

# **STRATEGIC HIGHWAY SAFETY PLANS: A FACTOR IN REDUCING HIGHWAY FATALITIES IN THE UNITED STATES**

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## **ABSTRACT (English)**

In 2005, a new United States federal surface transportation act, the *Safe Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users* (SAFETEA-LU) was signed into law. Among hundreds of other provisions, this law required every State in the US to develop and implement a State Strategic Highway Safety Plan (SHSP). The SHSPs are multidisciplinary, data-driven plans that address engineering, education, enforcement and emergency services as key factors in solving the highway fatality problem.

In 2005, when SAFETEA-LU was passed, the US had over 43,000 highway fatalities – the highest number since the early 1990s. By September 2007, all States had developed a SHSP, and the emphasis areas where they planned to focus their attention to reduce fatalities ranged from reducing roadway departure crashes to reducing distracted driving to improving data and data systems. In 2009, only five years after SAFETEA-LU, the fatality figure in the US is at a historic low of fewer than 34,000 deaths.

This paper reviews the changes that have occurred in the US in this time frame and discusses how they may have impacted the fatality figures. Just as crash causation is tied to many factors, reductions in crashes will be related to many factors as well.

## **EXTRACTO (Español)**

En agosto de 2005 el Congreso de los Estados Unidos de América aprobó la ley habilitadora para la transportación terrestre conocida como *Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users* (SAFETEA-LU). Entre sus provisiones, esta ley requirió a los estados desarrollar planes estratégicos de seguridad vial (SHSP por sus siglas en inglés). Estos planes de enfoque multidisciplinario contemplaron aspectos de infraestructura, educación, cumplimiento de las leyes y manejo de emergencias como factores determinantes para reducir las muertes causadas por accidentes de tránsito.

Para ese mismo año, el número de muertes en las carreteras alcanzó las 43, 510; la cifra más alta registrada en los Estados Unidos desde principio de la década de los '90. Dos años después, los estados instituyeron planes de acción (SHSP) que incluían diversas estrategias para reducir accidentes. A cinco años de que SAFETEA-LU entrara en vigor, el número de muertes en la carreteras se redujo a menos de 34,000; la cifra más baja alcanzada desde 1954.

Este documento recoge la multiplicidad de políticas y estrategias implantadas en los Estados Unidos en los pasados años y el impacto que éstas han tenido en la reducción de muertes en las carreteras.

## 1. HISTORY OF HIGHWAY SAFETY PROGRAMS IN THE UNITED STATES

In the 1890's, the League of American Wheelmen, a bicycling group, was the leading organization behind the first "good roads" movement in the United States. The League was a prominent advocacy group for the improvement of roads in the US long before the advent of the automobile. In 1893, the first federal road agency, the US Office of Road Inquiry, was organized within the Department of Agriculture, with a mission to investigate the best methods to make roads [1]. Before that time, individual States had addressed road issues, with most of the emphasis on moving goods to markets. In 1908, about 700 people were killed on roadways in the United States (0.78 per 100,000 population) [2] so roadway safety issues were not actively considered.

By 1921 the number of highway deaths had dramatically increased to over 13,000 (over 12 per 100,000 population) [3]. In 1956 a critical Federal Aid Highway Act was passed that began the development of the interstate highway system. The first major legislation for highway safety, however, wasn't enacted until the 1960's.

### 1.1 United States Highway Safety Legislation

In 1966, over 50,000 people were killed in traffic crashes in the United States – a fatality rate of 5.5 per 100 million miles (3.4 per 100 million kilometres) of travel or 25 per 100,000 population [4]. This represented a 35 percent increase in deaths in just five years, although vehicle miles travelled had only increased about 25 percent in that time. Clearly action was needed. The United States Congress enacted the Highway Safety Act of 1966, establishing the States' Highway Safety Programs. The act required each State to have a program, approved by the Secretary of Transportation, to reduce traffic accidents and deaths. The act also authorized States to use federal funds to develop and strengthen their highway traffic safety programs in accordance with uniform standards. The legislation was fairly broad in terms of emphasis areas, including provisions for effective record keeping, vehicle registration and inspection, traffic surveillance, driver and pedestrian performance, highway design and maintenance, and emergency services.

