially true when applied to weather. The ability to get real time weather information above, on and below the ground is critical in highway maintenance when it comes to making the roads as safe as possible.

That's the idea behind the NH Department of Transportation's introduction of mini-weather stations across New Hampshire to provide the building blocks for a Road Weather Information System (RWIS). These "environmental sensor stations" to be strategically located along highways will include the hardware, software and communications equipment to provide such valuable meteorological information as soil, pavement and air temperatures, wind speed and direction, water vapor (dewpoints and relative humidity), and rain and snowfall.

This data collecting weather station at the Canterbury Rest Area on I-93 is one of 11 being installed across the state.

"The goal of the RWIS Program is to provide a better level of service to our customers - the motorists," says the NHDOT's Steve Gray, who is overseeing this special project. "Safety is certainly a major part of that level of service, along with protecting the environment through more informed decision-making about when and how much to apply anti-icing treatments."

The first stage of the RWIS network for New Hampshire is a $720,000 contract to buy, install and maintain 11 RWIS stations, including sites along the I-93 corridor (Salem, Derry, Canterbury, Sanbornton, Ashland, Woodstock, Littleton), I-89 (Springfield), NH 101 (Manchester), NH 112 (Woodstock) and NH 9 (Westmoreland).

Another ten sites are planned to complete the statewide network that also includes a site on NH 16 in Newington. Information collected at these sites from above and below-ground sensors will be transmitted to Highway Maintenance District Offices and the new State Transportation Management Center in Concord.

"The benefits of RWIS are not just real time," Steve Gray says. "This weather reporting system will give us a better handle on when a storm is going to start, what's its intensity, and when it's going to stop."

Plymouth State University is also actively involved in the project, contributing meterological advice for site location and $300,000 to the effort. PSU graduate students will use the data collected for developing forecasts and other weather-related applications.

"Within days, the Department of Transportation was reopening roads, reconnecting communities and giving people hope that recovery was on the way," Governor John Lynch said in his State of the State Address on January 18 about the response to the flooding that struck southwest New Hampshire in October 2005.

Sections of Route 123 in Alstead that were virtually destroyed by raging floodwaters were repaired and reopened to traffic before Christmas (left photo). This issue of the "On the Move" has detailed follow-up coverage of the devastating flooding and the NHDOT's major role in repairing that damage.

Commissioner's Corner

by

Carol A. Murray

Cameras Promise More Efficiency and Safety in Transportation

It is one of the biggest transportation questions facing America. In a country where the growth in the number of drivers and vehicles continues to far outpace new highway miles, how can you effectively address the growing congestion problems and safety issues on America's roadways?

Even a still relatively rural state like New Hampshire is not immune to this challenge. Major routes in the southern part of the state experience congestion during morning and afternoon commuting times. Some of these roads are exceeding their designed traffic capacities on a regular basis. The results are lost time, wasted fuel and less safe highways.

We can no longer simply build our way out of this problem. The one tool that will increasingly be considered for addressing congestion and improving everyone's ride is the development of "Intelligent Transportation Systems", advanced transportation technologies.

These technologies assist with a wide range of issues in such areas as traffic control, incident management, road and weather conditions, crash prevention and safety, traveler information, and electronic tolling, all in an effort to improve traffic safety and traffic flow.

A key component in the use of technology to improve transportation is the camera. Highway cameras provide vital information for decision-making and rapid response for such things as winter maintenance operations, responding to highway emergencies, and rerouting traffic. More and more motorists are relying on highway cameras featured on Department of Transportation websites nation-wide as a tool for ensuring a safe trip to work and back home.

A New Hampshire Department of Transportation informal survey of highway camera use in other states found some very positive experiences.

"The cameras are a lifesaver here in Virginia. They enable us to see accidents, incidents, and causes of backups on our interstates and help keep congestion to a minimum. With the cameras, not only can individuals make more intelligent decisions about their travels, but we as an agency can dispatch help more quickly to save lives and clear the roadway."

From Alaska: "Our travelers find them very useful in knowing the road conditions – ice, snow, earthquake faults, construction, etc."

In Oregon: "We've found the cameras very useful and well-liked and supported by the public. The only negative response is if any cameras go down. I get nasty e-mails from people saying they can't check traffic."

From Iowa: "While the majority of these cameras are in an urban setting, we are beginning to see the need and demand to expand into many of the rural parts of the state."

Many of the states share their video feeds with television stations for traffic reporting. All say they have strict policies for protecting privacy that include no archiving of the camera images, except in special circumstances. All report strong public support and widespread use of the service.

Cameras are already being introduced on New Hampshire's roadways and bridges. They assist with operations and surveillance on bridges, and are being used to guarantee the proper use of the new E-ZPass electronic tolling on the Turnpike System.

Next year a state Traffic Management Center will begin operations within the new emergency management facility now under construction in Concord. This will house Transportation, State Police, 911, and Emergency Management communications and dispatch capabilities under one roof. With the ability to monitor live camera feeds from all over the state, this facility will greatly improve the decision-making and response time for highway maintenance and incident response on New Hampshire's highways.

The result will be a better and safer ride in the 21st Century for our residents and visitors.

New Hampshire DOT
Department of Transportation
Committed to Excellence, Safety, Innovation, and the Future.

Winter 2005-2006

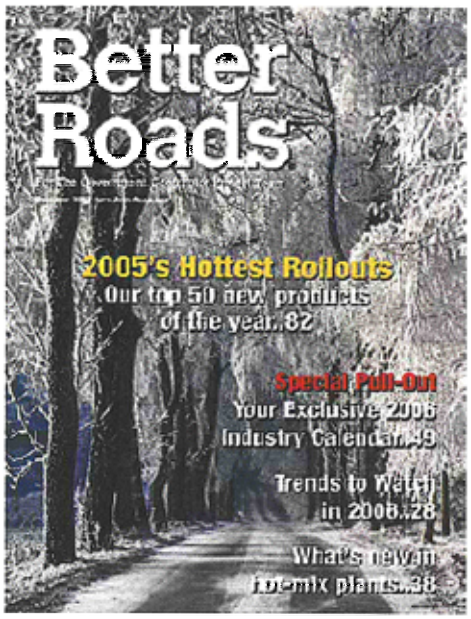
Governor.....John H. Lynch
Commissioner.....Carol Murray
On the Move Editor.....Bill Boynton

PRINTED IN THE NHDOT PRINTSHOP ON RECYCLED PAPER

National Magazine Gives Kudos to the NHDOT's Flood Response Efforts

Editor's Note: The following item appears on page 9 of the December 2005 Better Roads Magazine which has a national circulation of 40,000 in the US and Canada. It is reprinted with the permission of the magazine.

OUR VIEW
by Ruth W. Stidger
Editor-in-Chief
Better Roads Magazine



December 2005

Combat Construction in New Hampshire

While hurricane damage in the billions of dollars continues to make news, consider New Hampshire. Here, flooding destroyed bridges and roads in a disastrous way. Sure, the total damage will be many millions rather than billions, but look at the cost per capita, and you will find that the disaster equals that of New Orleans and the surrounding area.

