

# THE 5E APPROACH TO WORK ZONE SAFETY

## SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION (SCDOT)

### Objective

The goal of SCDOT's 5E Approach to Work Zone Safety is to reduce crashes, along with their resultant injuries and fatalities, within the State's work zones.

The SCDOT is legislatively mandated to provide a safe and efficient transportation system for the people of South Carolina and visitors to the State.

### Approach

#### Background

In 2000, a statewide safety summit was convened to address highway safety issues. Summit participants developed recommendations based on the "5E's" of Education, Engineering, Enforcement, Emergency Medical Services (EMS), and Economic Development. SCDOT utilized summit recommendations compiled from all 5E areas to develop their 5E Approach to Work Zone Safety.

Also in 2000, SCDOT enacted a program to complete 27 years of road construction within a 7-year period. In addition to this increase in construction activity during this period, the State also experienced an increase in licensed drivers, number of vehicles, and annual vehicle miles of travel (VMT). The 5E approach was used to not only mitigate the anticipated increase in crashes due to the coupling of demographic changes with an aggressive construction program, but also to reduce both the occurrence and severity of crashes below the statistical mean.

Key elements of the program grouped according to the 5E's are described below.

#### Education

The leading cause of work zone-related crashes in South Carolina is driving too fast for conditions. Motorists have little or no comprehension of the danger that excessive speed poses to drivers and workers in the work zone, so education is the key to increasing safety conscious behavior. Drivers need to understand the risks of speeding through work zones and apply defensive driving techniques. They also must be aware of fines and penalties that are imposed for violation of the law.

SCDOT along with other public and private sector entities developed a comprehensive campaign to transform attitudes and modify thinking that leads to unsafe driving behavior. This social marketing campaign included television public service announcements, billboards, and formal educational curricula.

To address the emotional factors that lead to unsafe behavior, campaign elements highlight the danger of excessive speed, inattention, and distractions while driving and focus on strategies to avoid them, such as better time management, leaving early on trips, and planning ahead for potential delays. As shown in Figure 1, advertising and public service announcements portray work zone crashes from the perspective of the victim and sensitize the public to the impact unsafe behavior has on workers and their families.

Figure 1. South Carolina Work Zone Safety Campaign



Each year new campaigns are launched, building on work done in the previous year. A campaign featuring workers' real children on billboards and in commercials was followed the next year by a campaign based on human interest stories of a worker and a marine killed in South Carolina work zones. Each year, ads aired thousands of times, with media outlets donating slots in excess of those purchased.

Through a three-year partnership with Clemson University, SCDOT developed a comprehensive K-12 traffic safety curriculum addressing work zone safety. It was tested in 19 school districts with a combined enrollment of over 3,000 students. Test results show a significant increase in safety awareness among participants. This program won the South Carolina Department of Education's 2004 Innovations in Education award.

SCDOT also partnered with Wilbur Smith and Associates to develop work zone training for driver education students in Richland and Lexington Counties. The program received tremendous support across the board and won an American Traffic Safety Services Association (ATSSA) award in 2004. SCDOT also partnered with the South Carolina Driver Education Association to provide instructional materials on work zone safety to classes statewide.

### Engineering

Work zones that look and feel consistent to motorists across jurisdictions provide drivers with an environment that better meets their expectations and promotes safety. Training for workers and contractors is critical for establishing this uniformity in work zone set up and utilization. A Work Zone Safety Committee consisting of members from SCDOT and the Federal Highway Administration (FHWA), with input from Associated General Contractors (AGC), counties, municipalities, EMS providers, and law enforcement agencies, was established to address these issues. As a result of this effort, uniform training to insure consistency has been provided to SCDOT personnel and personnel from contractors, local governments, municipalities, and law enforcement.