Although the States responded with plans and programs, by 1973 the US had reached an all-time high for highway fatalities with over 55,000 deaths. The Highway Safety Act of 1973 established the Highway Safety Improvement Program which emphasized infrastructure improvements, including the Highway-Rail Crossing and Hazard Elimination Safety Programs.

In the 1970s and 1980's traffic fatalities in the US headed downward, with approximately 41,000 deaths in 1990 (18 per 100,000 population) [5]. The 1990's, however, were relatively stagnant in terms of saving lives – with totals hovering between 40,000 and 42,000 fatalities annually. In these years, the Highway Safety Improvement Program, the primary federal source of funding for infrastructure safety projects, was not a core program for the Federal Highway Administration, but rather a small set aside within a larger program.

### 1.1 Today's Highway Safety Infrastructure Legislation

In 2005, a new United States federal surface transportation act, the *Safe Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users* (SAFETEA-LU) was signed into law. The largest surface transportation investment in the Nation's history, SAFETEA-LU included over \$244 Billion for highways, highway safety and public

transportation. It built on previous legislation and refined programs necessary to continue to improve US transportation.

SAFETEA-LU changed many aspects of the Federal Highway Program, but most significantly for highway safety, the Highway Safety Improvement Program (HSIP) was raised a core program, and the funding doubled to over \$1 billion annually. Among the many changes to the HSIP, one of the most significant was the requirement for every State to develop and implement a State Strategic Highway Safety Plan (SHSP).

## **2. DEVELOPING STATE STRATEGIC HIGHWAY SAFETY PLANS**

Before the passage of SAFETEA-LU, some States had begun to address the interdisciplinary nature of traffic crashes through development of comprehensive highway safety plans. However, such approaches were not widespread and were often implemented because of the drive and determination of a small group of individuals. A collaborative, interdisciplinary approach to improving road safety was the exception rather than the norm. The obligatory SHSPs in SAFETEA-LU required each State to develop a multidisciplinary, data-driven plan to address engineering, education, enforcement and emergency services (“the 4Es”) as key factors in solving the highway fatality problem.

By 2007, all 50 States, plus the District of Columbia, had developed their SHSP and identified the emphasis areas where they planned to focus their attention to reduce roadway fatalities. Emphasis areas ranged from reducing roadway departure crashes to improving seat belt use rates.

### **2.1 Legislative and Regulatory Requirements for Strategic Highway Safety Plans**

The SHSP development is led by the State Department of Transportation (DOT). The SHSP is a State-wide, coordinated safety plan that provides a comprehensive framework for reducing highway fatalities and serious injuries on all public roads. The SHSP strategically and collaboratively establishes State-wide goals, objectives, and key emphasis areas in consultation with Federal, State, local, and private sector safety stakeholders. The SHSP makes effective use of crash data, describes a program of projects or strategies to reduce or eliminate safety hazards and is implemented and regularly evaluated. This legislative and regulatory mandate was a new way of approaching the highway safety problem for many States.

#### *2.1.1 Providing a Comprehensive Framework on All Public Roads*

SAFETEA-LU requires the State to develop an SHSP that addresses the 4 Es of highway safety. This comprehensive approach allows safety problems to be addressed through behavioral and infrastructure related strategies and countermeasures.

The US has an extensive transportation network. Over 30,000 State and local governments own and operate the more than 4 million miles (6.4 million kilometres) of roadways. Although the States DOTs are responsible for leading the development of the SHSP, the plan covers all public roadways within the State’s boundaries. Because most of the federally available funding for roadways is focused on larger (often State-owned) roadways, the fact that the SHSP addresses all public roads is important, and HSIP funds can be spent on any public roads. Given that, on average (the figure is different in every State) only about 30 or 35 percent of the network is owned by the States, this emphasis on all roadways is critical to reducing roadway fatalities.

### *2.1.2 Reducing Fatalities and Serious Injuries*

The Highway Safety Improvement Program (HSIP) had been functioning for many years when SAFETEA-LU passed. One of the critical changes in the new legislation, and a specific emphasis in SHSPs, is focusing safety efforts on a particular class of crashes – those resulting in fatalities and serious injuries. Previous HSIP efforts had included reductions in all crashes, sometimes yielding safety programs that addressed minor or property damage only crashes. The new emphasis on fatal and serious injury crashes helps the States focus on reducing those crash types that result in the most severe consequences.

