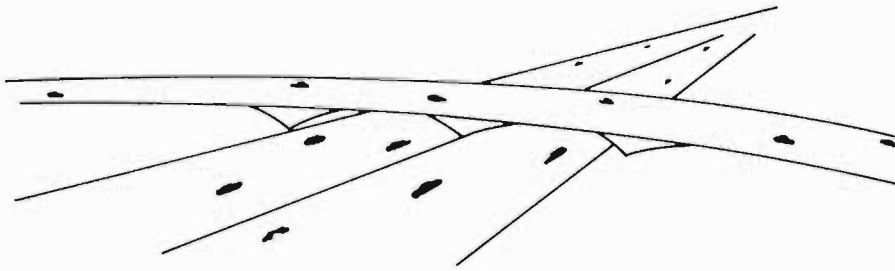

DEPARTMENTAL RESEARCH

Report Number SS 12.4

HIGHWAY SAFETY: HOW FAR DO WE GO?

STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

HIGHWAY SAFETY: HOW FAR DO WE GO?

By

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Prepared for Presentation at the 54th
Annual Short Course - Session 15

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Highway Safety: How Far Do We Go?

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Looking at deaths on our highways from the DPS Motor Vehicle Traffic Accident report of 1979 (Table I), it is noted that traffic accident deaths reached a record high of 4,229, an increase of 6% over the previous high of 3,980 in 1978, and up 14% from 3,698 in 1977. The vehicle miles traveled reached a record high of 102.6 billion miles in 1978, or a 6% increase over 1977, but fell to 101.9 billion miles in 1979. The death rate for 1979 therefore, was 4.1 per 100×10^6 vehicle miles traveled versus 3.9 per 100×10^6 in 1978.

Licensed drivers increased 354,000 to 9.1 million from 1978 to 1979 with approximately 11×10^6 vehicles registered. Each person drives 1.2 vehicles, which means some vehicles have 0.2 drivers. This may be a big cause of accidents.

Rural accidents accounted for 2,397 deaths or 57% of the statewide death toll, leaving 43% in urban areas where the miles of urban streets are 25% of the total mileage in the state. Therefore, approximately 43% of the deaths occur on 25% of the total road mileage, indicating that urban traffic areas are 2¼ times more subject to fatalities than rural areas. Cities over 250,000 accounted for 960 deaths or 23% of the state total. Perhaps this should give us a clue as to where considerable attention should be concentrated.

Pedestrians accounted for 650 or 15% of the deaths. Motorcyclists accounted for 356 deaths or 8%. Of major interest is the fact that 98.4% of the people in vehicle accidents were not wearing seat belts when killed, although it is estimated that 50% of deaths might have been eliminated by wearing belts.

TRAFFIC DEATHS

YEAR	1977	1978	1979
	3698	3980	4229

6% INCREASE

14% INCREASE

VEHICLES MILES
(100 MILLION)

YEAR	1977	1978	1979
	97.0	102.6	101.9

(-) 0.7% DECREASE

5% INCREASE

DEATH RATE PER
100 MILLION VEHICLE MILES

YEAR	1977	1978	1979
	3.8	3.9	4.1

TABLE I

Also, of the 356 motorcyclists killed, 70% were not wearing protective head gear. Lack of protective head gear usage is considered to triple the risk of death in accidents for motorcycle riders.

This leads me to refer to a report prepared by Barbara E. Sabey and H. Taylor entitled "The Known Risks We Run; The Highway." I have kept up with Ms. Sabey for the past 20 years or so and she has done more research on more items concerning safety, with impressive and usable findings, than anyone I have ever known. Also, the research done has always been prior to or beginning a similar effort in the USA. Therefore, I consider her a leading authority on the subject of highway safety.