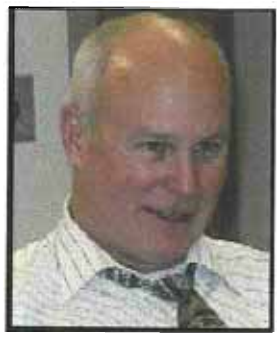
New Hampshire Governor John Lynch declared a state of emergency before the flooding ended. Transportation Commissioner Carol Murray called emergency road repairs "combat construction". Work crews blocked damaged roads quickly and then turned to repairs. Bailey Bridges were put in place to provide transit across rivers and creeks.

Road repairs will require many months as well as money. About 30 roads were closed or partially cut off in the western part of the state, according to New Hampshire Department of Transportation's Bill Boynton. A historic double arch stone bridge in Walpole washed away, along with more than a dozen more modern bridge structures in the area. Route 123 suffered especially severe damage, with parts of the road simply disappearing along with the flood.

Better Roads' correspondents Dan and Gini McKain drove over one 30-mile section with half of the road "nothing but rubble". Miraculously, they could still drive on the other side of the road or on the shoulder, where damage was not as disastrous. Traffic engineers are also concerned about roads that appear to be safe now, but which may have been undermined, according to Murray.

A full report on the reconstruction will appear in Better Roads in a later issue, but in the meantime, let's all be proud of the quick response and fast action of the New Hampshire DOT and its people. And let's remember to extend any help we can give. The Gulf Coast is not the only location of road disasters this year.

Mike Burlage Retires to Iraq: "I know I can help"



After Mike Burlage completed four years of Reserve Officer Training ROTC) at the University of New Hampshire in 1973, he was commissioned into the Army Reserve. He was never called to serve in Vietnam. Instead he went to work for the New Hampshire Department of Transportation, helping to expand Interstate 95 on the seacoast from four to eight lanes.

While continuing his NHDOT career, first in Construction and later in Highway Maintenance in District 6, Mike remained active in the Army Reserve as an infantryman. He rose to the rank of Lt. Colonel before he reached mandatory retirement after 28 years in January of 2001. Eight months later came September 11, 2001. Mike Burlage was profoundly affected by what he saw. "We were attacked. I talked it over with my family and sent a letter to the Army saying I was available if needed," Mike remembers.

Three years passed. After many years as the District 6 Engineer, Mike was promoted to NHDOT Assistant Director of Operations. Then, in December of 2004, the call came. Mike Burlage was told to take a physical and prepare for active duty as early as March. More months passed and he heard nothing. Then another call came on November 4, followed by official orders on November 23 to report for duty in "Operation Iraqi Freedom". Mike Burlage didn't hesitate. He filed for retirement after 32 ½ years at the place he had worked since leaving college. As Mike packed his office items on his last day of work (December 13), he had a flood of mixed emotions. While the sense of duty was still clearly there, so was reflection on what he was leaving behind.

"It's tough leaving something you've done most of your life." What will he miss? "The people…the challenges." "How could you not be proud of the New Hampshire Department of Transportation and its employees after what was accomplished following the flooding in Alstead?"

With the beginning of 2006, not long after his 56th birthday, Mike Burlage reported for active duty at Fort Carson, Colorado. As soon as a month later, he could be in Iraq, working to train Iraqi soldiers to take over defense of their country. "I know I can help. If it weren't me, it would be someone else. I won't be knocking down doors, but I know I have something to offer," Mike Burlage said shortly before leaving his DOT job for the last time. "Only time will tell if this is right or not."

Chopping Ice for the Choppers

The NH Army National Guard had a problem with snow and ice buildup on the runways from a recent storm at the Army Aviation Support Facility in Concord. They called the NHDOT for help.

Along came the cavalry from Highway Maintenance's District 5. First the graders moved in to scrape the snow and ice off the tarmac. Then came the salt brine truck with an underbody scraper that was used on an airport access road.

Making it all happen on December 21 were Adam Dow (525 crew in Canterbury), Ben Tatro (526 crew in Warner) on the graders, and Ryan Boisvert (527 crew in Manchester) operating the brine truck. The result was a useable runway and the end of concerns about a winter-long ice pack.

A Good Neighbor Policy...

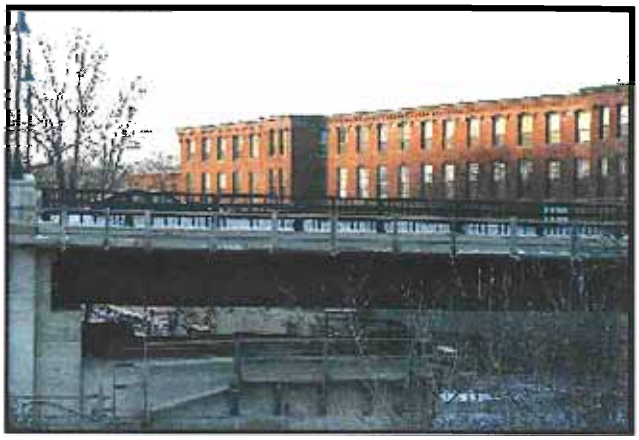
A NHDOT District 5 grader makes a pass to clear the runway as a Huey helicopter is prepared for a flight.

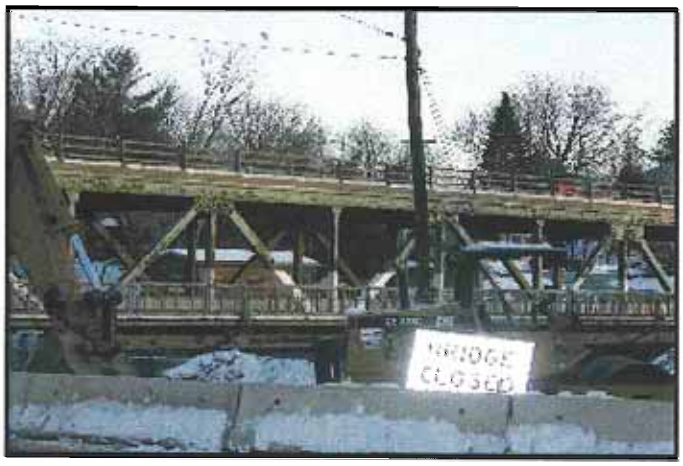
One Pembroke-Allenstown Bridge Open - Another Project Gets Underway Nearby

They are both Red List (structurally deficient) Bridges over the Suncook River connecting the towns of Pembroke and Allenstown. They are separated by just hundreds of yards. Both are being replaced just months apart. In fact their construction schedules overlapped.

The new Main Street Bridge (right photo) was opened to traffic on December 8 just as work was getting underway on the replacement of the "double decker" bridge on US Route 3 (below photo).

The new $2.4 million, 120-foot long Main Street bridge replaces a bridge that was originally built in 1900 and rehabilitated in 1970. E.D. Swett, of Concord was the general contractor for the project.





