

A QUALITATIVE ANALYSIS OF WRONG-WAY
DRIVING IN TEXAS

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ABSTRACT

A questionnaire survey was conducted of state and local highway engineers and law enforcement personnel in an attempt to qualitatively determine the nature of wrong-way driving in Texas. In general, these officials considered the greatest problem with respect to wrong-way driving to be that of the drinking, drunk, or drugged driver. They also suggested that wrong-way driving should be confronted through engineering, enforcement, and education, and that better approaches and techniques for reducing it were desired.

DISCLAIMER

The opinions, findings, and conclusions expressed or implied in this report are those of the authors and not necessarily those of the Texas Highway Department or of the Federal Highway Administration.



SUMMARY

A questionnaire survey was conducted of state and local highway engineers and law enforcement personnel in an attempt to qualitatively determine the nature of the wrong-way driving problem in Texas. The following factors concerning wrong-way driving in the state were considered:

1. The percentage of the total accident problem due to wrong-way driving.
2. The trend of the wrong-way driving problem over the last several years.
3. The causes of wrong-way driving.
4. Possible or promising solutions to wrong-way driving.
5. Whether wrong-way driving in Texas merits more consideration and research than it is now receiving.

The officials were also asked to comment on present approaches used in their respective areas toward reducing wrong-way driving. Other possible solutions to the problem were also solicited.

The following findings are based on the response of 32 engineers and 19 law enforcement personnel to the questionnaire on wrong-way driving in the state of Texas:

1. The majority (80 percent) of the engineers and law enforcement personnel indicated that wrong-way accidents constituted two percent or less of the total accident problem.
2. The majority (74 percent) of the engineers and law enforcement personnel indicated that the problem of wrong-way driving apparently is not increasing. Fifty percent believed wrong-way driving was remaining fairly constant.

3. Both the engineers and law enforcement personnel felt that over half of all wrong-way driving maneuvers were due to drinking, drunk, or drugged drivers. In a California study, drinking drivers accounted for 43 percent of the drivers involved in all wrong-way accidents, and 78 percent of all drivers involved in fatal accidents whose sobriety were known. In a Michigan study, 50 percent of all wrong-way accidents involved drinking drivers.
4. Twenty-six percent of all wrong-way driving maneuvers are caused by drivers becoming confused by the geometric design, signing, etc., in the opinion of the respondents.
5. Fifty-nine percent of the engineers and law enforcement personnel felt that wrong-way driving in Texas merited more consideration than it is now receiving, 33 percent indicated that it did not, while 8 percent were undecided.
6. Present approaches to the solution included the following:
 - a. Stricter penalties for wrong-way violators
 - b. More driver education and publicity of wrong-way driving accidents
 - c. Elimination of two-way service roads
 - d. Illumination signing
 - e. Detection and warning devices
7. The respondents ranked the area of enforcement as offering

the most promise for reducing wrong-way driving. Enforcement received a score of 30, engineering 28, education 25, and the research area 17. However, the support given to research, relative to the well-known three E's, appears to indicate that better approaches and techniques for reducing wrong-way driving were desired by the respondents.

Recommendations for Implementation

The following recommendations for implementation were drawn from the findings of this study:

1. Current emphasis should be continued on eliminating the drunk driver.
 - a. Every effort should be made in the field of driver education to communicate the grim consequences that often result to a drunk driver and to many innocent victims of his driving actions.
 - b. The areas of traffic safety legislation and law enforcement should continue to be given strong support.
2. Continued efforts should be made in the fields of highway design and traffic engineering to improve the driving performance of drivers whose capabilities are impaired.
3. Actual case studies of wrong-way accidents should be conducted and documented to determine the cause of the driving maneuver, in the driver's opinion, and what could have been done to prevent it.

4. Effective communication of traffic surveillance information between law enforcement officials and highway and traffic engineers should be encouraged.

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A QUALITATIVE ANALYSIS OF WRONG-WAY DRIVING IN TEXAS

General

In an attempt to determine the nature of wrong-way driving in Texas, a questionnaire survey was conducted of state and local highway engineers and law enforcement personnel within the state. A total of 51 respondents, 32 engineers and 19 law enforcement officers from both urban and rural areas of Texas, participated in the questionnaire. The objective of the questionnaire was to qualitatively identify the following factors concerning wrong-way driving in Texas:

1. The percentage of the total accident problem due to wrong-way driving.
2. The trend of the wrong-way driving problem over the last several years.
3. The causes of wrong-way driving.
4. Possible or promising solutions to wrong-way driving.
5. Whether wrong-way driving in Texas merits more consideration and research than it is now receiving.