SCDOT's Work Zone Safety Committee reviews work zone crash data on a quarterly basis, develops policy recommendations, and modifies established procedures to improve work zone safety. The Committee also has created a Work Zone Certification and Training Program and has established Personal Protective Equipment (PPE) requirements. A Work Zone Inspection Team, established by SCDOT, conducts operational reviews of work zones statewide on a semiannual basis. Inspection findings are shared with agency managers and executive leadership.

### Enforcement

Two issues initially identified with the insufficient enforcement of work zone safety laws were lack of funding (manpower) to adequately patrol work zones and lack of information about them i.e., where they are planned and when work will take place. This lack of knowledge prevents enforcement agencies from properly scheduling personnel and enforcement activities in work zone areas.

To address these issues, SCDOT partnered with South Carolina Department of Public Safety (SCDPS), the AGC, the 16 South Carolina Law Enforcement Networks (LEN), and local law enforcement agencies to create and implement the High-Visibility Work Zone Enforcement Initiative shown in Figure 2. This initiative combined public outreach, in the form of television ads and billboards informing the public of zero tolerance for speeding in work zones, with concentrated high-visibility enforcement efforts.

**Figure 2. High-Visibility Work Zone Enforcement Initiative**



In preparation for this initiative, SCDOT engineers worked with enforcement personnel to identify potential problems and develop solutions prior to implementation. Some of the solutions prescribed include providing law enforcement with advance notification of work zones, designing

work zones to accommodate enforcement efforts, and establishing contacts and defining procedures to resolve problems encountered during the initiative.

## EMS

SCDOT enlisted the support of the EMS community through the South Carolina Public Information, Education and Relations in EMS (SC PIER) team, a nationally recognized organization designed to maintain the image of EMS services and educate the public about EMS.

SCDOT reached out to SC PIER and provided presentations and other supporting materials for the work zone campaign to them. SC PIER agreed to help by including information and handouts to participants in their educational programs.

Because SC PIER is successful at promoting and maintaining a positive image of EMS among the public, and due to their expertise, deep concern for preventing injuries and fatalities, and ability to command the attention of the community, they are an excellent partner in the promotion of work zone safety and the education of the citizens of South Carolina.

## Economic Development

The cost of collisions, injuries, fatalities, and property damage affect everyone, both statewide and across the nation. According to the National Safety Council, each fatality imposes \$1,120,000 in direct and indirect costs on society, while incapacitating and non-incapacitating injuries impose costs of \$55,500 and \$18,200 respectively. These costs are unacceptable and reducing them is a major focus of this effort. Improving work zone safety will have a positive impact on the number of fatalities and injuries thereby improving the economic outlook for the State.

## Resources

Resources for the initiatives implemented under this plan include agreements and partnerships with other states, most notably the North Carolina Department of Transportation and North Carolina Occupational Safety and Health Administration, as well as other state agencies in South Carolina, including the Department of Labor, Licensing, and Regulation, South Carolina Educational Television, and the Department of Public Safety (Highway Patrol and Transport Police Divisions). Law enforcement partners include the Sheriffs Association, Chiefs of Police, police agencies statewide, and members of the 16 LENS. Counties and municipalities also participated in these initiatives, including coroners and school districts. Emergency Nurses CARE participated, as did Clemson University and Mothers Against Drunk Driving. Other private sector partners include the AGC, J.J. Keller, 3M Corporation, the South Carolina Trucking Association, and MTS Safety Supply.

Funding was established for advertising and other campaigns under a three-year grant from SCDPS using 402 funds. Airtime for commercials was financed with FHWA Surface Transportation Program (STP) funds designated for safety.

