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A
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**A
Viewpoint
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December, 1976



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(Highlights of a recent presentation before the National Highway Safety Advisory Committee) by Howard L. Anderson, FHWA Associate Administrator for Safety.
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DISPELLING A MYTH

A Viewpoint on Highway Safety

THE NEED to improve the Nation's safety record has been a concern of the highway profession since the first organized plan to build roads started after World War I. Our success and failure to accomplish this goal is best illustrated by analyzing the Nation's fatal accident rate during the last 50 years. The accident rate for any given year has been rather variable, but over the 50 year period has been a consistent downward trend in the fatality rate. There are a number of safety milestones worthy of mention during the past 50 years:

1925—*The Nation adopted a uniform marking system for the Federal-aid highways. A number of other significant safety advances had already been accomplished by this time. Hydraulic brakes for autos were introduced in 1920 and the first dual-lane highways were constructed in Chicago and New Jersey in 1923. The all steel auto body also appeared in 1926.*

1928—*Safety glass became standard equipment in the automobile.*

1934—*The Nation initiated a safety program to improve railroad-highway grade crossings.*

1935—*The first edition of the Manual on Uniform Traffic Control Devices (MUTCD) was published by the Bureau of Public Roads (BPR). The turret top or steel top auto was first offered by all major auto manufacturers.*

1938—*By this time the initial surfacing of the Federal-Aid Highway System was virtually complete, and the Nation started to build bypass routes around major cities. Congress directed the BPR to*

investigate the feasibility of a national system of super highways.

- 1940—*The Pennsylvania Turnpike was opened to traffic. Major cities such as New York, Los Angeles, Chicago, and Detroit were developing the first urban freeways and parkways.*
- 1942—*This was the year of national gas rationing and the 40 mph speed limit—the sharp decline in rate was similar to the 1973 experience.*
- 1954—*The American Association of State Highway and Transportation Officials (AASHTO) developed the national "Policy on Geometric Design of Rural Highways" (blue book).*
- 1960—*The report by the Special Freeway Study and Analysis Committee of AASHTO was the first study of freeways to determine those features of design that cause operational or safety difficulties. The findings of this committee led to the publication of the 1967 so called "yellow book" on "Highway Design and Operational Practices Related to Highway Safety."*
- 1961—*By this year safety was becoming a major concern of the old BPR and the first Office of Highway Safety was established.*
- 1966—*The National Highway Safety Bureau was formed, and States were accelerating the implementation of spot safety improvements. At the same time the Interstate System became a reality. The System now had open to traffic over 24,500 miles of new freeways and started to carry over 10 percent of the Nation's traffic at less than half the fatality rate of the Nation's other road systems.*

THE CONTRIBUTION of safer highways to the reduction of accidents is substantial and has made a major contribution to our gradual decreasing fatality rate.

FHWA developed major highway safety efforts long before the passage of the 1966 Highway Safety Act.

In 1964, FHWA established a program to accelerate highway safety improvements by urging the States to identify and correct highway hazards with Federal funds on the Primary, Secondary, and Urban Federal-aid Systems. Until that time, Federal-aid highway construction funds had been used traditionally by the States for major construction projects.

Achievements of the Federal-aid safety improvement program were recognized by Congress and the program was given new emphasis by enactment of the Highway Safety Act of 1973.

It is estimated that since 1964, FHWA has obligated about \$3.7 billion for safety improvements on our Nation's highway system. Almost 84 percent of these funds were obligated within the last 5 years. This represents about 24,000 individual safety projects of which 17,000 were initiated within the last 5 years. It is obvious that there has been a substantial acceleration in highway safety improvement in the recent past.

Highway improvements have made significant contributions to accident reductions in the past, and the success of these improvements is well documented.

FHWA recently completed a review of the California safety improvement efforts and the effectiveness of this program has been outstanding. Between 1968 and 1973 California completed 1,497 safety improvement projects at a total cost of \$53 million. Before-and-after accident studies indicate the net result of these improvements has been a reduction of about 5,000 accidents, 1,900 injuries, and 210 fatalities annually. For every dollar spent on these safety improvements, the public has received \$5 in accident savings

alone. In addition to these spot safety improvements, California has also developed a program to clear hazards from its freeway roadsides, called the "Clean Up the Roadsides Environment" program (CURE). This program has produced about an 18 percent reduction in fatalities on the California Interstate System and represents a savings of about 1,000 fatalities over the last 8 years. If it were not for these two safety programs, the average fatality rate for the entire California highway system would have been 18 percent higher than it is presently.

