

# **Integrated Efforts in North Carolina Prove Effective in Reducing Fatal, Truck-Involved Crashes**

**Colonel David Richards  
Commander  
North Carolina Division of Motor Vehicles  
Enforcement Section**

**R.G. Hughes, Ph.D.  
University of North Carolina  
Highway Safety Research Center**

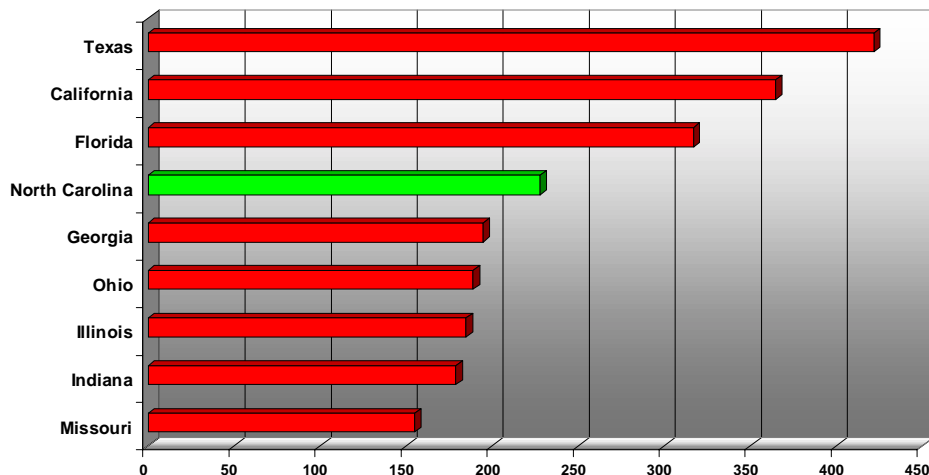
**February 2000**



## Integrated Efforts in North Carolina Prove Effective in Reducing Fatal, Truck-Involved Crashes

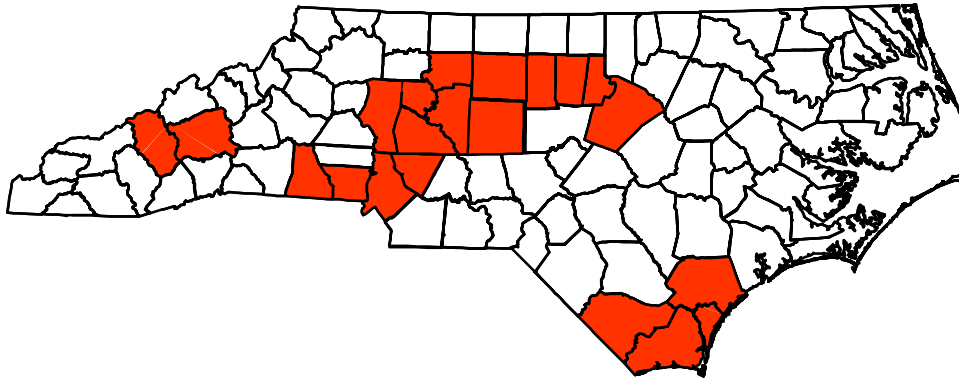
In recent years, North Carolina has ranked as one of the worst states in the nation in terms of the number of fatal, truck-involved crashes. In 1998, North Carolina was ranked 4<sup>th</sup> on NHTSA's 'Top Ten' list of states having the greatest number of fatal truck-involved crashes (see Figure 1). Needless to say, crash reduction ranks very high on the list of performance goals in the state's Commercial Vehicle Safety Plan (CVSP). An integrated program focusing on analysis, legislation, enforcement, adjudication, and program evaluation is beginning to show evidence of a significant reduction in truck-involved fatal crashes. The article describes the basic components of the North Carolina program, one that could serve as a possible 'model' for the rest of the country.