Work on the replacement of the "double decker" bridge began in early December. The bridge was built in 1931 and was the #3 Red List Priority in the most recent Ten Year Transportation Plan.

Initial work is requiring the closure of the southbound on-ramp to US 3 for 18 months for both work on the bridge replacement and the relocation of a water main.

Audley Construction, of Bow, New Hampshire is the prime contractor for the $11.4 million bridge and road reconstruction project, which has a final completion date of October 2007. Also part of the project are new traffic signals at the intersection of US 3 and School Street in Allenstown.

Meet the New Faces in the Human Resources Bureau

Services to NHDOT employees have been enhanced with the addition of five new employees to the Human Resources Bureau since September.

Bonnie Berry (Program Specialist) is a legal specialist focusing on discipline.

Alexis Martin (Program Specialist) is working on Workers' Compensation issues.

Renee Dupuis (HR Technician) is responsible for job certification and posting.

David Wood (Program Specialist) is focusing on job recruitment.

And Michelle Fransen-Conroy is the new receptionist in the Morton Building.

All can be contacted at 271-6070.

New employees bolstering the effectiveness of the Human Resources Bureau include: (front l to r) Bonnie Berry and Alexis Martin, and (back row) Renee Dupuis, David Wood and Michelle Fransen-Conroy.

THE GEOLOGY OF A FLOOD: "Tens of Thousands of Years in a Few Minutes"

by Richard Lane, PG,, CPG

Editor's note: NHDOT Geologist Dick Lane (Materials & Research) was among those called to action following the severe floods of early October in southwestern New Hampshire. He shared his views on the event in an article published in the Granite State Geologist, the newsletter of the Geological Society of New Hampshire.

Flooding is one of the most common and destructive geological hazards. Water-related events account for over three-quarters of the federal disaster declarations in the United States. Severe flooding in New Hampshire in early October resulted in the Governor declaring a State of Emergency in five counties.

These devastating events, allow a glimpse at some of the geological forces that shape our planet and continually change the environment. Stream erosion and deposition are ongoing geological processes that can be greatly accelerated during periods of flooding.

A flood event is like watching geology on fast forward. What may normally take tens to thousands of years to occur can take place in a few minutes.

The New Hampshire flood of 2005 resulted in loss of life, damage to private property, destruction of homes and businesses, severe damage to public infrastructure (roads, bridges, drainage structures, government facilities, etc.), damage to communication lines, extensive erosion, contamination of drinking water, loss of agricultural productivity and psychological trauma. The storm event also triggered mudslides in several areas across New Hampshire.

The origin of the flood at Cooper Hill Road in Alstead, looking across the gorge to NH 123 (55 feet deep and 110 feet across).

Storm damage resulted in 57 miles of state roads being closed on October 9, 2005. One day later, 43 miles of road were open for emergency vehicles and local traffic, while 14 miles remained closed. On October 19 only 4.5 miles were closed, 29 miles were open and 23.5 miles were open for emergency vehicles/local traffic.

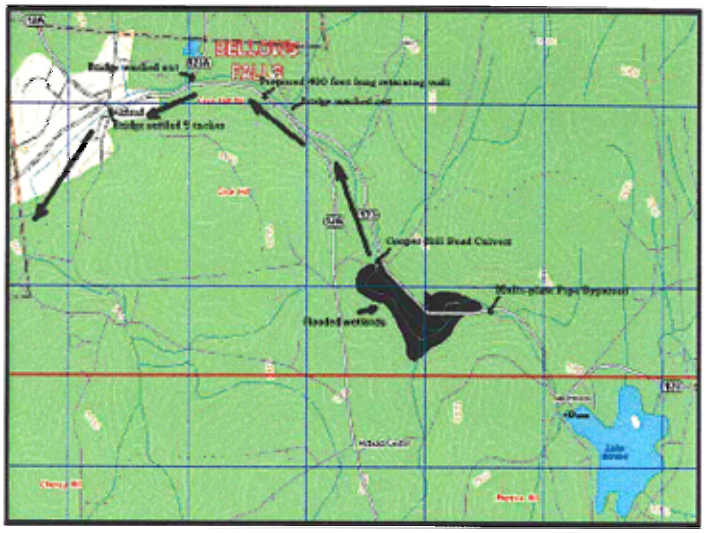
Due to safety concerns and access difficulties, seven NHDOT bridge inspection teams were mobilized to inspect over 170 bridge structures across the state. Other NHDOT teams were mobilized to inspect roads, drainage structures and slopes throughout the state. The most severe and widespread damage occurred in the village of Alstead NH, along Routes 123 and 12-A.

During a 30-hour period, the Alstead area received approximately 12 inches of rainfall. The U.S. Geological Survey reported a peak flow of 150 times normal for Cold River, just a short distance downstream from Alstead Village Most engineered structures, embankments and drainage systems are designed for a 100-year flood.

The heavy rainfall and related events that occurred during October 2005 exceeded the established limits for normal engineering design.

(continued on page 7)

Geology ***(continued)***



Warren Brook flowed through a 12-foot diameter culvert that extended underneath a 30-foot high embankment fill at Cooper Hill Road, approximately 2 miles upstream from Alstead Village. Damage from the floodwater extended from Cooper Hill Road to where the Cold River empties into the Connecticut River, a distance of approximately 7.5 miles.

A total of 36 buildings were completely destroyed and 71 homes sustained varying degrees of damage. A combination of heavy rainfall, runoff and overflow from the Warren Lake Dam resulted in a large volume of water becoming impounded behind the roadway embankment at Cooper Hill Road. (Note that it was impounded water...more water than the 12-foot culvert could pass, that filled the meadow upstream from the culvert. It currently appears as though the culvert was NOT plugged…it just couldn't take all the water coming down Warren Brook.)

During the early morning hours of October 9, 2005, the water breached the Cooper Hill Road embankment, sweeping away the culvert and a large section of the 30-foot high road embankment. A 30 to 40 foot high wall of water and debris surged down the valley of Warren Brook, along the side of NH 123 and on through the village of Alstead. The raging floodwater carved a gorge estimated to be 55 feet deep and 110 feet wide at the Cooper Hill Road brook crossing. At the culvert location, the floodwater had cut into the underlying basal till, lowering the brook channel an additional 8 to 10 feet. The basal till, a highly compacted glacial deposit, has a density equivalent to concrete. The till has a low-permeability and under normal conditions would erode very slowly.

Along both sides of Warren Brook and the Cold River, acres of farmland were completely stripped of topsoil and/or covered with all types of flood debris. Cars were carried thousands of feet down stream, some perched in trees and others crushed like aluminum cans. Portions of foundations and concrete slabs were under cut, leaving buildings precariously overhanging eroded stream banks. Several buildings were ripped from their foundations, large trees uprooted, roads washed out, bridges carried away, and at some locations the overlying soil was stripped to bedrock. Concrete foundations were all that remained of several houses.