Good highway design has continued to have a major impact on our Nation's fatality rate long before the advent of the safety improvement programs. This is best illustrated by the accident record of freeways, the best designed road system in the world, over the last 25 years. Between 1950 and 1975, the fatality rate on the California freeway system has been better than 50 percent lower than the rate on other California highways. Considering the fatality rate for other California highways, the design standard used on the California freeway system has contributed increasingly since 1950 to the State's safety performance, and by 1975 had contributed 30 percent to the overall reduction in the fatality rate.

PROBABLY the most outstanding example of the impact of good roadway design on highway safety can be seen by the Interstate System's remarkably low fatality rate. The fatality rate on the Interstate System has consistently been about half the rate of the remainder of the Nation's highways. Since its inception, the Interstate System has saved about 60,000 lives. We are proud of this record, but we know we can do even better. Recent studies have shown that traffic fatality rates are about 20 percent lower on sections of Interstate highways opened since 1966 than on sections opened earlier. Interstate roads built after 1966 incorporated higher safety standards than those completed in the initial construction phases.

On many of our heavy urban Interstate highways, such as those in California, the rate is as low as 0.73 fatalities per 100 million vehicle miles. These freeways represent the latest and safest design standards. Application of these safe design principles such as breakaway and light standards, concrete median barriers, and other features to the local road system is materially reducing the accident rates on these facilities.

There are many impediments to improving the safety of our highways. These include: lack of funds, a vast highway system, and resistance from the highway profession itself. *One of the greatest hurdles to our safety efforts is internal resistance caused by a safety myth.* We have all heard this myth from time to time, and it is critical to our safety efforts to overcome this fallacy.

This is the "nut behind the wheel" myth or the often repeated statement that 80-90 percent of all accidents are created by driver error. We have heard these statements many, many times not only from the average driver, but also from sources within the safety establishment.

It is no wonder we believe this myth because it is so often stated by knowledgeable sources, but the myth is really only a half truth. You have to consider the basic source of the data and just apply common sense to the findings. Of course, the basic source of almost all accident data comes from police accident reports. It is the law enforcement officer's responsibility to determine accident liability; therefore, he approaches any accident investigation looking for violations of the law, and in the vast majority of the cases he can find a violation of the law or judgment. The patrolman is providing a vital service to the safety community in accident reporting, but we must remember he is more of a fault finder than a fact finder. As long as we rely on the accident report for our basic accident data, we must realize the results will generally report a driver error or law violation.

It is easy to see why the driver is so often charged in an accident situation. We can rationalize that almost any accident was caused by the human factor. If a tire blows out, the driver should have replaced it sooner. When the brakes fail, they were improperly maintained. That right-angle collision at a blind intersection was caused by failure to yield the right-of-way. The fixed object accident in a construction zone was caused by driving too fast for conditions.

IT is incredible that such a myth persists in light of common sense. Of course, human error is a significant cause in many accidents, but it is not the only factor. As an example, would you consider an accident caused by a driver stopping suddenly because of a confusing directional sign driver error only? Is that head-on collision on a narrow bridge driver error only? Is that pedestrian accident in a residential area without sidewalks driver error only? Are those 12 right-angle collisions at an unsignalized intersection driver error only? Of course not, you know it, we know it, the general public knows it, and even the safety profession will admit it once in a while. The National Safety Council's *Accident Facts* indicates that in about 30 percent of all fatal accidents, no improper driving was indicated. A recent Indiana study reported that driver error is a major cause of accidents, but goes on to conclude: "However, these results indicate that vehicular and/or environmental factors were definite or probable causes in nearly one-half of the accidents investigated and should not be ignored."