### *2.1.3 Establishing State-wide Goals and Emphasis Areas*

States adopted strategic and performance goals as part of their SHSP development that addressed both behavioural and infrastructure issues. The goals focus attention on the area of greatest need. Emphasis areas provide direction on how and where programs can have significant impacts.

Other planning processes within the State have documented goals, but the SHSP provides a home for the interdisciplinary safety strategic goal that all parties are striving toward. Development of the strategic goal is an opportunity for all partners and stakeholders to have a voice in the final outcomes to be achieved.

The emphasis areas are developed based on analysis of State specific data and cover all of the 4 Es of safety. They provide a rallying point for various players to participate in achieving the goal. Emphasis areas are not project descriptions, but rather more general depictions of the areas that will be focused upon and, to some extent, the types of activities or strategies that will be pursued to achieve the goals.

### *2.1.4 Consulting with Stakeholders*

A wide range of stakeholders are involved in the development and implementation of the State SHSP. The Governor of the State (the highest elected official) approves the plan, and partners involved include the State Department of Transportation, the State Highway Safety Office, regional planning organizations, representatives of major modes of transportation, State and local traffic law enforcement officials, officials responsible for truck and bus safety in the State, motor vehicle (driver licensing and vehicle registration) officials, public health officials and other major stakeholders.

Based on State needs and active organizations, other partners and stakeholders are involved in the SHSP, ranging from not-for-profit organizations focusing on issues such as reducing drunk driving and distracted driving to insurance industry representatives and the business community. A broad base of stakeholders allows for many ideas to be brought to the table at the inception of the plan and insures buy in by all participants.

### *2.1.5 Using Crash Data*

Each State has access to different levels and types of data, and is required to analyze and make effective use of all available State, regional and local crash data in the SHSP development process. A wide variety of data sources are considered including: State traffic records systems (crash data, driver data), police data (citations), medical records, roadway inventories, and traffic data (volume and vehicle type).

While gathering and analyzing data for the SHSP process, some States realized that they needed better data and analysis tools to make more informed decisions. In those States, improvements in data became an emphasis area in the plan. As these data enhancements are implemented, the States have better access to quality data which will be used when the SHSP is updated.

#### *2.1.6 Implementing a Program of Projects*

One of the reasons the SHSP is so critical in the US is the diversity of programs, and therefore funding sources, oriented toward highway safety. At the federal level (US Department of Transportation) there are four major programmatic/funding streams: Federal Highway Administration Programs (infrastructure issues); National Highway Traffic Safety Administration Programs (vehicle, education, and enforcement issues); Federal Motor Carrier Safety Administration Programs (safety issues for trucks and buses); and Federal Railroad Administration Programs (highway rail grade crossings).

Because the SHSP addresses emphasis areas across these programs, the implementation of the plan includes funding, direction and resources from all these sources. Implementation will also include activities well beyond these federal grant programs, using planning and funding processes within each State.

#### *2.1.7 Evaluating the Plan*

States provide annual reports to the Federal Highway Administration on their Highway Safety Improvement Program. These reports, along with other regular re-examinations of data, should be used to regularly update the SHSP. Safety issues may change over time with advancement of new State laws, changes in highway and vehicle design standards, and/or changes in driver behaviour. The SHSP must account for such changes to continue to be a life saving plan.

### **3. IMPLEMENTING STATE STRATEGIC HIGHWAY SAFETY PLANS**

Because political, demographic, geographic and other critical elements are different in each State, the methods for successfully implementing SHSPs have varied across the US. Some States have been quick to move toward making the SHSP an important part of project planning, while others have waited to see how the SHSP fits into their existing transportation planning models.

Despite these differences, almost as soon as States began implementing their SHSPs, lessons learned and best practices began to emerge. A series of peer exchanges brought State safety professionals together to discuss SHSP implementation. A variety of research projects analyzed the effectiveness of various implementation strategies and pilot programs have been initiated to assist States with their implementation process. Through these efforts, some best practices for various aspects of implementing SHSPs have been gathered.

These best practices can be summarized into four major categories: Turning Data into Information; Collaborating across Agencies and Disciplines; Keeping Emphasis Areas Energized; and Leading with Accountability.