**Figure 1**  
**1998 Data: Top Ten States in Terms of**  
**Large Truck Involved Fatal Crashes**  
**Source of Data: NHTSA**



### A 'Targeted Approach'

In establishing crash reduction goals for the state's FY99 Commercial Vehicle Safety Plan (CVSP), the Enforcement Section of the NCDMV and the Traffic Engineering Safety branch of the NCDOT analyzed truck crashes over the period between August 1995 and January 1998. From this analysis, twenty-one of the state's 100 counties were identified as 'high crash' counties and were specifically targeted by the NCDMV for increased commercial motor vehicle (CMV) enforcement (see Figure 2). '*Increased CMV enforcement*' was defined in terms of an increase in vehicle and driver inspections and an increased focus on citations for serious CDL traffic violations (driving in excess of 15mph over the posted limit, following too close, erratic lane change, reckless, etc).



**Figure 2**  
**21 High Crash County Enforcement Area**

**Addressing the Judicial Component.**

Combined with increased efforts in the areas of roadside inspections and traffic enforcement activities, the NCDMV also increased its public education and public awareness efforts and instituted an adjudication tracking process aimed at increasing the percentage of as-charged convictions for serious CDL violations. Related to an increased focus on the adjudication process, per se, the state also began an effort to develop an effective judicial outreach program to increase the awareness of prosecutors and judges as to the seriousness of serious CDL violations. The goal was to decrease the number of dismissals and to increase the number of as-charged convictions.

**More In-depth and Better Coordinated Analysis Efforts**

To better track the effectiveness of DMV Enforcement efforts, the state MCSAP program contracted with the University of North Carolina Highway Safety Research Center (HSRC) to augment DMV’s own analysis and program evaluation capability. Concurrent with NCDMV program, the North Carolina Governor’s Highway Safety Program (GHSP) funded the Highway Safety Research Center to conduct more extensive problem identification efforts than had previously been carried out. This involved analyzing CMV-involved crashes over a five-year period (1993-1997), both fatal and non-fatal crashes. Thus, while HSRC efforts supported by the GHSP focused more on crash causation, the HSRC efforts supported by the MCSAP focused more on documenting the *effectiveness* of specific CMV enforcement actions.

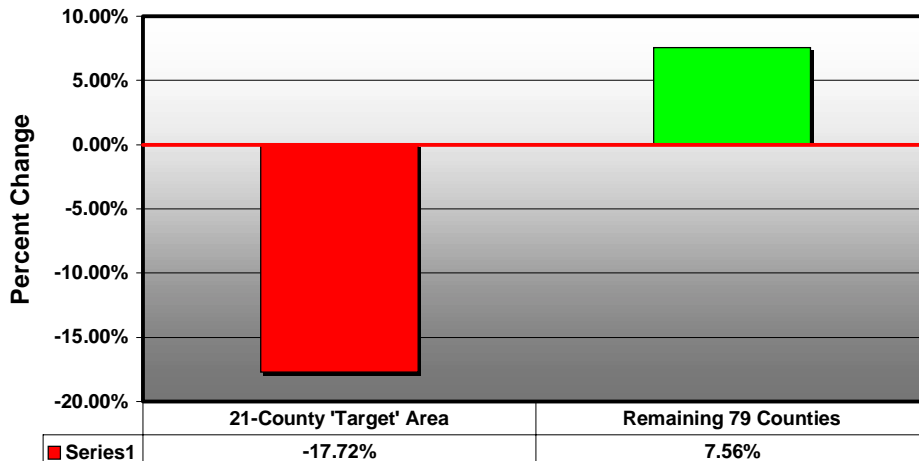
**Expanded Effectiveness Through Partnering.** In an effort to extend/expand the resources available in the state for CMV-related enforcement, the MCSAP program continues to engage in ‘partnering’ efforts with other local and state law enforcement agencies. While the roadside (in particular vehicle) inspection program remains firmly the responsibility of MCSAP and CVSA-trained personnel, ‘wolf pack’ operations conducted statewide with other agencies provide effective means of joint CMV traffic enforcement. Outside these specific wolf pack operations, DMV efforts are also

underway to better document and coordinate the level of CMV enforcement occurring on a day-to-day basis (e.g., between the NCDMV and the State Highway Patrol).