The respondents were also asked to comment on present approaches used in their area of the state toward reducing wrong-way driving. Other possible solutions to the wrong-way driving problem were also solicited. The questionnaire is reproduced in Appendix A. Unless otherwise noted, wrong-way driving is considered to be as defined in the questionnaire.

Statistical data of recorded wrong-way driving accidents and violations in Texas are presented where appropriate to provide an additional basis of analysis. These results were obtained from the yearly accident and enforcement summaries prepared by the Texas Department of Public Safety.

RESULTS

Magnitude of Problem

Table 1 presents a summary of the respondents' opinions regarding the percentage of all accidents that are due to wrong-way driving in Texas. The majority of replies for engineers as a group, law enforcement personnel as a group, and both groups as a whole indicated that accidents due to wrong-way driving comprised two percent or less of the total accident picture. Eighty percent of the engineers and law enforcement personnel thought this was the case, while 20 percent were of the opinion that wrong-way accidents comprised greater than two percent of all accidents.

The types of violations found to contribute to fatal accidents in Texas are presented in Table 2. On a statewide basis in 1969, 1.4 percent of all fatal accidents were found to involve a wrong-way driving violation. The wrong-way driving violation contributed to only one-sixth the number of violations due to driving on the wrong side of a roadway, such as a vehicle crossing over the centerline or median of a highway. The drinking while driving violation was the most frequent single violation.

A measure of the potential accident hazard of wrong-way driving is indicated in Table 3. Wrong-way driving was found to constitute 1.4 percent of all charges filed for moving traffic violations in 1969 with similar results from 1967 to 1968. Of the total 10,980 charges filed for wrong-way driving in 1969, 718 or 15 percent of the wrong-way driving maneuvers resulted in some type of accident.

TABLE 1
 RESPONDENTS OPINION OF PERCENT
 OF ALL ACCIDENTS THAT ARE WRONG-WAY IN TEXAS

Percent of All Accidents That Are Wrong-Way	Respondents		
	Engineering ⁺ (%)	Law Enforcement* (%)	All Respondents (%)
<u><1</u>	69	69	69
1-2	12	8	11
>2	19	23	20

+ 32 respondents.

* 13 respondents.

TABLE 2
 TYPES OF VIOLATIONS CONTRIBUTING
 TO FATAL ACCIDENTS IN TEXAS

Violation	Rural			Statewide
	1965	1967	1969	1969
Wrong Way - One Way Road	0.9	0.9	1.0	1.4
Wrong Side - Not Passing	14.1	15.1	13.0	8.6
Drinking While Driving	39.0	37.0	38.0	34.0
All Other Violations	46.0	47.0	48.0	56.0

Source: Texas Department of Public Safety.

TABLE 3

CHARGES FILED IN WRONG-WAY DRIVING
ON ONE WAY ROADS IN TEXAS

Violation	1967	1968	1969
Number of Charges Filed	10,120	10,043	10,980
Percent of Total Moving Violation Charges Filed	1.5%	1.3%	1.4%

Source: Texas Department of Public Safety.

Trend of Wrong-Way Driving

The results of Tables 2 and 3 indicate that the problem of wrong-way driving in Texas apparently is not increasing significantly, if at all. Most of the respondents in the questionnaire survey are in agreement with this trend as is shown in Table 4. Seventy-two percent of the engineers and 78 percent of the law enforcement personnel thought wrong-way driving was not increasing. Approximately one-half of both groups felt wrong-way driving in Texas was remaining fairly constant. Of the 26 percent of the respondents who felt it was increasing, most indicated the cause to be due to the increasing number of one-way roads and controlled access facilities.