### 3.1 Turning Data into Information

A successful SHSP depends on strong data to guide the process toward the most successful strategies. Individual pieces of data are not sufficient to guide the SHSP process. For data to be used in the development, implementation and evaluation of an SHSP, it must be synthesized into useful information.

Data sources relevant to highway safety are housed in a variety of agencies all of which have different primary purposes for gathering the data. The important aspect of turning these varied sources into useful information is to focus on the utility of each data source in more clearly defining the problems that lead to highway fatalities and the strategies that are successful in combating those problems. Furthermore, the more widely the information can be shared, the more likely it is that all necessary partners and stakeholders will understand the importance of the activities. Finding methods of using existing data more efficiently as well as improving data systems and analysis techniques is critical.

One way to improve the utility of data is through development of base maps that include information on every roadway in a State, regardless of ownership. Geo-coded base maps permit all the data sources to have a single portal for locating critical highway safety information – crash locations, roadway features, traffic characteristics, and enforcement efforts – anything that can be tied to a place can be coded and therefore synthesized on one map.

Another way to insure that data becomes informative is to use multiple years of data when considering crashes. Particularly in rural areas, where crashes at a particular location may be infrequent, summarizing data over 3 – 5 years avoids the pitfalls of the randomness of crash locations. In addition, electronic reporting of crashes by police officers improves the timeliness and accuracy of crash data, leading to better decision making.

Finally, because analyzing complex data sets requires sophisticated knowledge and tools, it can be useful for a central body within a State to take on those responsibilities for the regional and local governments. It is crucial that States make good decisions, based on accurate and timely data that is appropriately analyzed.

### 3.2 Collaborating across Agencies and Disciplines

SHSPs include emphasis areas in a wide range of fields, from policy oriented changes to technical engineering countermeasures to outreach and education for road users. No single agency or discipline in a State has the capacity or the knowledge to successfully implement such diverse actions. Further, in some cases those with the best knowledge can be more successful if a novice is added to their team – this provides opportunities for seemingly naive questions from a newcomer that may lead to a breakthrough.

Collaboration takes time, but is critical when resources are scarce. Fruitful collaborations prevent duplication of effort and can leverage resources for particular actions. States that have successfully implemented their SHSPs report that active, regular, and consistent engagement with partners allows everyone to integrate SHSP elements into their plans and programs.

Having aggressive and highly visible goals, as well as clearly described emphasis areas and action plans, can move the collaborative approach forward. Visibility is particularly important – there may be potential partners and stakeholders who were not involved in the development of the SHSP but who may hold the key to some successes. Keeping an open door policy on the composition of the SHSP implementation teams is very important. New participants should be continually sought as appropriate.

Where feasible from a resource perspective, a central coordinator for the SHSP can be very helpful. Although the plan and its implementation are owned by all, a coordinator can step outside the day to day implementation actions and perhaps identify areas of cooperation that specific agencies do not see.

One interesting approach to collaboration is to find those parties who might oppose a particular action and get them involved in the SHSP. A bicycling group, for example, might think rumble strips are hindering their ability to use the road network. They may be interested in working on implementing other areas of the SHSP, however, and everyone can learn more both rumble strips and bicycling safety through their participation.

Finally in some cases, identifying a leader within a certain group of potential partners may be the best way to bring all the partners along. States that have had some problems getting local governments to actively participate in the SHSP implementation have found that getting the trendsetter local agency to the SHSP table helps bring others along.

### 3.3 Keeping Emphasis Areas Energized

The selection of emphasis areas in the SHSP was one of the most critical actions in its development. Keeping the emphasis areas relevant is crucial to implementing the SHSP. Detailed action plans can be time-consuming and laborious to prepare, but can serve as a rallying point when participants need to be energized. The action plans show the clear link between the daily activities of each partner and the emphasis area and final goals.

Some States have found that having too many emphasis areas weakens the SHSP. A small number of areas that are appropriately resourced is more likely to be successful than a long list that does not receive sufficient attention. Using action plans and implementation teams (particularly multi-disciplinary teams) has been a very successful mechanism to implement the SHSP, and can serve to keep the emphasis area fresh. An effective action plan will provide details to all partners on how strategies will be implemented including timelines and clear descriptions of responsibilities of each partner.

