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Strategic Plan for Improving Roadside Safety

This digest summarizes the results of NCHRP Project 17-13, "Strategic Plan for Improving Roadside Safety."

The strategic plan represents the ideas and thoughts of nearly 200 roadside safety professionals.

This digest is based on a draft final report prepared by Dr. Richard G. McGinnis, Bucknell University.

This digest provides an overview of a strategic plan for improving roadside safety. Many of the action items outlined in the plan can be immediately implemented by safety practitioners at minimal or no cost.

INTRODUCTION

Each year, roadside crashes cost the United States an estimated \$110 billion, killing approximately 15,000 people and injuring another 100,000. Many of these crashes involve single vehicles that run off the road and either overturn or crash into a fixed object, such as a tree or pole.

Despite dedicated efforts over the past three decades to improve highway safety, roadside safety remains a major problem. The ever-changing characteristics of vehicle fleets, driver populations, traffic conditions, and highway environments make improving roadside safety a difficult task. In fact, addressing roadside safety problems may represent an even greater challenge than that of improving highway safety.

The importance of improving roadside safety has been recognized by different organizations, including the Federal Highway Administration (FHWA), the American Association of State Highway and Transportation Officials (AASHTO), the National Highway Traffic Safety Administration (NHTSA), the Transportation Research Board (TRB), and others. In 1995, AASHTO addressed this need by initiating NCHRP Project 17-13, "Strategic Plan for Improving Roadside Safety."

A panel of 15 prominent roadside safety experts from FHWA, NHTSA, state departments of transportation, universities, safety hardware manufacturers, vehicle manufacturers, and a safety advocacy group was

formed to develop the strategic plan. A number of multiday meetings were held, with many additional people participating at different times in the plan development. This process produced a strategic plan with 5 missions, 25 goals, 78 objectives, and 359 action items, all of which are directed toward establishing a highway system in which drivers rarely leave the road, but in which when they do, the vehicle and roadside work together to protect vehicle occupants and pedestrians from serious harm.

MISSIONS

To establish such a system, five targeted missions were identified. Each mission is a focused group of efforts needed to improve roadside safety. The set of five missions addresses the full realm of endeavors needed to solve the roadside safety problem.

Mission 1: Increase the awareness of and support for roadside safety

Roadside safety cannot be improved until people see it as a problem. In addition, significant improvements to roadside safety require a coordinated effort of the many involved organizations, manufacturers, and stakeholders. Increased funding is needed to implement the initiatives of the strategic plan. A coalition of governmental, industrial, institutional, and civic partners needs to be formed to work toward the improvement of roadside safety. The general public, decisionmakers, and special interest groups can be made aware of the roadside safety problem through public information campaigns. With this awareness, support for safety

funding at the federal, state, and local levels can be generated.

Mission 2: Build and maintain information resources and analysis procedures to support continued improvement of roadside safety

A better understanding of the driver-vehicle-roadway relationship associated with roadside crashes is needed so that the most cost-effective remedies can be perfected. Less expensive methods for ensuring the compatibility between roadside hardware and the increasingly diverse vehicle population are required. Improved roadside and roadway inventory systems that are based on a common location referencing system need to be created to provide sufficient roadside safety information to researchers, designers, and decisionmakers. State-of-the-art computers and analysis techniques need to be used to study roadside crashes and to simulate hardware crash tests. Safety audits and other techniques should be used to identify hazardous roadside locations.

Mission 3: Prevent vehicles from leaving the roadway

Roadside crashes occur when vehicles leave the roadway. Loss of vehicle control can result from driver errors, driver incapacity, vehicle failures, highway conditions, busy traffic situations, or environmental factors. Consistent and improved highway designs and better control of traffic operations can be used to reduce the occurrence of events that contribute to losing vehicle control and to roadside encroachment. In addition, improved maintenance of highways and vehicles will reduce the chance of losing vehicle control. Innovative vehicle-based systems that help keep drivers on the road need to be developed. Driver behavior will be enhanced through education, training, legislation, and traffic law enforcement.

Mission 4: Prevent vehicles from overturning or from striking objects on the roadside when they leave the roadway

The chances of severe injury or death increase greatly when an errant vehicle overturns or hits a fixed object. Utility poles, trees, steep sideslope, drainage facilities, and

roadside hardware are potential hazards to roadside encroachers. Roadside geometry needs to be improved to reduce the chances of rollover. Hazardous fixed obstacles in the roadside need to be removed or modified where possible. Improved vehicle designs that increase vehicle stability in run-off-the-road situations need to be developed. Driver performance must be improved through education and training.