. In some instances, the current was so strong it removed the upper layer of fractured bedrock. Segments of paved roadway, hundreds of feet in length, were swept away. In some areas, the stream channel had been rerouted to where the road originally existed. Other areas were buried under assorted debris and soil deposits with boulders (3 to 4 feet in diameter). A river bottom's current velocity of at least 38 feet per second is needed to move boulder size material. Clear water with little suspended matter has a limited capacity for abrasive action. When running water transports sand to pebble size particles, it becomes a powerful agent of erosion.

A combination of sheet runoff and stream erosion were responsible for roadway washouts, loss of homes, damage to drainage structures and severe erosion just down stream from the Warren Lake Dam. Hundreds of feet of buried underdrain pipe, installed at a depth of 6 feet along the edge of the road, were plucked from the ground. The rushing water had cut narrow trenches with nearly vertical walls into the underlying dense glacial till.

The trenches were eroded four feet below the pipe elevation for a total depth of 10 feet. At a brook crossing southeast of the Alstead town garage, Warren Brook bypassed a large multi-plate pipe,

(continued on page 10)

A house ripped from its foundation and deposited in a flood plain.

NEW HIRES

Robert Baltazar, Highway Maintainer 1, District 2
Edwin Bartlett, Highway Maintainer 2, District 1
George Beaudette, Highway Maintainer 2, District 5
Mark Bolduc, Highway Maintainer 2, Turnpikes
John Boynton, Highway Maintainer 2, District 1
Daniel Busa, Highway Maintainer 1, District 5
Steven Chagnon, Highway Maintainer 2, District 2
Robert Currier, Highway Maintainer 1, District 2
Andrew Dimond, Highway Maintainer 1, District 2
Jeremy Gibbs, Highway Maintainer 1, District 3
Christopher Hammond, Highway Maintainer 2, District 2
Kathleen Levesque, Engineering Tech, 1, Highway Design
Clayton Smith, Highway Maintainer 1, District 1
Michael Smith, Bridge Maintainer 2, Bridge Maintenance
Christine Willis, Highway Maintainer 2, District 5
Diane Johnson, Highway Maintainer 2, District 2
Douglas Kerr, Highway Maintainer 1, Turnpikes
Michael L'Esperance, Highway Maintainer 2, District 5
Jeremy Lavigne, Highway Maintainer 1, District 5
Joyce Libbey, Account Clerk 3, District 3
Andrew Loats, Ass't Highway Patrol Foreman, District 2
Mark Lyford, Heavy Equip. Mechanic, Mech. Services
Carol Niewola, Principal Planner, Aeronautics
John Orkins, Highway Maintainer 2, District 4
Christine Perron, Environmentalist 2, Environment
William Piper, Bridge Maintainer 2, Bridge Maintenance
Franklin Ritter, Highway Maintainer 1, District 3
Roger Smith, Highway Maintainer 2, District 4
James Villemure, Highway Maintainer 1, District 5
Tobie Wilson, Highway Maintainer 2, District 4

PROMOTIONS

George Beaudette, Highway Maintainer 3, District 5
Wayne Beers, Highway Maintainer 2, District 6
Marshall Bennett, Highway Maintainer 2, District 3
Robert Bennett, Highway Maintainer 3, District 5
Paul Blackwood, Engineering Tech. 2, Highway Design
Ryan Boisvert, Highway Maintainer 3, District 5
Stephen Boyington, Civil Engineer 4, Bridge Design
Walter Boyson, Radio Dispatcher, District 6
Richard Chaput, Highway Maintainer 3, District 5
Jamie Cotnoir, Highway Maintainer 2, Traffic
Edward Coulombe, Highway Maintainer 2, District 5
Michael Coulombe, Highway Maintainer 2, District 5
Thomas Cutter, Engineering Tech. 3, Highway Design
Robin Davis, Highway Maintainer 2, District 3
Valerie Everett, Accountant 1, Turnpikes
Dennis Ford, Maintenance Supervisor, District 2
Michael Geilen, Engineering Tech. 2, Highway Design
John Gibbons, Highway Maintainer 3, District 5
James Gilbert, Right-of-Way Agent, Right-of-Way
Denise Godbois, Toll Attendant 2, Turnpikes
Ruth Godfrey, Information Center Attendant 2, District 5
James Gould, Highway Maintainer 2, District 3
Michael Grigas, Highway Maintainer 3, District 5
Martha Heater, Radio Dispatcher, District 4
Douglas Holmes, Engineering Tech. 4, Highway Design
Emily Hughes, Survey Team Technician 2, Highway Design
Michael Tuttle, Engineering Tech. 3, Highway Design
Nagavalli Nyakaranam, Engineering Tech. 2, Highway Des.
Christopher Wasczcuk, Civil Engineer 7, Highway Design
Cameron Huntoon, Highway Maintainer 3, District 2
Richard Jameson, Highway Maintainer 2, Turnpikes
Carol Jeffery, Radio Dispatcher, District 4
Kellen Jordan, Highway Maintainer 3, District 5
Peter Kane, Highway Maintainer 2, District 5
Michael L'Esperance, Highway Maintainer 3, District 5
Tricia Lambert, Administrator 3, Aeronautics.
Michael Lovoie, Highway Patrol Foreman, District 6
Gary LeBlanc, Ass't Highway Patrol Foreman, District 6
Beau Leighton, Highway Maintainer 2, Turnpikes
Matthew Littlefield, Highway Maintainer 2, District 3
David Mansur, Highway Maintainer 3, District 5
Peter McKinnon, Highway Maintainer 3, District 5
Steven Paisley, Survey Team Tech. 2, Highway Design
Kerry Paquette, Highway Maintainer 2, District 5
Richard Patch, Survey Team Tech. 3, Highway Design
Peter Pelletier, Ass't Highway Patrol Foreman, District 5
Russell Pilotte, Highway Patrol Foreman, District 1
Matthew Powers, Civil Engineer 2, Highway Design
Henry Radwanski, Highway Maintainer 3, District 5
Robert Reinhard, Ass't Patrol Foreman, District 1
Richard Robinson, Ass't Patrol Foreman, District 4
David Rodrigue, Civil Engineer 5, Traffic
Barbara Rollins, Engineering Tech. 3, Highway Design
Mark Rousseau, Highway Maintainer 2, Traffic
William Shanahan, Toll Attendant 2, Turnpikes
Robyn St. Pierre, Data Control Clerk 2, Turnpikes
Linda Wescott, HR Assistant 1, Human Resources
David Wood, Program Specialist 1, Human Resources

SERVICE AWARDS

January through March 2006

35 YEARS

David Preve, Traffic

30 YEARS

Robert Lang, Traffic
Gary Pinard, Highway Design
Ronald Spalthoff, Construction

20 YEARS

Douglas Burhoe, Traffic
William Cass, Commissioner's Office
Ronald Crickard, Environment
William Erwin, District 5
Daniel Fogg, District 1
Christopher Hope, District 4
Richard Keegan, Construction
Richard Merrill, Turnpikes
Jesse Wheeler, District 4
Paul Yeaton, Planning