## Results

**Reduction in Fatal Crashes in 21 County ‘Target’ Area.** The results focus on improvements observed during FY99 compared to FY98. In terms of roadside inspection activity, North Carolina conducted 129 percent more inspections in FY 99 in the 21-county target area than in FY98. The majority of these inspections were Level II and Level III, with a particular emphasis on the *driver*. Citations for serious CDL traffic violations increased statewide in FY99 between 50 and 300 percent, depending upon the particular offense. The vast majority of CDL citations continued to be for speeding. The data show that 61% of all serious CDL citations were issued in the 21 county area. The effect of this targeted increase in enforcement activity was a 17.7 percent *reduction* in fatal truck-involved crashes in the 21-county area. Outside the 21-county area, inspections decreased, and while this decrease in roadside inspections did not have the effect of increasing crashes (crashes actually decreased 4-5 percent), the number of fatal truck-involved crashes *increased* by 7.6 percent compared to the preceding fiscal year (FY98).

**Figure 3**  
**Number of Commercial Motor Vehicles Involved in Fatal Crashes 'Down' 17.7% from FY98 to FY99 in 'Target' Area; Up 7.6% Elsewhere in the State**

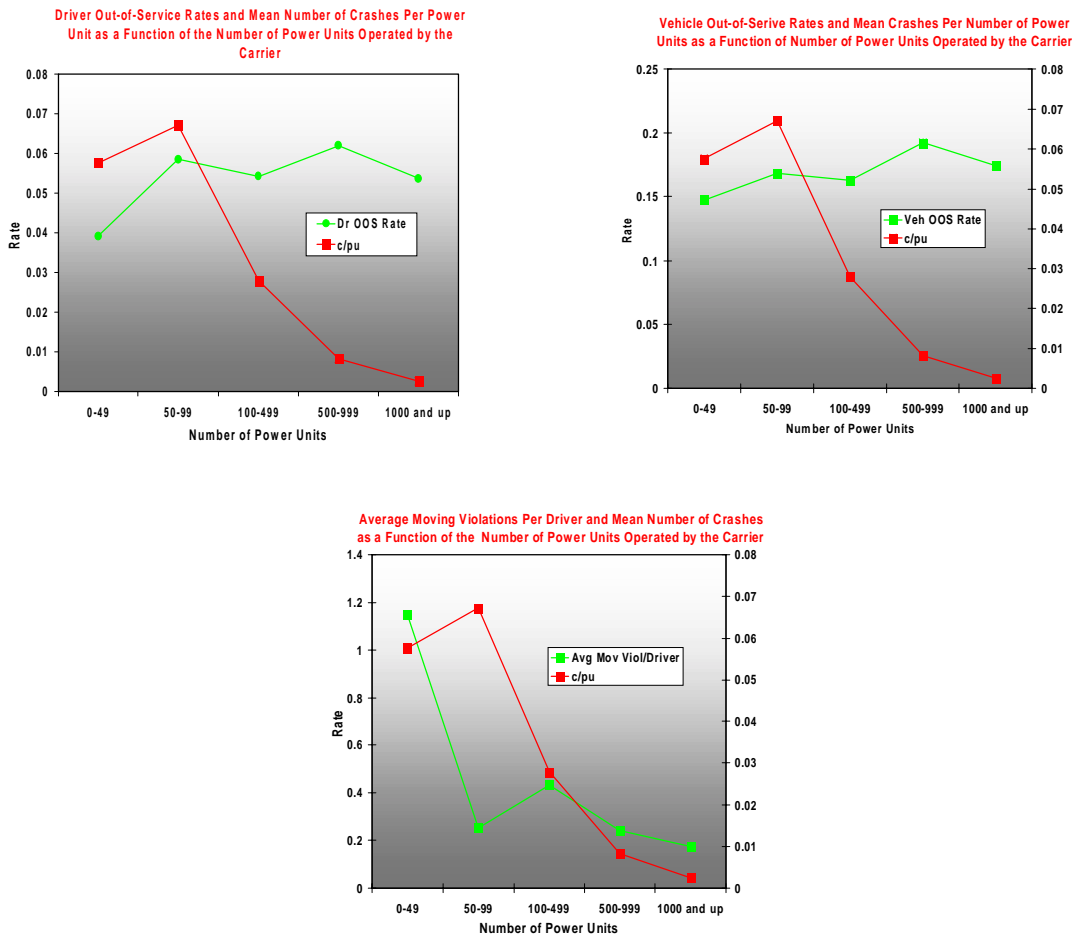


**Evidence for Increase in Convicted-As-Charged Outcomes.** Adjudication tracking efforts indicated evidence of a modest increase in the as-charged rate for some serious CDL violations (e.g., speeding). The frequency with which charges are either reduced or dismissed (no conviction) remain important concerns in the effective prosecution of CDL offenses in North Carolina. Tracking, itself, remains a difficult and time consuming process, but one which the MCSAP office feels is critical along with more effective judicial outreach. Legislation and enforcement provide little deterrent without effective prosecution.

