



# UPDATE

Virginia Keeps America Moving

Winter 2009

## Variance in Speed, Not the Speed Limit, Poses Greatest Risk on Interstate Roads



Magenta signs accompany the speed limit signs on I-81 in Botetourt County and ask drivers to "Please" obey the speed limit.

"They drive too fast" is the cry of many citizens when discussing how people drive on Interstate 81. At times this refrain is directed to the trucking industry and at other times to drivers in general. Consequently, some people have suggested the speed limit should be lowered to 55 miles per hour on I-81.

However, research shows that faster travel is not necessarily associated with an increased risk of being involved in a crash.

When vehicles travel at the same speed in the same direction – even high speeds, as on interstates – they are not passing one another and cannot collide as long as they maintain the same speed.

Conversely, when vehicles are traveling at different rates of speed, the frequency of crashes increases, especially crashes involving more than one vehicle. The key factor is *speed variance*. The greater the speed variance, or the distribution of speeds, the greater the number of interactions among vehicles. Thus, passing maneuvers and opportunities for collision increase. Speed variance, not necessarily high speed, is associated with an increase in the frequency of crashes.

Interstate highways in Virginia such as I-81 generally are designed to accommodate traffic traveling 70 mph. This is called the design speed. Typically, people drive at or near the design speed because it is comfortable for them. When speed limits are set substantially below the design speed, research and experience show that most drivers will exceed the posted speed limit. In fact, before the rural interstate speed limit was raised to 65 mph in 1988, the majority of vehicles were traveling faster than the posted 55 mph.

Research also shows that when the speed limit is below the design speed, there is an increase in speed variance, which is associated with a higher risk of crashes. Vehicles at either end of this speed distribution – the slowest drivers and the fastest drivers – are more likely to be involved in crashes.

Research also shows that higher speeds can increase the severity of an accident. The higher the speed, the greater the chance of injury and death in a crash. A lower speed limit generally

results in fewer fatal crashes because lower speeds mean less energy has to be absorbed when a crash does occur. However, the chances for being involved in a crash are greatly increased if an unrealistically low speed is set below the design speed on an interstate because drivers tend to ignore the lower speed limit.

In summary, research shows

- ◆ Crash risk does not necessarily increase with an increase in speed, but is likely to increase with an increase in speed variance;
- ◆ Speed variance increases when the speed limit is set substantially below the design speed;
- ◆ And, higher speeds can increase the severity of an accident.

Sources: Virginia Transportation Research Council  
VDOT Traffic Engineering Division  
Virginia State Police  
Virginia Department of Motor Vehicles

## SAFETY IMPROVEMENTS ON I-81

The long-term solution for Interstate 81 is to increase capacity. However, depending on the availability of funding, it could be six to 10 years before any major section of I-81 is under construction. In the meantime, the Virginia Department of Transportation has implemented many safety improvements along I-81. VDOT engineers are constantly researching and trying new materials and techniques to make our highways safer. Here are some of the examples of safety improvements that VDOT is now implementing on I-81.

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# I-81 Progress Report

## BRISTOL DISTRICT

### I-81/I-77 Overlap Location Study

The Virginia Department of Transportation in January issued a request for proposals for consultants to conduct a location study for the I-81/I-77 overlap in Wythe County. The procurement process usually takes approximately four to six months, so a consultant firm is expected to be hired by summer.

Once the consultant is on board, VDOT plans to hold an information meeting to introduce the study team and provide the public with information about the study process.

Based on findings from the initial I-81 Improvement Studies, the Commonwealth Transportation Board included \$2.5 million in the 1999-2000 Six Year Improvement Program to fund the location study. The purpose of the comprehensive location study is to develop alternatives to alleviate congestion on the I-81/I-77 overlap, which was determined to be the top priority for I-81 improvements in the Bristol transportation district.

The earlier improvement study of the 11-mile overlap section looked at alternatives to widen the interstate in its present location and the feasibility of separating the two interstates. However, it was determined that a more detailed, exhaustive review of all potential alternatives, including the "no build" alternative, must be performed before a decision can be made.

During the comprehensive location study, the study team will perform an in-depth review considering environmental and cultural/historical information, economic and right of way impacts, terrain, geology, constructability, impact of traffic during construction, safety and how proposed locations would serve the nation's interstate network.

VDOT will continue to work closely with the U.S. Department of Transportation's Federal Highway Administration, as they did during all phases of the I-81 Improvement Study.

Additionally, there will be opportunities for the public and local government officials to participate in various stages of the location study.

A typical location study takes about 24 months to complete.

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## SAFETY IMPROVEMENTS ON I-81

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### VDOT Launches Safety Service Patrol on I-81



Flat tire? Out of gas? The Safety Service Patrol can help.

In the past, the Virginia Department of Transportation has operated a Safety Service Patrol on Interstate 81 only during heavily-traveled weekends and holidays,

but in December, a permanent program to assist I-81 motorists in the Roanoke and New River valleys was kicked off by VDOT Commissioner Charles "Chip" Nottingham.