Keeping partners engaged and energized can be difficult, but collaboration and regular reporting can facilitate this. One way to keep the emphasis area and actions plans on track (and to keep partners engaged) is to identify what funding sources and programs – federal, State and local – are relevant for that area.

Use of data and performance measures is another way to keep the emphasis areas active. In some States, implementation is tracked and reported separately by emphasis area. In other States, crash data are analyzed and reported by each emphasis area (e.g, reductions in single vehicle roadway departure fatalities or reductions in alcohol impaired fatalities) as well as by the overall goals and objectives. These approaches allow each emphasis area action team to stay aware of how they are performing and how their efforts are leading toward successful achievement of the goals.

### 3.4 Leading with Accountability

In any long term adventure, leadership is obviously critical to success; implementation of the SHSP to reduce fatalities and serious injuries is no exception. Successful implementation will require an investment of resources, financial and human, that can only be achieved through commitments by leaders. The Governor's signature on the SHSP is a first step toward insuring this crucial support, but this leadership must be seen and felt at all levels of the implementing agencies. Leadership can assist in breaking down barriers between agencies and developing mutual measure of accountability for implementation.

One way to focus the leadership efforts while simultaneously addressing accountability is through development and signing a memorandum of understanding between the critical implementing agencies at the State. Many partners from multiple disciplines are needed to make the SHSP make a difference, and leadership across these disciplines provides a critical link between the partners. Documentation from each leader committing to achieving the goals of the SHSP and agreeing to work together sends a powerful message to all involved that SHSP implementation is an important priority.

In some States, there is regular reporting to the leadership team, and to the Governor, on the status of SHSP implementation and how goals and objectives are being met. This provides an occasion for participants to be acknowledged for their efforts, as well as a chance to highlight opportunities for leadership intervention to remove roadblocks in the process.

Clear performance measures for each emphasis area (often contained in the action plans) provide a metric for reporting to leadership and address the issue of accountability head on. If what gets measured gets done, then applying performance measures at the regional and local level can help all participants stay focused and feel valued and important. Some States have developed a simple, graphic, publically accessible database that tracks progress on SHSP goals and implementation – a way for leadership and the public to engage in the process.

## **4. EVALUATING AND UPDATING STATE STRATEGIC HIGHWAY SAFETY PLANS**

Clearly States have used their SHSPs to focus resources on improving highway safety. However, for the SHSP to remain relevant and useful, it needs to be regularly revised and updated. In 2009, an internal analysis by the Federal Highway Administration showed that over half the States had either updated their SHSP or were in the process of doing so. Of the 20 States that had not yet updated (or were not actively in the process of updating) their SHSP, over half had specific plans to do so.

Three major reasons were cited by the States for updating their SHSP. Data was cited most often as a reason to update the plan; either because the data trends had changed or the data sources had improved. A second major influencer was implementation. In some cases, the State felt that the implementation had been successful and it was time to take on new challenges, while in other cases the lack of implementation success indicated that the plan needed to be revised. Finally, in some States, a designated timeframe for revisions was included in the original plan or in other related documentation. Some States use a staggered approach, with minor updates annually and major revisions less frequently.



Evaluation of the SHSP is an important factor in keeping the plans viable and useful. Evaluation a plan as broadly defined as the SHSP can be difficult, however. For infrastructure emphasis areas funded through the Highway Safety Improvement Program annual evaluation reports assist in evaluating the SHSP, but because engineering is only one component of these multidisciplinary plans, this is not sufficiently robust to really determine if a plan is working. Broad measures of fatality and serious injury reductions can be used, but it is difficult to tease out precisely which emphasis areas or activities in the SHSP were relevant in those reductions. The Federal Highway Administration is currently gathering information from the States on SHSP evaluation to prepare a best practices document.

## 5. SAFETY IMPROVEMENTS AND STRATEGIC HIGHWAY SAFETY PLANS

As noted earlier, the US has seen dramatic reductions in highway fatalities between 2005, when SHSPs were first required, to today. As seen in table 1, on every measure of highway safety (numbers or rates of crashes, injuries or fatalities) reductions have been dramatic. Furthermore, two measure of exposure (population and number of registered vehicles) have experienced small or moderate increases, and the third major exposure variable, vehicle miles travelled, has experienced only a small decrease.

