

Can Highway Accidents be Reduced?

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I am not sure who suggested that I address myself to the question, "Can highway accidents be reduced?" The question seems fair enough, but discussing it with state-city-county highway officials, contractors, and others close to the problem is quite a challenge.

The explosive growth in numbers of vehicles and their use has raised radically the exposure to traffic accident hazards. After a generation of encouraging decline, the nation's traffic death rate leveled off in 1961, when 5.2 deaths per 100 million vehicle miles of travel were recorded. In 1962 the 40,800 lives lost in highway accidents topped the 21-year-old high of 39,969 fatalities recorded in 1941, and the fatality rate turned upward to 5.3. Again in 1963 deaths on the highway were still climbing, even faster than highway travel, and 43,400 occurred, with the corresponding higher rate of 5.4 deaths per 100 million miles of travel. Traffic deaths are of great significance, but we must also remember that current estimates of annual traffic injuries total approximately 1.6 million persons. Dollar losses are rarely if ever fully evaluated, but \$7.7 billion is the accepted estimate for 1963. This exceeds the total amount expended last year for highway construction by all levels of government.

The central thesis of my remarks will be that highway accidents can be reduced *if*—and here I introduce two mighty big "ifs":

(1) *If* there is sufficiently widespread recognition of the magnitude, complexity, and urgency of highway safety requirements. These requirements have been grossly underrated, misunderstood, and unrealistically met with too little staff and funds.

(2) *If* appropriate action is taken by public officials with the authority, the competence, the means, and the courage to settle highway safety issues on the basis of enlightened public interest at all levels of government.

Speaking to my first "if," namely, that the magnitude and complexity of highway safety requirements have been grossly underrated, misunderstood, and unrealistically met, I submit that critical examination of the wide range of proposals, some of them offered or supported by officials in responsible positions, will establish the statement's validity.

As an illustration, I have a news clipping—one of many—which states, "The drivers who are causing *all* of the serious injury accidents and deaths can be classified into about a five percent group.

"If we could remove a select five percent of the licensed drivers, we could eliminate about 90 percent of the state's fatal and serious accidents," the story goes.

The idea that the irresponsible few, or the irresponsible many for that matter, constitute the traffic accident problem is sufficiently widespread to warrant our close examination. If we can solve the highway accident problem, or 90 percent of it, simply by getting rid of the bad drivers, why don't we do it? Why go to the expense of more costly measures?

Research into driver characteristics has been underway for some time and will continue, but one of the problems in attempting to classify drivers is that they don't always fit the classifications or stay classified after we get them there.

We do know that most reported accidents in a given period of time are first accidents. We also know when an accident occurs that the difference between no-injury and injury or injury and death is often a matter of inches—or chance. It may be a matter of the interior design of the vehicle—or the availability of adequate medical care.

Of course there are devices and tests that are useful for screening out or preselecting bad drivers, but the best ones devised to date have such a low validity that in order to eliminate even a small proportion of "poor risk" drivers a large number of good ones would have to be rejected, too.

The problem was stated very well there in a paper entitled "Selection Tests—Dubious Aid in Driver Licensing," by J. E. Uhlaner and A. J. Drucker of the U. S. Army Personnel Research Office, presented recently at the 1964 annual meeting of the Highway Research Board.

It was their estimate that in order to reduce total accidents in the United States from 15 million to 10 million, public officials would have to take 23 million drivers off the road, utilizing a battery of tests with an estimated validity coefficient of .20, the best they have devised to date. This would mean the unjust and meaningless removal of 18 million safe drivers for the benefit of removing 5 million poor drivers.

All this is not to say that driver licensing procedures cannot and should not be strengthened. It has occurred to me that many of the states could probably make some improvement by quizzing the driver on things he needs to know before giving him a new or renewed license. I fully believe that the main job in this field is to make better drivers out of the ones we have—not spend our time in looking for the mysterious few who are being erroneously blamed for the large share of accidents.

Perhaps this illustrates an important point. It is not difficult for engineers to come up with answers. Motor vehicle administrators have their answers, too, and their own particular set of problems. Police officials also have their problems and their answers.

One of the major needs is for better communications among motor vehicle administrators, enforcement officials, and engineers to provide a stronger interdisciplinary approach to the complex problem we are discussing here.

I sometimes think that officials in each group focus attention so sharply on their particular part of the problem that they sometimes lose sight of the whole—a little bit like the fable of the blind men and the elephant.