Eight VDOT employees have been trained to aid motorists who may have medical or vehicle problems. These patrollers wear highly visible uniforms and drive specially equipped pickup trucks. They work in close cooperation with the Virginia State Police and may function as "first responders" on the scene of accidents and incidents.

"Our goal is to reduce the risk of secondary accidents, to get traffic moving again whenever an incident slows things down, to provide first-aid if anyone needs it, and to help stranded motorists get back on the road as safely and as smoothly as possible," explained Nottingham.

The Safety Service Patrol's area includes I-81 from Buchanan in Botetourt County to Christiansburg in Montgomery County, I-581 from I-81 to Elm Avenue in Roanoke and the Route 220 Expressway from Elm Avenue to the Tanglewood area of Roanoke County. Ultimately, patrollers will pass the same point every 20 minutes.

Patrollers are trained in first aid, automotive repair, hazardous materials, traffic control and radio systems. The patroller's bright orange pickups are equipped with fuel and water, jumper cables and battery booster packs, tire-changing tools and air compressors, first aid kits, fire extinguishers and arrow boards for directing traffic. The trucks also are equipped with push bumpers for removing vehicles and objects off the road.

"We want to clear the highway as quickly as possible if someone has a minor accident or a flat tire or a breakdown," said Nottingham.

Each patroller will work a 40-hour week, concentrating on weekends and holidays. They also will work during inclement weather and for special events that draw heavy traffic along I-81. In addition, the service will be offered on selected days when heavy traffic is expected.

VDOT also operates Safety Service Patrols in the Northern Virginia, Fredericksburg and Suffolk transportation districts. ♦

### New Signs

PLEASE

DRIVE

CAREFULLY

In the Salem District, VDOT is placing new signs on I-81. Magenta signs accompany the speed limit signs on I-81 in Botetourt County and ask drivers to "Please obey the speed. New signs are being installed in Botetourt County on I-81 to encourage drivers to "Please Drive Carefully." Additional signs are drawing attention to the congested area at the I-581 and I-81 interchange in Roanoke County.

### Guardrail



During the past two to three years, more than \$2 million of federal money has been spent on new and better guardrail along I-81 and I-77. The new guardrail is called strong post guardrail and has been tested with today's vehicles, such as sport utility vehicles and pickups, for crash resistance. Crash energy absorption is improved with this new guardrail, and the larger end sections are more crash resistant.

# SAFETY IMPROVEMENTS ON I-81

## Overhead Variable Message Boards

Six large, overhead changeable message signs are being installed on Interstate 81 as part of a current VDOT effort to install variable message signs throughout Virginia. Each sign costs between \$100,000 and \$200,000, depending on size of structure. These signs should help to communicate real-time traffic information to motorists. Signs are currently being installed at these locations:

- ◆ Northbound Augusta County approaching I-64
- ◆ Southbound Augusta County approaching I-64
- ◆ Northbound Botetourt County approaching I-581
- ◆ Southbound Roanoke County approaching I-581
- ◆ Northbound Wythe County approaching I-81/I-77 overlap
- ◆ Southbound Wythe County approaching I-81/I-77 overlap

For roughly what it costs to install a traffic signal at one intersection, a variable message board can be installed on an interstate road, providing vital traffic information to motorists as they travel to their destinations. This technology commonly used in Virginia in urban areas has finally arrived on I-81. The first of several signs were installed in late 1999. More signs will come during the next two years, with eventual coverage at the Commonwealth's borders and at all junctions with other interstate roads throughout Virginia.



Without a doubt, traffic and incidents on I-81 have increased, particularly in the last decade. The need for communications with motorists has become critical to allow for timely travel decisions and detour information. The signs will be used to communicate information about accidents, incidents, road conditions and work zones.

In conjunction with highway advisory radios (HAR), the variable message signs will be a powerful communication system. HARs are low-powered radio stations that are used by VDOT to provide road condition information at accident sites or at work zones. The combination of the variable message signs and the HARs will offer motorists more detailed information than was ever possible with traditional portable roadside message boards.

The new signs will be able to display three lines of text at a time using a light emitting diode (LED) display. Several panels of text can be flashed on the sign, providing drivers with real-time traffic alerts. These signs will be controlled through a computer located in the VDOT district offices. Training for the sign operators occurred in mid-January. Messages will be coordinated with the VDOT district staff and VDOT's Emergency Operations Center located in Richmond.

The variable message signs are part of VDOT's Smart Travel programs that use intelligent transportation systems to help manage traffic. ◆

## Rumble Strips

Rumble strips are being installed on outside shoulders along I-81. The strips also are installed on the inside shoulder next to the median, where conditions allow. The strips consist of one-half-inch-deep grooves in the pavement between the outside lane marker and the shoulder of the road. If a drowsy or inattentive motorist's vehicle wanders off the travel lane and onto the rumble strip, the resulting vibration immediately jars the driver from "highway hypnosis" that can set in after long periods of time behind the wheel.

Nationwide, statistics credit rumble strips with as much as a 70 percent reduction in run-off-the-road type crashes.



## I-81 Progress Report continued

### Construction Project

*Bristol.* Construction has been under way since spring 1998 to widen to six lanes the section of I-81 in Bristol from just south of Exit 74 in Tennessee to just north of Exit 7 in Virginia. The project is divided into two contracts.