Measure	2005	2009	Percent Change
Police reported crashes (estimated)	6,159,000	5,505,000	↓ 10.6
Injuries	2,699,000	2,217,000	↓ 17.9
Fatalities	43,510	33,808	↓ 22.3
Population	295,753,000	307,007,000	↑ 3.8
Fatalities per 100,000 population	14.71	11.01	↓ 25.1
Injuries per 100,000 population	913	722	↓ 20.9
Registered motor vehicles	245,628,000	258,781,000	↑ 5.3
Fatalities per 100,000 registered motor vehicles	17.71	13.06	↓ 26.2
Vehicle miles (km) travelled (billions)	2,989 (4,810)	2,979 (4,794)	↓ 0.3
Fatalities per 100 million vehicle miles (km)	1.46 (0.91)	1.13 (0.71)	↓ 22.0
Injuries per 100 million vehicle miles (km)	90 (56)	74 (46)	↓ 17.8

Table 1 – Measures related to highway safety

Because complete 2010 data are not available for the US to date, the emphasis here is through 2009. However, it is important to note that preliminary 2010 data show a continued decrease in fatalities, with initial estimates to be a 4 or 5 percent decrease from 2009 figures [6]. Although this is less than the annual percentage reductions between 2005 and 2009, it nonetheless represents at least 1500 additional lives saved. Furthermore, as the recession ended, the vehicle miles travelled in the US began to increase, with 2010 estimates showing a possible 0.6 percent increase from 2009. [7]

Clearly many factors influenced highway safety through these years. Some are investigated below, and, where relevant, how they were addressed in the context of SHSPs. The SHSP is not an implementing plan. Specific actions that were undertaken in particular areas listed below (alcohol impaired driving, occupant protection) might have occurred even without the SHSP. The SHSP, however, was an important catalyst in raising the importance of the emphasis area in the State and bringing additional support and focus to the activities. Furthermore, the SHSP provided a venue for coordination and collaboration with partners.

## 5.1 Alcohol Impaired Driving

In the 51 initial SHSPs developed by the States and the District of Columbia, 46 included reducing alcohol impaired driving as an emphasis area. Strategies ranged from sobriety checkpoints and saturation patrols to education programs and paid media campaigns. Furthermore, aggressive national directed campaigns to reduce alcohol impaired driving occurred between 2005 and 2009.

In 2005, 39 percent of traffic fatalities in the US were alcohol-related –16,885 deaths. By 2009, alcohol-impaired driving fatalities made up 32 percent of all traffic fatalities - 10,839 deaths [8]. This 35.8 percent reduction in alcohol-impaired fatalities is larger than any other fatality reduction measure. Improvements in reducing alcohol impaired driving may have been a particular factor in the significant fatality reductions overall.

## 5.2 Occupant Protection

In 2005, 49 States and the District of Columbia (DC) had seat belt use laws in effect, but use rates varied widely reflecting a variety of public perception issues and enforcement and legal provisions. In 2005, 25 States (including DC) had primary enforcement seat belt laws (occupants can be ticketed simply for not using their seat belt – a secondary enforcement law requires the occupants be stopped for another violation before being cited for seat belt non-use) and the national seat belt use rate was 82 percent [9]. By 2009, 27 States (including DC) had primary enforcement seat belt laws, and the national seat belt use rate was 84 percent [10]. In 2005, 35 percent of passenger car occupants involved in fatal crashes were unrestrained; in 2009 31 percent were unrestrained [11].

In the years between 2005 and 2009, there was a large national incentive program to encourage States to pass primary seat belt laws, or achieve a high seat belt use rate. Further, 48 of the 51 initial SHSPs included increasing seat belt use as an emphasis area, with strategies ranging from high visibility enforcement of seat belt laws to corridor safety efforts in low seat belt use locations. Although seat belt use increased in the years between 2005 - 2009, the increases were not as pronounced as the fatality reductions.

## 5.3 Economic Indicators

The US experienced a recession beginning in December 2007 and ending in June 2009 [12] that may have influenced highway safety. The total vehicle miles travelled in the US in those two years decreased by approximately 3 percent [13]. Some have speculated that younger drivers are more likely to reduce their driving due to economic fluctuations than the rest of the population [14] although specific age-related travel data is not available. As younger drivers have the worst fatality rates, this could be where and how economic indicators influenced traffic safety figures.