RETIREMENTS *(years of service)*

Terry Chagnon, District 3 (25)
William Holbrook, Turnpikes (24)
Edward Hudson, Turnpikes (21)
Mark Lance, District 3 (10)
Ron Wanner, Aeronautics (17)
Fred Prior, Materials & Research (35)

15 YEARS

Alicia Davis, Turnpikes
Neal Heon, Turnpikes
Faith Pallleschi, Turnpikes
David Rodrigue, Traffic
Thomas Samms, Right-of-Way

10 YEARS

Paul Arguin, District 1
Kevin Belanger, Construction
Brian Cole, Bridge Maintenance
Sandy Hogan, Turnpikes
Mark Laboie, District 1
Elizabeth Richardson, Highway Design
Michael Tuttle, Highway Design
Trent Zanes, Highway Design

Frederic Prior (above right) is congratulated on his 35 years of State service and his pending retirement by Project Development Division Director Jim Moore. The Geotechnical Chief in the Bureau of Materials & Research, Fred is the grandson of F.E. Everett, the first and longtime Commissioner of the NH Highway Department.

Geology *(continued from page 8)*

wiped out a section of Route 123, cut a new channel at the roadway location and completely filled the existing 60-foot long cross pipe with gravel and cobbles.

The damage to state roads and bridges across the state is estimated to be in excess of $25 million. Some locations were repaired within hours or days, while other sites are expected to take weeks to months. In addition to repairing the highway infrastructure, a massive cleanup operation has been underway to remove debris from the stream and adjacent flood plain.

The parade field in Alstead was utilized as a temporary storage area for flood debris. Materials were sorted into separate piles of tires, wood, cars, metal, trees, etc. Trees were shredded into wood chips and topsoil recovered by screening some of the woody debris. The cleanup activities were ongoing from sunrise to sunset, seven days a week. The cost for pickup and disposal are estimated at $120,000 per day.

The most difficult roadway sites to repair in the Alstead area are a 400-foot long segment of Route 123 along Warren Brook, just west of its intersection with Route 12-A and portions of Route 123 at the Cooper Hill Road intersection.

A segment of Route 123 at the Cooper Hill Road intersection was temporarily rerouted while permanent repairs are designed and constructed. Until then Cooper Hill Road has been dead-ended.

Temporary repairs at the site downstream from the Route 12-A intersection will involve the placement of stone fill in areas where the road has been washed out. Anchorage may be needed for large rocks placed along the toe of the embankment. A geotextile will be installed between the existing soil and the stone fill.

Two alternative designs are being considered for the permanent repairs at this location. The first alternative involves the construction of a 400-foot long retaining wall along Warren Brook. The wall would reach a maximum height of approximately 25 feet. The second alternative would be to cut into the steep hillside on the opposite side of the road and move Route 123 away from the brook. The geologic conditions, feasibility of construction and cost for both alternatives will be compared.

Several stream crossings have been spanned with temporary Bailey bridges, while plans are underway to build new replacement structures.

A temporary Bailey bridge was installed at the Warren Brook culvert pipe crossing in Alstead.

The bridge over Cold River in the village of Alstead has settled approximately 9 inches at the south end. Borings are planned to determine if voids exist beneath the southern abutment. The scope of repairs for this structure will depend on the subsurface conditions.

It was reported that floodwater washed over the bridge at a height of four feet above the deck. An eyewitness stated that a wrecker truck carried by the floodwater, crashed into the bridge, flipped over the bridge and then was swept further downstream .

Accounts describing the devastation in Alstead provide some insight into the awesome power of flooding as a geologic process. These events are also a frightening reminder that even a small brook, under the right conditions, can become a destructive force as well as a powerful erosional agent.

The Challenge of a Career: Overseeing the Rebuilding on NH 123 in Alstead

Editor's note: Craig Forest's more than three decades of NHDOT experience were put to the test when the Construction Bureau Contract Administrator was called upon to head up the field work reconstructing NH 123 in Alstead.

Craig Forest

What did you find as the biggest challenge in your role in responding to the flood damage?
The biggest challenge had to have been just getting started. Having to try and get organized to get the work done without any of the things we normally use, such as a contract, an office, plans, etc. We really started with the work in full stride and us with nothing as far as field organization.

What was the most frustrating part of your job during this crisis?
The most frustrating part of the crisis was finding space to work in the beginning. The numbers of people working in the area at the beginning was staggering. There were search and rescue people, utility crews, law enforcement and of course victims wanting to return to their homes. As the contractor would push a road through into an area, these other people would also be using these roads for access to the sight. It became a very difficult balancing act sometimes, to get the work done yet keep access available to everyone.

What are some interesting numbers associated with this repair work?
The contractor has placed approximately 40,000 cubic yards of earth fill and 13,000 cubic yds. of stone fill.

What has been the biggest misperception or misunderstanding by the media and/or the public about the repair work effort?
All in all the media have done a good job of reporting on the work to get Route 123 back into service. The public, and especially the victims of the flooding, have been very understanding of the huge task to get the road back into service.

What was the most memorable day you experienced?
My most memorable days had to have been the first few days. Just viewing the devastation from the flooding and the huge numbers of people involved in the relief effort was staggering.

How would you characterize the joint "team effort" by many NHDOT Bureaus and employees?
The efforts of all of the state personnel involved were very impressive. This started with Governor Lynch. He took control of the situation from day one and made sure that every effort was made to do whatever it took to restore this area. From Commissioner Murray down through every employee in the DOT, every Bureau made themselves available to do whatever it took. District 4 had several roadways that were damaged in this storm event and their crews did some impressive work in getting as many roadways back into service as quickly as they did. The work in Alstead which I was involved with was accomplished with very supportive efforts from all of the DOT Bureaus. This included design support from Bridge and Highway Design. Especially helpful were the efforts of Bridge Maintenance. Their crews supplied technical assistance, sometimes working side by side with the contractor. And also the repair work of their crews on the many structures damaged in the area.

What comment that you received from the public stands out the most for you?
There wasn't any one comment from the public that stands out in my mind. I did talk with many of the victims of this tragedy and was amazed at their strength in dealing with all of this. Indeed some of them lost everything, not only their homes but all the soil their homes sat on. Yet everyone I talked with was appreciative of the efforts of the DOT to restore access to their property.

(continued on page 12)

Craig Forest *(continued)*

What was the biggest engineering challenge you encountered?
The biggest engineering challenge we faced was getting the last section of roadway open to traffic. One section of the roadway was washed away approximately 25 deep for about 600 feet. The challenge was that it had washed down to bedrock which sloped away from the roadway and was adjacent to Warren Brook. Trying to establish a stable roadway embankment and of course maintaining the brook was very difficult. Tom Cleary of Materials and Research played an integral part in reviewing the contractors recommendations and ultimately proposing solutions in the most difficult areas. So although the contractor had to work through below zero temperatures, frozen ground and double digit snowfalls, we finally got the last section open to traffic on December 23.

A retaining wall shores up a temporary one-lane section of NH Route 123, that had been washed away to bedrock by the raging flood waters.