**Enactment of New Truck Safety Legislation.** Two other areas which are likely to begin impacting truck safety in North Carolina in FY2000 are (1) the enactment of new truck safety legislation (House Bill 303) which provides for CVSA civil penalties, (2) a zero tolerance policy for alcohol possession, and (3) the adoption by the NCDOT of selective lane restrictions currently on specifically identified sections of multi-lane (3 or more) interstate roadways.

**More Analysis Focus on the ‘Carrier.’** In terms of GHSP-supported problem definition efforts, HSRC analyses focused attention on several areas: (a) the high percentage of fatal truck-involved crashes on rural NC and US-numbered routes, (b) a high percentage of ‘angle’ crashes occurring at/near intersections or other ‘access’ points, and (c) a rate of multiple vehicle, tractor trailer-involved *fatal* crashes that was increasing at a faster rate than the number of tractor trailer miles traveled in the state. The NCDMV has also been making use of the A&I On-line data now available on the Internet. The carrier level data, in particular, has been instructive in pointing out that variables such as the average number of moving violations per driver (for a carrier) may be more predictive of a carrier’s crash *risk* than driver and/or vehicle out of service rates (see Figure 4). Such data support North Carolina program objectives that call for more inspection attention being paid to the driver, and increased emphasis being placed on the enforcement of serious CDL traffic violations

**Figure 4**  
**Carrier Data Showing Relationships Driver Moving Violations, Vehicle and Driver Out-of-Service Rates, and Carrier Crash Risk**