As described by Ms. Sabey and Mr. Taylor, the desire to travel is strongly rooted in mankind. Then, as now, travelers frequently suffered hardships and in some cases lost their lives in the process. Although present day travel is much safer, the amount of traffic creates a statistical probability of accidents. Since travel by automobile is so common and so different from other threats to personal safety, it is not generally recognized until an accident occurs and then only to the persons directly affected. Although highway accidents are treated by the medical profession as other medical cases, they are not considered in public health terms. However, with general improvement in public health, highway accidents are now the main cause of deaths for young people in the ages of 16-26 years old and possibly to age 35. It is interesting to note that, in Texas, people over 35 accounted for only 40% of the deaths; as a matter of fact, no one 92 and over was killed. That is a rather facetious comment, but people over 60 only accounted for 7.5% of the deaths.

Since driving while intoxicated accounted for approximately 22% of the deaths in Texas in 1979 (not conclusive, since Texas does not require chemical tests on injured or deceased drivers), perhaps the combination of alcoholism

and vehicle deaths will be considered a combination social and health problem. If cancer deserves recognition as a public health problem then why shouldn't deaths on our highways also receive the same consideration?

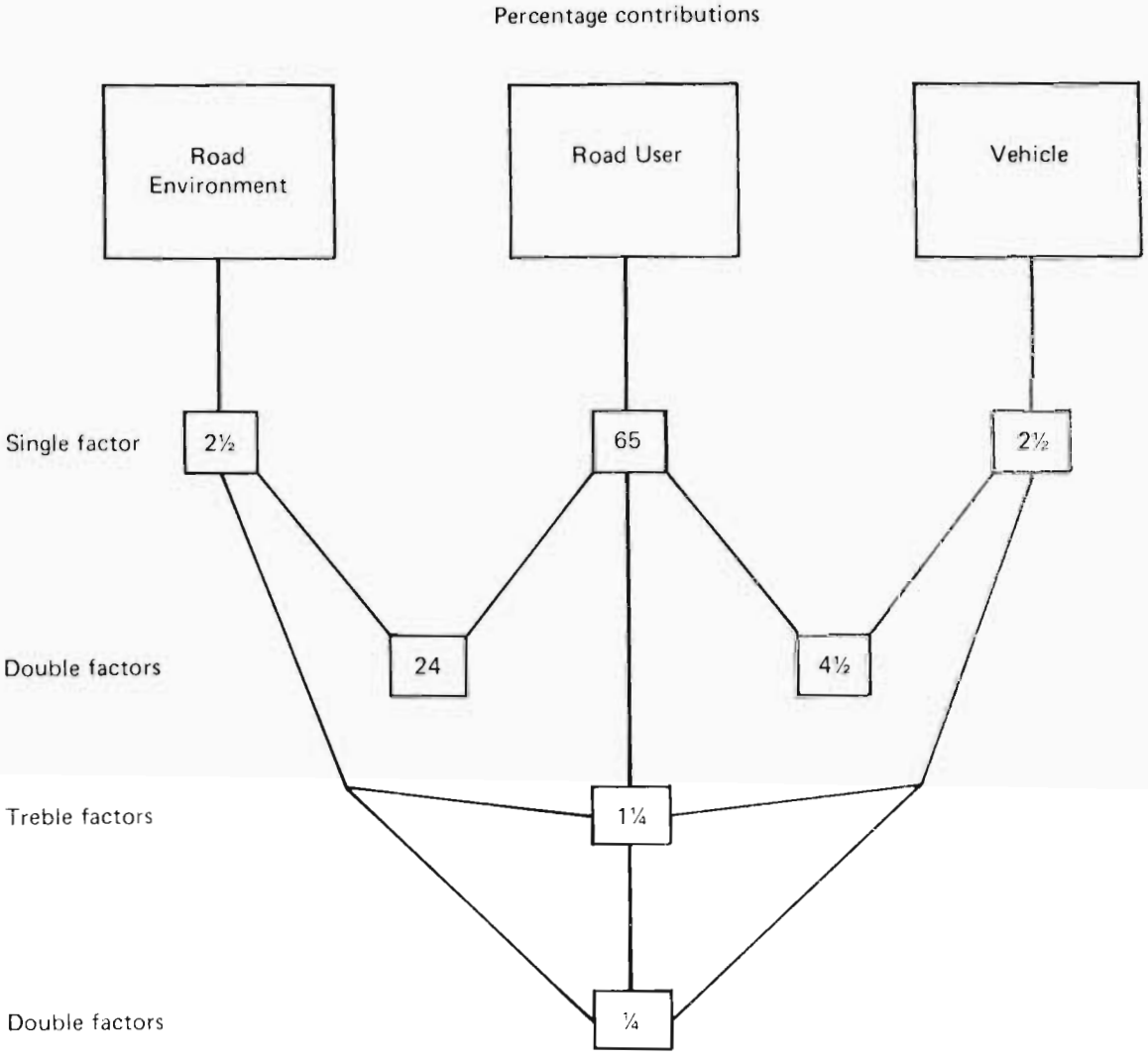
Since the risk of highway accidents is so minimal, it is very seldom considered by the highway users. For instance, in England, the risk for injury accident is once in 57 years, in a fatal accident, once in 2,500 years, and a property damage accident, once in 6 years. Therefore, it is pretty obvious that there is little concern of vehicular accidents by the general public. In Texas, DPS estimated a loss of $\$2{,}580 \times 10^6$ in 1979, due to fatalities, injuries, and property damage. This is phenomenal, but there is some question as to how much money the general public is willing to spend to reduce this loss. Perhaps they are willing to spend a great deal but when you look at the role of the road, vehicle and user in accidents, it is very revealing (Table II) to see that the user contributes 94 3/4% either singly or in combination to the causes of road accidents. Incidentally, this table shows the results of the English study, although a study in the USA at an Indiana University gave almost identical results.