What has been the most rewarding part of this work challenge?
The most rewarding part of this work was being able to be a part of helping the victims of this tragedy.

How do you think you will look back on this experience when you are retired and sitting in a rocking chair somewhere?
I am sure I will look back on this experience as the most challenging and at the same time the most rewarding work.

I would like to add that none of the accomplishments we participated in could have been made without the contractors that did the work. In my case I dealt primarily with Frank W. Whitcomb Construction Corporation .When called upon for assistance by Commissioner Murray, Whitcomb was onsite in a matter of hours and started work. They shut down other projects they were working on in New Hampshire and Vermont and concentrated their efforts in this area. Being a local company, this was a very personal effort to them. Many of the victims of this tragedy were friends neighbors and relatives of Whitcomb personnel. The entire Whitcomb company took part in this effort. In particular, Jim Hollar organized equipment, personnel and materials. He also came up with recommendations for repairs in most areas of the work.

Contract Administrator Rick Oberst (left), an Alstead resident, and Constructiou Bureau Administrator Ted Kitsis check out the progress of the demolition of the flood-damaged stone arched bridge that carried NH 123 over the Cold River in Walpole. A short detour will remain in effect in 2006 until a new bridge can be built.

Winning Popsicle Stick Bridge Holds 358 Pounds of High School Students

by Michelle Marshall (Highway Design)

The New Hampshire Department of Transportation hosted its third annual TRAC (Transportation and Civil Engineering) Popsicle Stick Bridge Building Competition on December 6 at the NHDOT headquarters in Concord. This year, five New Hampshire schools demonstrated their expertise in applying basic engineering concepts by constructing bridges made from Popsicle sticks.

During the competition, each bridge was evaluated in one of three entry categories: Strongest Bridge, Most Original Design, and Most Classic Design. All bridges were judged for their design as well as their strength. To determine the load capacity of each of the bridges, they were placed on a testing device specially designed to "stress" the bridge until it broke, or in engineering terms - failed.

The five schools that competed in this years' competition included Belmont High School, Merrimack High School, Pembroke Academy, Wilton-Lyndeborough High School, and Winnisquam High School. Throughout the event, UNH Professor Ray Cook challenged the students to identify the strengths and weaknesses of key structural components in order to estimate the capacity and predict the failure points of each bridge. While testing the strength of each bridge, students used their own body weight on the testing device to gradually apply force until the models they created failed.

The competition rules limited the construction materials to Popsicle sticks and hot melt glue. Additionally, each bridge had a span of 36 inches and could weigh a maximum of 800 grams.

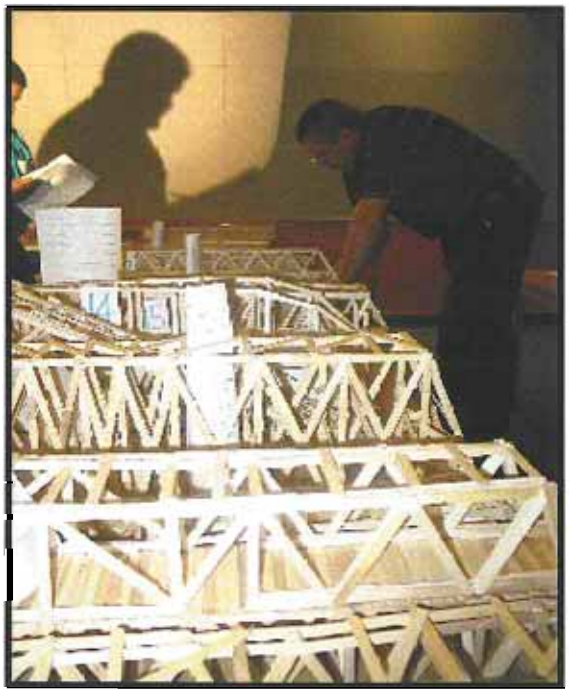
After a day of much excitement, and some anxiety, the final standings were as follows:

• **1st** Place for Weight to Strength ratio	**Belmont High School**	**358 lbs**
• **2nd** Place for Weight to Strength ratio	**Merrimack High School**	**266 lbs**
• **3rd** Place for Weight to Strength ratio	**Pembroke Academy**	**213 lbs**
• Most Classic Bridge Design	**Belmont High School**	
• Most Original Bridge Design	**Pembroke Academy**	

All bridge entries from both Pembroke Academy and Merrimack High School held over 110 pounds.

Michelle Marshall, a design engineer, organized this event with help from engineers Ron Kleiner and Dave Powelson, who visited each school with a presentation to educate students on the fundamentals of bridge design. During their presentations they showed several examples of the different bridge types and demonstrated methods of joining the Popsicle sticks to make their creations.

Additional special thanks go out to a host of engineers who made this event a huge success: Wendy Johnson, Victoria Chase, Samantha Fifield, Steve Liakos, Larry Keniston, Tony King, Glenn Roberts and Frank Bauer; and four other NH DOT engineers who led the way by building and testing their own popsicle stick bridges—Tony King, Ron Kleiner, Steve Boyington and Jerry Zoller.



The Shadow Knows - Categories judged at the Popsicle stick bridge competition included most original and most classic bridge designs.

LETTERS

On the morning of Dec. 3, I had the misfortune to be in a car accident on Route 113 in Madison, where my car rolled over and was upside-down in the water.

I was able to crawl out and climb the embankment, where I saw a plow truck coming down the road, and I was lucky that this nice man stopped to help me. He gave me his jacket and put me in the cab of his truck and called the rescue from his cell phone.

I am forever grateful to this man for his help. Whoever your are, God bless you. I would like to thank you from the bottom of my heart.

My mom would also like to thank you for helping me.

Kelby Moore
Madison, NH

Editor's note: The above letter was published on December 7 in the Conway Daily Sun. The driver of the State NHDOT plow truck was William Sheppard from District 3's 301 Patrol Shed in Conway.

To NHDOT employees:

On behalf of the Board of Directors of the Greater Manchester Chapter of the American Red Cross, and the thousands of victims your support has helped, thank you very, very much for your gifts totaling $3,003.00 to the American Red Cross for Hurricane Katrina Relief Fund.

Michael Allard
American Red Cross
Manchester, NH

Merrimack Police Department

November 8, 2005

On November 7 the Merrimack Police Department received reports of gun fire directed towards vehicles on Daniel Webster Highway.

Due to the concern for public safety, a portion of the heavily traveled Route 3 was shut down for approximately four hours. Members of your agency responded to assist us in directing traffic during this time.

On behalf of myself and the men and women of the Merrimack Police Department, I would like to extend my thanks to you and each member of your department who responded to assist with this incident.

William Mulligan
Chief of Police

I am not a resident of Hinsdale and haven't even traveled on the repaired bridge and roads.

I am, however, an admirer of individuals and organizations who get things done.

From all accounts, it reads like you and your associates did a terrific job of making the necessary repairs in record time.

Your accomplishments are exemplary of public service and government at its best.