Driver error contributes to many accidents and so does the highway environment. In fact, the environment may lead the driver into error or prevent him from making the right decision. We recognize the importance of driver error accidents in our nationally accepted accident warrants for stop signs and signals contained in the "Manual on Uniform Traffic Control Devices." These warrants indicate that a number of driver error

accidents is a justification for the installation of these devices. Consider this, if driver error is the major basic cause of accidents, why is the accident rate on the Interstate System less than half that on the rest of the Nation's roadways and why is the urban Interstate fatal accident rate half of the urban fatal accident rate?

The real danger of the 80-90 percent myth is that it leads to the false assumption that we can shrug off our safety responsibility. Dr. William E. Tarrants of the National Highway Traffic Safety Administration expressed concern over this very fallacy in his 1968 feature article in *Highway Research News*. He stated, "*The most common and universal fallacy in the field is one which is so ingrained that it is seldom explicitly recognized. . . . We rank the relative contribution of causes. In its most common form, the assumption states that because drivers cause most accidents, most prevention programs correspondingly must be concerned with drivers. . . . In the real world, there is no basis for making this assumption.*"

However, we in the highway profession too often believe this fallacy and think the safety of the highway environment is only a sideline activity in our national safety efforts. Our reasoning is that we can only impact a small percentage of accidents because most accidents are caused by the driver and this small percentage is not worth our attention. Nothing could be further from the truth. The environment has a highly significant impact on safety payoff. There are literally hundreds of documented studies which clearly indicate the value of environmental improvements in reducing accidents.

If driver error is the cause of most accidents, the environment certainly must have a major effect on these errors. In fact, environmental safety improvements have shown more substantial results than the results of both vehicle and driver programs combined.

Many freeways today in urban areas have fatality rates less than 1.0 per 100 million miles. This contrasts to 2.6 to 3.8 fatality rates on the major urban arterial street. This 70 percent improvement in fatality rates on the urban freeway system can be attributed to the skill and genius of the highway profession. The same drivers use both facilities. Both facilities have approximately the same ratio of drivers subject to driver error. The only difference is one facility is designed to accommodate many of the driver weaknesses.

WITH ENGINEERING ingenuity, we should be able to reduce the fatality rate on our urban freeways to no more than 0.5 per 100 million vehicle miles. This rate has already been realized on some of our better designed urban facilities. These very low accidents rates, when compared to urban arterials, have been accomplished entirely by the engineer's ability to provide a safe environment. Additional engineering improvements may even reduce this low fatality rate; however, at the 0.50 rate we are probably reaching the point of diminishing returns with environmental improvements.

The fatality rate remaining after we have completed all feasible engineer improvements is more appropriately the target of driver and vehicle-related safety programs. However, the contribution of the engineer should be so effective that there will be very little left for the other safety programs to accomplish.

The application of the safety principles we have learned on the Interstate System to the local road system will have a corresponding beneficial effect on the fatality rate on those highways. A recent California study showed that upgrading 1,552 railroad grade crossings to automatic devices resulted in a 69 percent reduction in train accidents and 80 percent reduction in deaths.

The following shows some effectiveness data reported by the States for recent safety improvement programs:

<i>Program</i>	<i>Total Cost</i>	<i>Fatal Accident Reduction Percent</i>
Rail-Highway		
Crossings -----	13,723,000	54
High-Hazard		
Locations -----	17,131,000	48
Roadside Obstacles --	4,349,000	68

The next time you hear the 80-90 percent myth, don't believe it, in fact, challenge it. Remember the driver is only human, he can, does, and always will make mistakes regardless of how well you train him, or how strictly you enforce the rules of the road. Highway safety improvements have a double payoff—better engineered roads mean less driver error and a more forgiving environment when an error is made. That is a difficult combination to beat. Seat belts are fine, we believe in them, but they do not prevent accidents. Well designed highways do.

We can be proud of the contribution safer highways have made to accident reduction, and FHWA will continue to accelerate its safety efforts. The national highway-related safety program is proving to be an effective means of reducing highway deaths and injuries. It can be improved, and it will be. This Federal-State partnership has made a significant contribution to the continuing downward trend in highway accidents and deaths. If we can dispel some myths that often block safety progress, the highway-related safety program has the potential to dramatically reduce our accident toll.

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