Several months ago the national representatives of the American Association of State Highway Officials, the International Association of Chiefs of Police, the Institute of Traffic Engineers, and the American Association of Motor Vehicle Administrators met under Bureau of Public Roads sponsorship to discuss mutual problems. All agreed on the need to extend their cooperative efforts through regional conferences of this kind.

The ultimate objective is to find an improved basis for teamwork among highway engineers, traffic engineers, maintenance engineers, driver licensing authorities, and enforcement officials, and thus to achieve safer management of the highway transportation system.

The most impressive proof presented to date that accidents can be reduced—dramatically—is the accident experience on completed sections of the Interstate Highway System. Here, the 1963 rate was 2.8 fatalities per 100 million miles compared to 9.7 on the older highways in the same traffic corridors.

It is important to note that the fatality rates on controlled-access highways have held their own while the overall rate increased, as we have seen. This lower rate will continue because of their built-in permanent safety features.

We find that some of the controlled-access roads appear to be much safer than others. Some turnpikes, New York Thruway, for

example, have had rates of less than one fatality per 100 million miles of travel. The differences in rates may be greater than can be accounted for by differences in design standards, which suggests that other factors may be operating, such as better police supervision.

Currently we are working on a project related to this possibility. With the cooperation of state police and state highway departments in the seven states traversed by Route 66 from Chicago to Los Angeles, a joint study will be made in June through August this year. Some of the route includes newly completed sections of the Interstate System; some is conventional highway.

Among other useful results of the study, we expect to obtain information on minimum requirements for adequate patrol supervision and emergency service requirements on the Interstate System.

How much reduction in the nation's highway accident toll can we expect when the Interstate System is completed in 1972? Our best estimates are that we can expect a saving of some 8,000 lives per year. Across the nation, 16,600 miles, or 41 percent of the system total, is now open to traffic. We estimate that about 3,000 people who might otherwise have been killed in traffic accidents during 1963 are alive today because sections of the Interstate are open to traffic.

It will cost 41 billion dollars to build the 41,000-mile system, but it will return that investment in about five years after it is completed, through benefits to highway users.

While control of access is the most important single factor contributing to the excellent safety record of freeways, other design features, such as wide lanes, broad medians, easy curvature and grades, and long sight distances, also are important. Head-on crashes, opposite direction sideswipes, and angle and pedestrian collisions are virtually eliminated.

The potential for accident prevention through freeway construction can be illustrated by a single design feature—elimination of cross traffic at grade. In California, for example, it was found that about two-thirds of all accidents in urban areas were at intersections; 37 percent of the rural accidents were at intersections. We eliminate intersection accidents when we eliminate intersections.

In short, the freeways are safer because they totally eliminate some conflicts in traffic movement and they minimize the possibilities of others.

The 41,000 miles of the Interstate System presently under construction will permit travel from coast to coast and border to border without a stop sign or traffic signal. Although constituting little more

than one percent of the nation's road and street mileage, it will carry 20 percent of all traffic.

What about the 98 percent plus of the nation's 3½ million miles of roads and streets which will continue to carry 80 percent of all traffic after 1972?

Nearly 70 percent of this mileage is over routes that were in use before we had any automobiles at all. What can be done to make these roads and streets reasonably safe?

The question has already been partially answered by the traffic engineer and his techniques for increasing the capacity and the safety of conventional streets and roads.

In the bureau we were intrigued several years ago with the question:

"What would happen if someone took an urban arterial street and applied to it every appropriate, known technique of traffic engineering?"

"How much would it increase street capacity?"

"How much would it reduce accidents?"

This led to a study on Wisconsin Avenue in Washington, D. C. The report was published and widely distributed under the title, "Increasing the Traffic-Carrying Capability of Urban Arterial Streets."

Without going into detail, I can say that the potential for increasing the capacity of urban streets, and at the same time reducing accidents through full use of traffic engineering, has led us to urge each of the states to conduct comparable studies and demonstrations. In doing so the states may utilize some of the one and one-half percent of Federal-aid highway funds available for planning and research.

At the present time nearly half of the states have begun or plan to begin such projects. We believe that as more and more drivers experience the convenience and safety which modern traffic engineering treatment provides they will demand and support more extensive applications.