Hats off to all for a job well done.

Rich Kalich
NH Resident and Taxpayer
Spofford, NH

END OF AN ERA FOR NEW HAMPSHIRE TURNPIKE TOKENS

Editor's note: Their end was inevitable with the advent of the more efficient E-ZPass and their fate was sealed by a new state law. New Hampshire's turnpike tokens, adorned with the image of the Old Man of the Mountain, had been part of the Granite State landscape since 1955. At their peak, they were used for 60% of all toll transactions and were particularly appealing for their 50% discount. Under a new law, token sales were ceased on September 1, 2005 and were no longer accepted for toll payments on January 1, 2006. Still to be decided is what will be done with the more than 15 million tokens now being kept in storage by the Turnpikes Bureau.

What is the history of NH Turnpike Tokens and discount rates?

1955 - NH Turnpike Tokens were authorized in 1955. At that time, tokens provided a 1/3 discount or 33% off the full price of the toll fare. Two types of tokens were introduced – an "A" token, silver in color, roughly the size of a dime and had a trip value of $0.10 and a "B" token, brass in color, roughly the size of a quarter and a trip value of $0.15. Tokens could be used by any class of vehicle at this time.

1977 - April - Discontinued the sale of "A" tokens. Tokens restricted to two-axle four tire vehicles.

1979 - Token discount increased to 50%.

1983 - Tokens in a roll increased from 30 to 40.

1989 - Token discount decreased from 50% to 40%.

1990 - Token discount returned to 50%

1995 - Commercial discount set at a 30% per month.

2005 - New State law ceases token sales on 9/1/05 and token use on 1/1/06

Commissioner Carol Murray models two innovative uses for NH Turnpike tokens, a ring and a stick pin. The State House Visitor's Center sells token earrings at $8 a pair (a 50% discount!) with funds raised going to charity. The Commissioner must still decide what to do with an inventory of more than 15 million tokens.

What did the NHDOT pay for tokens?

NHDOT paid about $0.0350 for each token. The cost did fluctuate some, based upon the market cost of the raw material needed to manufacture the tokens. Token purchases ranged between 3 and 6 million per order. The cost for 6 million tokens was $225,000.

Where were tokens purchased from?

Two companies had the authority and the die needed to mint NH Turnpike Tokens - Roger Williams Mint, Attleboro, MA and Osborne Coinage, Cincinnati, Ohio.

What % of class 1 vehicles (passenger car) traffic used NH Turnpike Tokens?

As an average, 60% of the total class 1 vehicles processed each year pay with NH Turnpike Tokens. Each plaza had different percentages of use based upon commuter volume. The percentage of token use by plaza through May 2005:

Hooksett Main	55.7%	Exit 10	72.4%
Hooksett Ramp	66.6%	Hampton	39.6%
Bedford Toll	68.0%	Hampton Ramp	60.2%
Bedford Road	75.6%	Dover Toll	70.4%
Exit 11 Ramp	73.5%	Rochester Toll	69.9%

Did tokens cause any operational issues?

Yes. Token sales slowed the processing of traffic through our attended lanes. It took approximately 45 -50 seconds to sell a roll of tokens. Data had to be entered on the toll terminal, change may have had to be made and a receipt was usually requested. Each year, the Turnpikes Bureau experienced a few material handling injuries (workers comp claims) related to NH Turnpike Tokens in some way.

Do any other Toll Agencies still use tokens?

The Garden State Parkway (New Jersey) is currently in the process of decommissioning them. Several other toll agencies had tokens prior to the deployment of E-ZPass technology. E-ZPass has become the electronic token.

NHDOT People

Tricia Lambert has been named the new Administrator of the Bureau of Aeronautics. With a background that included working as an airport operations manager in New Jersey, Tricia joined the bureau in 1999 as an aviation planner. She has been responsible for programming and coordination of the Federal Aviation Administration airport capital improvement program for New Hampshire airports. She was the project manager for design and construction of the Aircraft Rescue and Fire Fighting facility located at the NH Fire Academy. Tricia Lambert lives in Hopkinton with her husband Dave and two daughters, Shea and Ava.

Operation Lifesaver's Person of the Year

John Robinson (Bureau of Rail and Transit) has been recognized by New Hampshire's Operation Lifesaver Committee as the volunteer organization's "Person of the Year" for his outstanding service in railroad safety. In a letter of commendation, Commissioner Carol Murray wrote, "This is a well-deserved honor that acknowledges your hard work and dedication to railroad safety across the state. Our citizens expect the State to play a leading role in protecting their safety, and although you are a "one-man team," they are well served by the work you do every day inspecting track and crossings from Mt. Washington to Nashua, trying to reduce the risk of accidents, and assisting the railroads, law enforcement, and others in making ours a safer State." John Robinson has worked for five years as the NHDOT's railroad safety inspector and investigator. He's been with the agency since 1997.

95 Years of Bridge Maintenance Experience

Four veteran Superintendents in the Bureau of Bridge Maintnenance were presented with with certificates of recognition for service on October 27. From left to right are Eric Bowser - 20 years, Dick Green - 30 years, Paul Spinney - 25 years and Doug Haskins - 20 years.

MATERIALS & RESEARCH SHOWCASE HIGHLIGHTS WHAT THEY CAN DO

"We can do a lot and there is a lot of value gained by research programs," Materials & Research Administrator Alan Rawson told a major staff meeting recently. "Continue to send ideas our way so that we can help solve your problems."

That "can do" attitude was demonstrated on January 4th when the Bureau of Materials & Research hosted its first Research Showcase & Poster Session in the Morton Building.

The Showcase was developed to increase awareness of the resources available through the research program and to highlight some of the successful projects which have benefited the Department in recent years.

Over 20 in-house and contracted studies were displayed using posters, videos and other presentation tools. Researchers were on hand to discuss their work and answer questions from participants. The event was well attended by Department personnel and included visitors from a number of municipalities, consulting firms, other agencies and organizations.

NHDOT Employees Sponsor 171 Children Through Operation Santa

Operation Santa Coordinators Sherry Brooks (Planning and Community Assistance), Cheryl Rasmussen (Highway Design), and David Goulet (Public Works) extend a big **THANK YOU** to all who helped this worthy project by sponsoring children and shopping for them, donating gifts for the raffle, baking goods for the bake sale, purchasing tickets and baked goods, and hauling and delivering these generous gifts to Operation Santa Headquarters with trucks supplied by Mechanical Services - a tremendous agency-wide participation!

DOT bureaus and individuals sponsored 171 disadvantaged children from around the State this year. Paulson's Café helped out a teenage boy in a culinary arts program who wanted a cookbook for Christmas. Others helped a disabled single parent by purchasing bicycles and helmets for his three young daughters.

Operation Santa Claus even got a head start on fulfilling their kids' wishes for next year when Sam's Club in Concord donated $1,000 to the SEA's annual project on December 22.