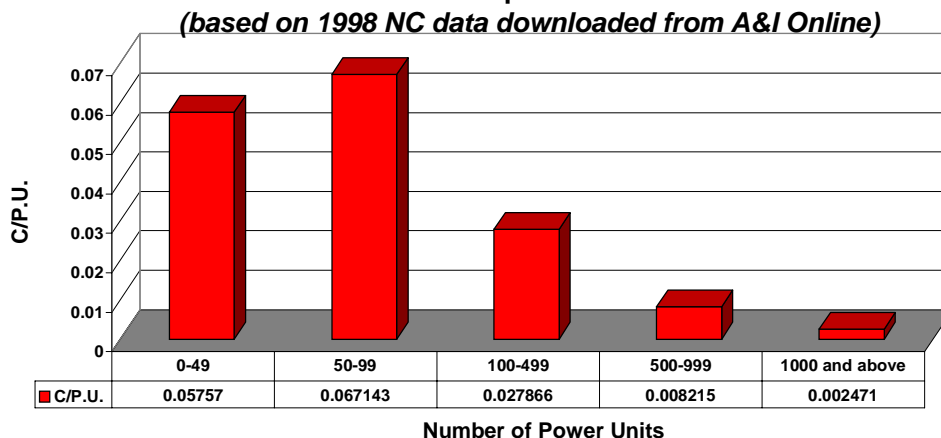


**Rethinking the Sufficiency of No-Zone Focus.** The analysis focus on ‘angle’ crashes in North Carolina raises concerns about the sufficiency of the *No-Zone* program emphasis on driver blind spots and suggests that perhaps more emphasis needs to be placed on the risk associated with *uncontrolled or limited control access points, vehicle speeds, and truck-specific braking constraints*. Truck-involved, angle crashes, according to the North Carolina crash data, are those with the highest *joint* probability of occurrence and probability of being fatal. As North Carolina’s population moves into formerly ‘rural’ areas, roadway design and traffic control methods often are not able to keep pace. As change occurs, the presence of work zones poses an increasing problem. Legislation in House Bill 303 increases fines for trucks speeding in work zones to a minimum of \$500 plus court costs. DMV is now involved in specific, targeted efforts to monitor work zones, and GHSP is supporting research efforts specifically addressing safety in work zones.

**What Next?**

From an analysis standpoint, MCSAP supported work continues to be focused on documenting the variables which affect CMV enforcement efforts (i.e., documenting the ‘process’ as well as the ‘outcomes.’ On the GHSP side, work is in progress to create a GIS-based, spatially referenced interface to CMV crash data. The work is being pursued by the UNC Highway Safety Research Center in conjunction with the North Carolina Center for Geographic Information and Analysis (NCGIA) in Raleigh. The GIS-based system approach will provide a more intuitive, visual interface to the CMV crash and enforcement data, and will provide a useful tool for more effective spatial targeting of limited DMV resources. On the MCSAP side of the effectiveness equation, analysis work is beginning to place an increased emphasis on the ‘carrier.’ Work conducted to date using data available from the A&I On Line web site has shown the crash risk (crashes per power unit) of smaller carriers operating in the state to be significantly higher, raising the issue of whether one should target those at the greatest risk or those who, by their size alone, contribute most to the absolute number of crashes.

**Figure 5**  
**Mean Number of Crashes Per Power Unit as a Function of the Number of Carrier-Operated Units**



Continuous tracking of CMV crash results has pointed out the 'dynamic' nature of the 'target' area; that is, counties on the original list of 21 no longer appear on the list while others are emerging to take their place. The challenge for the NCDMV is how to *sustain* the demonstrated level of crash reduction in the original 21 high crash counties while *expanding* its increased enforcement model the newly emerging hi crash counties and ultimately to state as a whole.

In addition to CVSP goals in crash reduction, NCDMV efforts are also addressing improvements in data quality as well as CVISN improvements that will permit rapid network-based access to driver, vehicle, and carrier data on-line. The adoption in FY2000 of a new, integrated crash report form will eliminate the older 349C dual track method of reporting and tracking CMV-involved data. Along with the installation of laptop computers and sophisticated software, North Carolina expects to eliminate or greatly reduce most of its major 'data quality' problems.

### **Summary**

North Carolina has demonstrated an ability to reduce CMV-involved crashes through a targeted approach of increased roadside inspections and increased enforcement of serious CDL traffic violations. More effective targeting of limited resources has been made possible through improved analysis, problem definition, and program evaluation capabilities. The North Carolina 'model,' if you will, also relies on effective adjudication tracking, judicial outreach, and public awareness training. The 'test' of the model will now be to determine how effectively it can be generalized beyond the original 21 county focus area, while sustaining the improvements demonstrated to date, and while doing so within the constraints of available resources.