Mission 5: Minimize injuries and fatalities when overturn occurs or when objects are struck in the roadside

When overturn occurs or when fixed objects are struck, the severity of the injuries is particularly grave if occupants are not wearing their safety belts. Increased use of safety belts needs to be promoted through advertising, training, legislation, and enforcement. Air bags and padded vehicle interiors are also effective, but new safety advancements in vehicle design are possible. Better roadside hardware designs and improved vehicle crashworthiness need to be developed. The selection, design, installation, and maintenance of roadside features must be optimized. Better emergency team responsiveness for highway crashes needs to be achieved.

GOALS

Under each mission, a set of goals was developed. These goals describe the desired outcomes of each mission. The goals for Mission 3 are shown in Table 1.

OBJECTIVES

Each goal has several objectives that describe the various tasks that must be accomplished to realize the goal. For example, the objectives for Goal 3.1 (see Table 2) require a change in how highway designs are produced. First, the relationships between highway designs and roadside crashes must be understood so that the design tools needed to improve highway design can be developed (see Objective 3.1.1). When these tools have been developed, design policies and guidelines must be modified to take advantage of

TABLE 1 Goals for Mission 3

Goal	Description
3.1	Improved highway designs that reduce the probability of vehicles leaving the roadway
3.2	Improved traffic-operating environment that reduces the occurrences of events contributing to losing vehicle control and to roadside encroachment
3.3	Sufficient maintenance of highways and vehicles to reduce the probability of losing vehicle control
3.4	Improved vehicle-based systems that help keep drivers on the road
3.5	Improved driver performance and behavior

TABLE 2 Objectives for Goal 3.1

Objective	Description
3.1.1	Develop the tools to allow highway designers to incorporate safety into the design process
3.1.2	Enhance design policies and guidelines to include safety considerations
3.1.3	Enhance the highway designer's understanding of the effects of highway design on roadway safety

TABLE 3 Action Items for Objective 3.1.1

Action Item	Description
3.1.1.1	Develop a better understanding of the effects of highway geometric design on roadside safety (e.g., sight distance, superelevation, and curvature)
3.1.1.2	Develop techniques to promote consistent designs that conform to driver expectations
3.1.1.3	Develop improved hazard identification tools to identify potentially hazardous roadside designs and features on all roadways, including local roads
3.1.1.4	Investigate the use of safety audits in the roadway design process
3.1.1.5	Develop uses of three- and four-dimensional visualization technologies to improve the design of highways

the new techniques (see Objective 3.1.2). Finally, highway designers must be trained so that they are aware of the effects of their designs on roadway safety and are capable of incorporating the new procedures into their work (see Objective 3.1.3).

ACTION ITEMS

Each objective has several action items that refer to explicit activities or research needed to achieve the objective. An action item is usually specific enough that it can be accomplished with a single research project or management directive. For example, Objective 3.1.1 has five action items (see Table 3). Action Item 3.1.1.1 addresses the basic research needed to understand the relationships between highway geometric design and roadside safety. Action Item 3.1.1.2 seeks to find ways to implement designs that are consistent with driver expectations. Action Item 3.1.1.3 addresses the need to be able to identify potentially hazardous designs so that they can be fixed before they are built. Action Items 3.1.1.4 and 3.1.1.5 suggest specific techniques for carrying out Objective 3.1.1. The action items are not necessarily all inclusive, but they do provide definitive projects that, if carried out, move roadside safety professionals closer to attaining the stated objective.

The details provided in the strategic plan represent the ideas and thoughts of nearly 200 roadside safety professionals who participated in the preparation of the plan. Although

the plan is insufficient in its present form to completely solve the roadside safety problem, it does set the stage for the initiation of a unified effort to improve roadside safety.

FINAL REPORT

The final report, published on-line as *NCHRP Web Document 33*, "Strategic Plan for Improving Roadside Safety," describes the development of the plan and includes a complete outline of the missions, goals, objectives, and action items. The web document can be found on TRB's website at <http://www4.trb.org/trb/onlinepubs.nsf>.

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