These and many other needed improvements in urban areas must be provided by engineering determination within the framework of a broad transportation planning process. The Federal-aid highway act of 1962 specifies that after July 1, 1965, Federal-aid projects in urban areas over 50,000 population can be approved only if they "are based on a continuing, comprehensive transportation planning process carried on cooperatively by states and communities."

Here I remind you of my second "if," namely, that if the job of reducing street and highway accidents is to be done, it will require the

courage and competence of public officials at all levels of government—courage to resist pressures and competence to plan wisely.

While street improvements in urban areas are urgently needed, selective improvement of rural highways at accident hot spots can do even more to reduce the fatality rate. Nearly three-fourths of the fatalities occur in rural areas, while the large majority of non-fatal injury and property damage accidents are in urban areas.

The Bureau of Public Roads is currently urging that attention be given to accident hot spots—in both rural and urban areas. While we must continue work to improve the entire network of the system, priority attention is being directed to those streets and roadways with high accident records. Indiana's record closely parallels the total U. S. experience, and this program for relief of accident hot spots is an important part of the answer to the question "Can highway accidents be reduced?"

In most cases we know, or can readily determine, where the high-accident locations are. Accident records, however weak they may be in other respects, usually do give us this information. Often even when hazardous features are known their elimination is deferred until such time as funds are available for the general improvement of the highway on which they exist. Now we believe the urgency of the traffic accident situation is such that we cannot wait longer.

Having a high priority in this program is the elimination of dangers at the roadsides. This includes insufficient lateral clearances, unnecessary and confusing use of curbs, fixed objects without needed protection, and areas which can be made less hazardous to vehicles leaving the traveled way through improvement of the roadside geometry. Confusing signs, improper marking, and inadequate control devices also contribute their share to the mounting accident experience and often need correction.

Unexpectedly sharp curves, inadequate superelevation, narrow bridges, and intersections having high accident experience will warrant alteration.

Apart from accident hot spot improvements, much more can be done to increase the safety of even our better highways. Chief among possible improvements are the removal of roadside obstacles and the adoption of flatter roadside slopes. Our engineering colleagues at General Motors have made highly useful additions to our knowledge in this area by experimental studies at their proving grounds.

Trees, light poles, culvert headwalls, and other solid obstructions

adjacent to the roadway often mean the difference between no injury and disaster when a car runs off the roadway.

On divided highways, paved flush shoulders can be provided on the left as well as the right, for additional safety.

We must face the fact that further reductions in highway accident rates will often require substantial expenditures of public funds, but these can be justified even by a small saving in the \$7.7 billion now being lost annually in traffic accidents. And by far the largest amount will have to be spent for street and highway improvements. This is true simply because of the tremendous growth in the number and use of motor vehicles. It has far exceeded the rate at which we have built and improved the roads they run on. Do you know that daily travel by motor vehicles now equals 4,600 round trips to the moon?

Because use of the motor vehicle is so great, street and highway improvements can never be considered more than a part of the answer. We need to improve the total highway transportation system, properly using engineering, education, and enforcement in a sound balanced program. We must give sufficient attention to the roadway, the vehicle, and the driver, and to the interaction of all these elements to achieve safe highway transportation.

Drivers must be given competent instruction and supervised practice prior to being licensed and then be evaluated in a continuing program.

We need uniform laws and ordinances, firmly and impartially enforced by police courts.

There is continuing need for improvements in vehicle design to provide safer "packaging" of vehicle occupants in case of accidents, and also to reduce the possibilities—and the consequences—of driver error in vehicle operation. And at least as important is the assurance that vehicles are maintained in safe operating condition.

The growing public acceptance of seat belts as necessary automotive equipment is sure to reduce the number of fatalities and injuries resulting from accidents.

In this connection I should mention that standards for seat belts shipped in interstate commerce are now being developed as required by act of Congress. The Office of Highway Safety in the Bureau of Public Roads is represented on the committee now at work.

We believe that installation and use of seat belts in all publicly-owned passenger vehicles will further stimulate their installation and use in privately-owned cars. A recent survey of Federal agencies shows encouraging progress with some agencies nearing the 100 percent mark.

Much has been said about the need for additional research to aid us in planning highway safety programs—this is true, but even more urgent is the need to apply what we have already learned from research and from successful experience.

We in the Bureau of Public Roads are very much aware that state and local officials have primary legal responsibility for highway safety measures.

We do feel a growing sense of responsibility in the problems of highway safety and we do propose to do all that we can to help demonstrate that highway accidents *can* be reduced.