Work is expected to be completed in fall 2000 on the section from Exit 74 in Tennessee to just south of Exit 3 in Virginia, which includes the reconstruction of the Exit 1 interchange with Route 58 (Gate City Highway). English Construction Co. of Lynchburg has the contract worth approximately \$21 million on this section. (The state of Tennessee is funding the segment in Tennessee.)

Work is expected to be completed in fall 2001 on the segment of I-81 from just south of Exit 3 to just north of Exit 7 along with modifications to the Exit 5 interchange with Route 11 (Lee Highway). Jones Brothers Inc. of Mt. Juliet, Tenn., has this contract worth approximately \$48 million.

### Design Projects

VDOT is currently in the early stages of design on the reconstruction of two of Abingdon's busiest interchanges, Exits 14 and 17. This design work also includes the section of I-81 from approximately one mile south of Exit 14 to one mile north of Exit 17.

## SALEM DISTRICT

### Construction Project

*Christiansburg.* Construction on the new Route 460 interchange with I-81 began in spring 1998 near mile marker 118. Work is about 61% completed with traffic moving on two new ramps.

I-81 will be widened, collector-distributor roads will be constructed parallel to the interstate, and a new interchange will be built. This project includes construction of ten new bridges and the replacement of two existing bridges.

In May 2000, the collector-distributor lanes should be completed, and traffic will be shifted to these new lanes while work on improving and widening existing I-81 begins. Portions of the new Route 460/Falling Branch interchange also will be opened in spring 2000.

Branch Highways from Roanoke has this contract worth approximately \$42 million. Estimated completion is summer 2001.

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# I-81 Progress Report

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## Design Projects

**Montgomery County.** In the current Six Year Improvement Program, the board included two projects in Montgomery County to improve safety. VDOT staff currently is designing improvements to extend acceleration and deceleration lanes at Exit 109 (Route 177) at Radford and Exit 114 (Route 8) at Christiansburg. A total of \$3 million has been budgeted for improvements on these two interchanges.

**Roanoke Valley.** The Commonwealth Transportation Board budgeted a total of \$21 million to be allocated over three fiscal years toward the widening of I-81 in the Roanoke Valley. The allocation will be used to draw up construction plans for a 16-mile section of I-81 that begins just south of Wildwood Road in Roanoke County and extends to two miles north of Exit 150 in Botetourt County. New interchange designs also will be included in these plans. Ground and aerial survey work is being performed currently. The 16-mile section of I-81 will be divided into six segments, and consultant designers will begin to develop construction plans in spring 2000 on these segments:

- ◆ Mile markers 136.4 to 138.4 (Roanoke County) including Exit 137 (Wildwood Road). A consultant designer should be selected by late May 2000. Design work should begin in June.

- ◆ Mile markers 138.4 to 140.9 (Roanoke County) including Exit 140 (Route 311). A consultant designer should be selected by late May 2000. Design work should begin in June.

- ◆ Mile markers 140.9 to 143.1 (Roanoke County) including Exit 141 (Route 419). The consultant firm of David Volkert & Associates of Alexandria was selected for this section. Design work should begin in May.

- ◆ Mile markers 143.1 to 144.5 (Roanoke County) including Exit 143 (Interstate 581). The consultant firm of URS Greiner Woodward Clyde of Richmond was selected for this project. Design work should begin in May.

- ◆ Mile markers 144.5 to 147.45 (Roanoke and Botetourt counties) including Exit 146 (Plantation Road). A consultant designer should be selected by late May 2000. Design work should begin in June.

- ◆ Mile markers 147.45 to 152.4 (Botetourt County) including Exit 150 (Route 220). The consultant firm of Hayes, Seay, Mattern & Mattern of Roanoke was selected for this project. Design work should begin in April.

Citizen information meetings on these six design projects will be held in February or March 2001.



## STAUNTON DISTRICT

### Design Projects

- ◆ Mile markers 191 to 202 (Rockbridge County). Design work has begun to widen the northbound and southbound lanes of the interstate and include a future truck-climbing lane in the northbound lanes. Wilbur Smith Associates of Richmond has this contract.

- ◆ Mile markers 184.2 at Buffalo Creek bridge and 190.3 at Maury River bridge (Rockbridge County). Design work for replacing the Buffalo Creek bridges with wider structures is under way. Whitman, Requardt and Associates of Richmond has this contract. Design work for widening and deck replacement on the Maury River bridge has begun also.

- ◆ Mile markers 240.6 to 253 (Rockingham County). Design work for the Harrisonburg area will be divided into three projects. Requests for proposals from consultant designers for two of the projects were advertised in the first quarter of 2000. VDOT staff will be designing the third project. Design work is scheduled to begin in 2000.

- ◆ Mile markers 312 to 320 (Frederick County). Design work for the Winchester area will be divided into three projects. Requests for proposals from consultant designers for two of the projects are being advertised in the first quarter of 2000. VDOT staff will be designing the third project. Design work is scheduled to begin in 2000.

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