Although it is evident that human error or impairment is a large contributor to deaths on our roads, it is easier to accomplish results quicker by engineering than by education, training or enforcement of legislation. However, engineering changes are only good for quick results whereas education, training and enforcement have longer lasting results with greater possibilities for a larger reduction in traffic deaths.

Perhaps we should get the cooperation of the public in judging needed improvements to bring the foregoing information, concerning the 94 3/4% user contribution to accidents, to their attention. This may eliminate many highway safety improvements; however, a disinterest in accidents was revealed by a

TABLE II

Contribution to road accidents



Total percentage contributions for each factor

28	94¾	8½

Virginia study, wherein 42% indicated no improvements were needed with the other largest response wanting improved pavement quality. Perhaps this would also relieve the department of some of the claim suits filed. Table III indicates causitive factors of deaths in Texas. You will note only 24% of the accidents involved fixed object accidents.

Table IV shows possible potential for accident and injury reduction in England based upon their study. You may note that only 1/5 or 20% of accident reduction is possible by changing the roadway environment. In Texas, with our wider right-of-way, wider pavements and shoulders, and fewer adjacent access points, by changing the roadway environment, it can be reasonably assumed that only a 12% reduction of fixed-object accidents could be realized.

What improvements to make to reduce accidents and fatalities on our highways is very difficult to determine. Perhaps the best method to complement present safety programs is one that the Beaumont District arrived at some 16 years ago, and that is to assign someone the responsibility of examining almost every accident that occurs on the highway system. Preferably, this should be done at the time of occurrence but since this is virtually impossible, each accident report should be examined to determine the causitive factors. This could lead to difficulties should the "wreck-chasing" lawyers get wind of this, but how else can we determine accurately what highway improvements should be made that might assist in the reduction of accidents?

Results to date have been considered productive by District 20; expecially in the area of finding and correcting slick pavement areas, removing trees, pavement marking, intersection lighting, and in some instances, correcting geometric features which are considered hazardous.