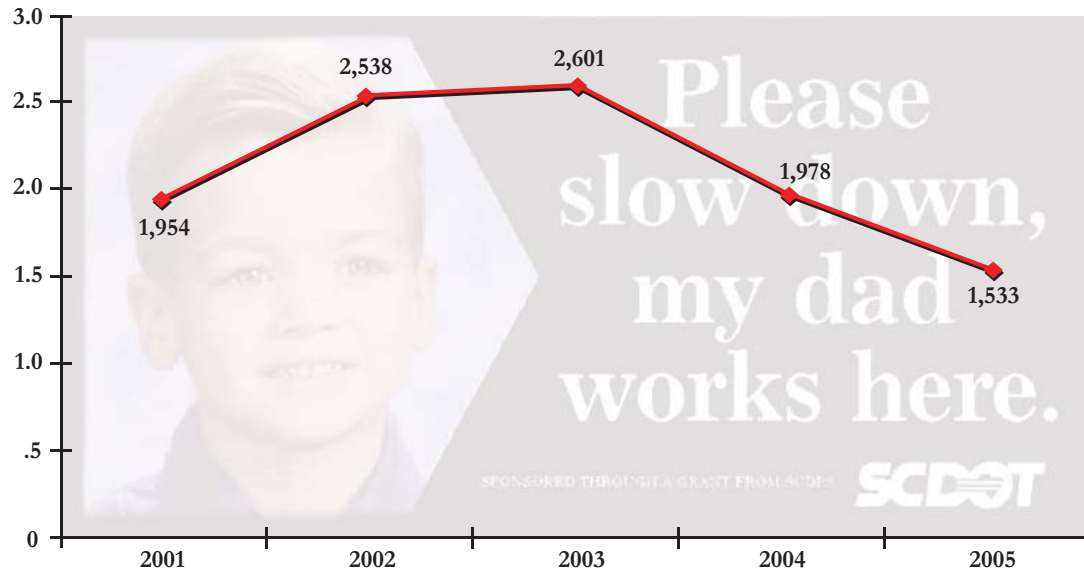
## Outcomes

Work zones and work zone construction nearly quadrupled from 1999 through 2005; however, work zone crashes decreased from the 2001 level of 1,954 to 1,533, a reduction of 21.5 percent (see Figure 3). Because of changes in the methodology used to determine whether a crash occurred within a work zone, statistics before 2001 are not comparable. Fatalities decreased by 48 percent overall, from 22 in 2001 to 11 in 2005, representing an annual reduction in costs of \$12,320,000.

The most dramatic reductions were experienced between 2003 and 2005. The advent of additional education and concentrated advertising that emphasized the humanity and vulnerability of workers in the work zone, coupled with heightened law enforcement awareness and implementation of stronger enforcement efforts, resulted in the dramatic reductions in crashes and their resultant injuries and fatalities.

Figure 3. Work Zone Crashes in South Carolina

Number of Crashes (in Thousands)



## Performance Measures

SCDOT has several goals for the work zone safety initiative. These include an overall reduction in the South Carolina fatality rate to within 10 percent of the national average and a reduction of work zone fatalities by 25 percent.

SCDOT also tracks the effect of the initiatives on public attitudes toward work zone safety. Studies performed as part of SCDOT's Work Zone Safety Campaign Awareness Tracking Study indicate awareness of highway safety among South Carolina drivers has increased as a result of the campaign. According to the surveys, public opinion regarding increasing fines has become increasingly supportive. In 2003, 66 percent of the public were favorable to an increase, but by 2005, the favorable rating had risen to 73 percent.

Other findings from the 2005 campaign evaluation show that:

- 88 percent of respondents agree with having enforcement blitzes for work zone safety;
- 78 percent believe the blitzes are an effective way to get drivers to slow down in work zones;
- 95 percent have heard the campaign slogan;
- 94 percent have seen signs; and
- 84 percent have seen "The Children" signs.

Terecia Wilson  
South Carolina Department of Transportation  
803-737-1161  
wilsontw@scdot.org  
www.dot.state.sc.us

Best practices are being identified and documented by the  
Transportation Safety Planning Working Group  
(TSPWG). For more information go to [tsp.trb.org](http://tsp.trb.org) or  
[www.fbwa.dot.gov/planning/SCP](http://www.fbwa.dot.gov/planning/SCP).

**TSP**  
TRANSPORTATION SAFETY PLANNING  
**planning**  
**it safe**