## 5.4 Unemployment

According to the Bureau of Labor Statistics, the unemployment rate in the US hovered between 4 and 5 percent from January 2005 until about May of 2008 when it dramatically increased, reaching up to 10 percent by the end of 2009 [15]. In 2010, the increases levelled off, and modest improvements (but still above 9 percent) were seen. The fatality reductions between 2005 and 2009 are significantly larger than the increases in unemployment, and the fatality reductions are continuing into 2010, as unemployment decreases.

## 5.5 Fuel Prices

In 2005, a gallon of gas in the US cost, on average, \$2.31. This figure peaked in 2008 at \$3.30 – a greater than 40 percent increase. In 2009 the average price had dropped back down to \$2.41 per gallon, only about 4 percent above the 2005 figure [16]. Although to some extent, fuel prices track the overall fatality reductions in the US the volatility of fuel prices makes it difficult to establish a direct relationship.

## 5.6 Infrastructure Spending

Funding for the federal Highway Safety Improvement Program (HSIP), the use of which is directed in the States by the SHSP, dramatically increased with the passage of SAFETEA-LU in 2005 – to over a billion dollars annually. SHSPs assisted States in planning for spending these funds for effective projects.

In 2005, States spent approximately \$755 million in HSIP funds on safety infrastructure projects. In 2009 this figure had more than doubled to \$1,624 million spent. Given the normally high benefit-cost ratios for infrastructure projects, along with the dramatic increase in spending, it is likely that the improved implementation of infrastructure projects through the SHSP was an important factor in the fatality reductions.

## 5.7 Young Drivers

As identified previously, there are some speculations that during the recession travel decreased more dramatically for young drivers (between 15 and 20 years old) than for the rest of the population. The number of young people involved in fatal crashes decreased a dramatic 31.4 percent between 2005 and 2009 [17], a significantly larger decrease than for the population as a whole. Of the original 51 SHSPs, 40 included younger drivers as an emphasis area including strategies ranging from driver education and training to public awareness campaigns.

## 5.7 Summary of Factors Influencing Safety Improvements

Many factors influenced the dramatic improvements in highway safety in the US between 2005 and 2009. Some of the factors discussed above seem more related than others to the reductions in fatalities. In particular, alcohol impaired driving fatality reductions and young driver safety improvements have been more pronounced than the overall improvements. These two factors, which are included in the majority of SHSPs, may have been critical drivers in the overall improvements. Further, infrastructure spending, also related to SHSPs, tracks closely with reductions in fatalities. It is difficult to specifically identify which improvements were most beneficial, but the interdisciplinary nature and directed focus that is inherent in the SHSP clearly provides a structure for States to leverage resources and make dramatic changes to save lives.

## **6. MOVING TOWARD ZERO DEATHS IN STRATEGIC HIGHWAY SAFETY PLANS**

As mentioned, preliminary 2010 data indicate that the US highway safety improvements continue, but appear to be slowing. Fatality reductions are anticipated, but perhaps not to the degree seen in previous years. The US needs to continue to take aggressive actions to address the unacceptable level of highway fatalities: over 30,000 people die each year on our nation's roads, and highway fatalities continue to be the leading cause of death for Americans between the ages of 4 and 34.

As indicated previously, many States have revised, or are planning to revise, their SHSP. There is an encouraging trend, borrowed from European partners, of States using a toward zero deaths approach/ethical platform in their SHSPs. Almost a dozen States are now using an approach that recognizes that any death on our roadways is a tragedy and the more appropriate vision, therefore, is to aim to remove fatalities from our system

## **7. SUMMARY AND CONCLUSIONS**

SHSPs have transformed how highway safety is approached in the US. States that previously focused on isolated areas of highway safety are now taking an integrated approach. Many State safety engineers and advocates have made observations along the lines of, “the SHSP was a difficult activity, but now that I’ve gone through it, I see the value and wouldn’t approach highway safety any other way”.

Many factors have influenced the dramatic traffic fatality reductions in the US in the past five years, but the collaboration and focus fostered by the SHSPs have been consistent and pervasive, impacting every area of highway safety and every level of government. Continued emphasis on a comprehensive approach to improving safety, along with aggressive target setting and continuing to learn and implement best practices (from the States and other countries) is the best way to continue to reduce the tragedy of fatalities and serious injuries.

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