State of New Hampshire
By His Excellency
John Lynch, Governor
A Commendation

NEW HAMPSHIRE STATE EMPLOYEES FOR THEIR FLOOD RELIEF EFFORTS

WHEREAS, Hundreds of state employees have worked countless hours to help New Hampshire citizens affected by the recent floods; and

WHEREAS, The Departments of Safety, Transportation, Motor Vehicles, Environmental Services, Fish and Game, Health and Human Services, Resources and Economic Development, Administrative Services, Public Utilities Commission, Office of Information Technology, New Hampshire National Guard, New Hampshire State Police, Bureau of Parks and the Fire Marshall's Office to respond efficiently and effectively to the flood disaster; and

WHEREAS, State employees worked around the clock during the flood emergency to re-open roads and reconnect communities, to get needed supplies to local communities, to inspect dams, to ensure the public's health, to test water, to assist with debris removal, to ensure public safety, and to assist with search and rescue; and

WHEREAS, Nearly all state agencies are involved in ongoing recovery efforts; and

WHEREAS, State employees provided critical support to local officials and New Hampshire residents during the flood;

NOW, THEREFORE, I, JOHN H. LYNCH, GOVERNOR of the State of New Hampshire do hereby commend **New Hampshire State Employees** for their flood relief efforts, and encourage all citizens to show their appreciation for those who have done so much to help New Hampshire citizens affected by the recent floods.

Given at the Executive Chamber in Concord, this 2nd day of November in the year of Our Lord, two thousand and five, and of the Independence of the United States of America, two hundre twenty-nine.

John H. Lynch
Governor

Celebrations Being Planned for the 50th Anniversary of the Interstate Highway System

Most Americans can't remember a time without interstate highways and for the most part take them for granted. The year 2006 will mark the 50th anniversary of the Interstate System. According to a website devoted to this milestone, "This 46,508-mile web of superhighways has transformed our nation and our economy. It is a symbol of freedom and a tribute to human ingenuity - although some of the changes it has brought our nation have been controversial."

The interstates were designed to be faster and safer. They put Americans within a few days drive of virtually any other state. They "stretched the link between homes and jobs" and fueled the economic strength of the nation.

Partly to recognize the many benefits of the interstate system, and also to point out the need to continue to invest in the aging system, a number of celebrations will be held in the coming year across the country, including a planned convoy to retrace the journey of a 1919 cross-country convoy that convinced a young Dwight Eisenhower of the need for a better highway system.

For more information on the Golden Anniversary of the Interstate Highway System, visit the new AASHTO website - www.interstate50th.org/

"Linking the Power of the Past to the Promise of the Future"

	1956	**Current**
U.S. Population:	168,903,031	293,655,404 (2004)
Annual Vehicle Miles:	627,843,000	2,829,336,000 (2002)
Federal Gas Tax:	3 cents	18.4 cents (last raised 4.3 cents in 1993)
Registered Vehicles:	54,013,753	135,669,897 (2003)
Registered Trucks:	10,678,612	94,943,551 (2003)

Official Name: Dwight D. Eisenhower National System of Interstate and Defense Highways

Route Traversing the Most States:
I-95, 16 states (including Washington D.C.): Florida, Georgia, South Carolina, North Carolina, Virginia, Washington D.C., Maryland, Delaware, Pennsylvania, New Jersey, New York, Connecticut, Rhode Island, Massachusetts, New Hampshire and Maine

Longest Interstate Route:
I-90, Seattle, WA. to Boston, Massachusetts, 3,020.54 miles

Total Miles: 46,508 *(2003)*

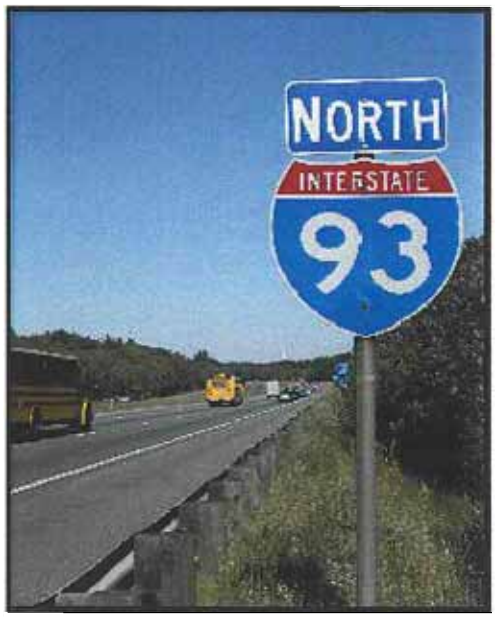
Interchanges: 14,750 (approximate)

Bridges: 55,311 *(as of December 2004)*

State with the Most Interstate Routes:
New York, 1,674.73 miles, 29 routes

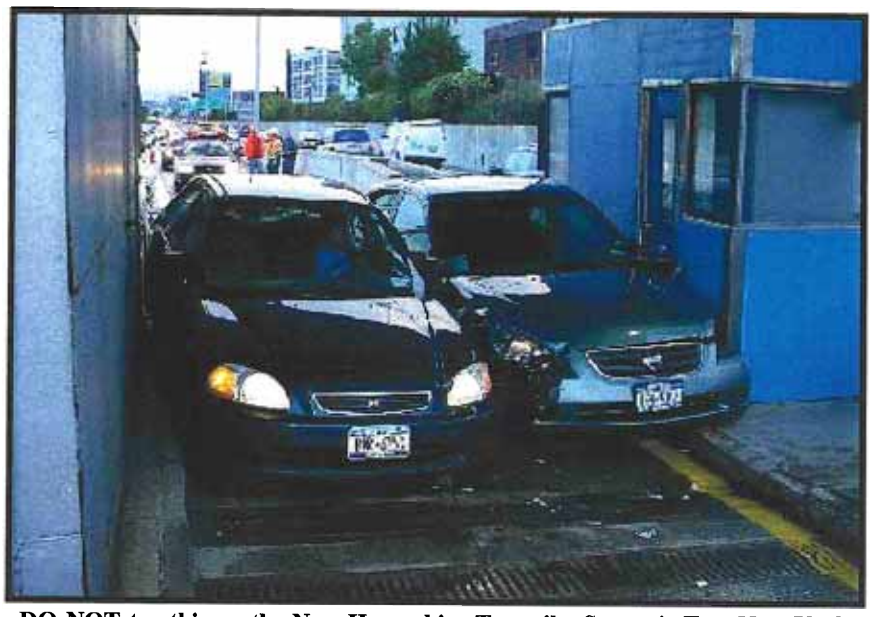
Highest Elevation: Eisenhower Memorial Tunnel, Clear Creek/ Summit counties, Colorado 11,012 feet *(east)* and 11,158 *(west)*

Lowest Elevation: Interstate 8, El Centro, California, 52 feet below sea level



Source: Federal Highway Administration, Program Administration

A Not-So-Easy Pass...



DO NOT try this on the New Hampshire Turnpike System! Two New York motorists were aparently unwilling to yield as they approached a toll booth in the Empire State. It appears the only injuries were to the egos involved. For the record, this was NOT an E-ZPass lane!

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