Such a program might be even more productive if appropriate personnel from the Department of Public Safety and the SDH&PT were thoroughly trained in this endeavor and cooperatively produced recommendations for alleviating

FATAL RURAL AND STATEWIDE MOTOR VEHICLE TRAFFIC ACCIDENTS
THE MANNER OF COLLISION

WITH PEDESTRIAN

RURAL	STATEWIDE
11.5%	16.0%

HEAD-ON

RURAL	STATEWIDE
21.3%	16.0%

REAR-END

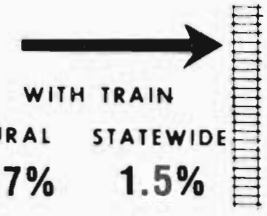
RURAL	STATEWIDE
3.9%	4.2%

AT ANGLE

RURAL	STATEWIDE
11.2%	16.0%

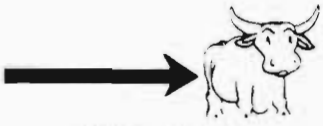
SIDESWIPE

RURAL	STATEWIDE
1.1%	1.4%



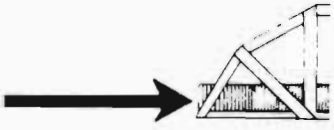
WITH TRAIN

RURAL	STATEWIDE
1.7%	1.5%



WITH ANIMAL

RURAL	STATEWIDE
1.0%	0.6%



WITH FIXED OBJECT

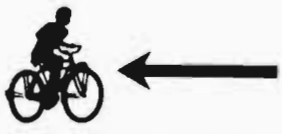
RURAL	STATEWIDE
24.0%	23.3%

OTHER OBJECT

RURAL	STATEWIDE
0.8%	0.8%

OVERTURN

RURAL	STATEWIDE
15.4%	11.0%



PEDALCYCLIST

RURAL	STATEWIDE
0.8%	1.8%

ALL OTHERS

RURAL	STATEWIDE
7.3%	7.4%

TABLE III

TABLE IV

Potential for accident and injury reduction in road accidents (based on 1977 data)

Options		Potential - per cent savings
ROAD ENVIRONMENT (low cost remedies)		
– geometrical design, especially junction design and control		10½ (11½)
– road surfaces in relation to inclement weather and poor visibility		5½
– road lighting		3 (1½)
– changes in land use, road design, and traffic management in urban areas		5 - 10 (7½ - 16½)
	OVERALL	ONE-FIFTH of accidents
VEHICLE SAFETY MEASURES		
Primary	– vehicle maintenance, especially tyres and brakes	2
	– anti-lock brakes and safety tyres	7 (6)
	– conspicuity of motorcycles	3½ (3)
Secondary	– seat belt wearing	7 (10)
	– other vehicle occupant protection measures	5 - 10
	OVERALL	ONE-QUARTER of casualties
ROAD USER AND ROAD USAGE		
– restrictions on drinking and driving		10
– more appropriate use of speed limits		5
– propaganda and information		up to 5
– enforcement and police presence		up to 5
– education and training		up to 5
– other legislation (eg restrictions on parking)		up to 5
	OVERALL	ONE-THIRD of accidents

Figures in brackets indicate earlier values based on 1973 data – where different from latest estimates.

high accident locations. Thus far, there has been little or no legal difficulties in use of this system in Beaumont. However, this may possibly be attributed to their expertise in handling these matters.

It is also the opinion of the author that the most effective expenditure of funds should be given to improving the riding surface, shoulder and clearances directly adjacent to the lanes. Expenditure of funds to eliminate or protect traffic from the millions of obstructions within the highway right-of-way is considered secondary to improving the pavement, shoulders, structures and minimum clearances. The extra costs of excessive clearances of objects outside the traveled way should be optimized on the basis of benefit/cost studies of the more important elements, should adequate funds remain for such work.

In the long run, improvements in driver performance and protective vehicle design would produce the greatest possibility for a large turnaround of the highway death statistics, but the question remains, is the general public willing and agreeable to relinquish part of their freedom and expenditure of funds for this purpose? We certainly should strive for a solution to this public health epidemic; however, the results mainly depend upon every vehicle driver.