Causes of Wrong-Way Driving

The identification of the factors which cause or contribute to the wrong-way driving maneuver would be helpful to highway engineers and law enforcement personnel in their efforts to eliminate wrong-way driving. To evaluate the feelings of the respondents as to the causes of wrong-way driving, the respondents were asked to indicate the percentage of wrong-way driving maneuvers which they thought were due to the following items:

1. Driver confused by signing, design, etc.
2. Driver drunk, had been drinking, drugged, etc.
3. Driver deliberately drove the wrong way
4. Other causes

Table 5 presents the average response as to the causes of the wrong-way driving in Texas. Both the engineers and the law enforcement personnel were in agreement that over half of all wrong-way driving maneuvers in Texas were due to drivers being drunk, drugged or had been drinking.

TABLE 4

RESPONDENTS INDICATION OF TREND
OF WRONG-WAY DRIVING IN TEXAS

Trend in Wrong-Way Driving	Respondents		
	Engineering ⁺ (%)	Law Enforcement* (%)	All Respondents (%)
Increasing	28	22	26
Fairly Constant	53	45	50
Decreasing	19	33	24

+ 32 respondents.

* 18 respondents.

TABLE 5

RESPONDENTS' INDICATION OF PERCENTAGE OF
WRONG-WAY DRIVING IN TEXAS DUE TO CAUSES SHOWN

Cause	Respondents		
	Engineering+ (%)	Law Enforcement* (%)	All Respondents (%)
Confused by Sign- ing, Design, etc.	24	28	26
Driver had been Drinking Drugged, etc.	52	56	53
Deliberate Violation	14	9	12
Other	10	7	9

+ 32 respondents.

* 16 respondents.

Drinking drivers in a California study (1) accounted for 43 percent of the drivers involved in all wrong-way accidents and 78 percent of all drivers involved in fatal accidents for which the driver's sobriety was known. In a Michigan study (2), 50 percent of all wrong-way accidents involved drinking drivers.

These results indicate that drinking, drunk, or drugged drivers exert a large influence on the number of wrong-way accidents. The percentage of these drivers who became confused or were misled by the signing, highway design, or the driving environment and committed a wrong-way driving maneuver is not known. However, results of the California study (1) suggested to its investigators that improved signing techniques and warning devices had a smaller effect on drinking and drunk drivers than on sober drivers.

Possible Solutions

A part of the questionnaire survey was directed toward determining possible ways for preventing or reducing wrong-way driving. The respondents were asked to assume they were charged with the responsibility for reducing the number of wrong-way accidents in Texas. They were asked to allocate their budget to the following areas:

1. Engineering
2. Education
3. Enforcement
4. Research

The average percentage allocation for each area is presented in Table 6. The response of the engineers and law enforcement personnel varied somewhat on the areas to receive the greatest percentage of budget allocation to re-

TABLE 6

RESPONDENTS' INDICATION OF PERCENTAGE
OF A WRONG-WAY BUDGET ALLOCATION TO AREAS SHOWN

Areas	Respondents		
	Engineering ⁺ (%)	Law Enforcement* (%)	All Respondents (%)
Engineering	28	29	28
Education	28	18	25
Enforcement	28	36	30
Research	16	17	17

+ 32 respondents.

* 15 respondents.

duce wrong-way accidents. For both groups as a whole, enforcement received the greatest percentage of budget allocation to reduce wrong-way accidents. Enforcement received 30 percent of the average budget allocation, with engineering, and education following closely with 28 percent and 25 percent, respectively.

Another portion of the questionnaire asked, "Does wrong-way driving in Texas merit more consideration and research than it is now receiving?" Evaluation of the response to this question showed that 59 percent of engineers and law enforcement personnel as a group answered "yes." Thirty-three percent of the respondents as a group answered "no" to the question and 8 percent were "undecided". These results are presented in Table 7.

These results suggest that the three E's - engineering, education and enforcement - all offer a substantial promise for reducing wrong-way driving. However, the support given to research appears to indicate that better approaches and techniques for reducing wrong-way driving were desired by the respondents.

In addition to the evaluation and results of the portion of the questionnaire presented to this point, two other questions were asked of the engineers and law enforcement personnel who received the questionnaire. These questions were:

1. What are the present approaches to the solution to wrong-way driving in your area?
2. What are your suggestions as to other possible solutions to the problems of wrong-way driving?

The replies to the question of what present approaches to the solution of any wrong-way driving problems that were now being used, generally fell into the following categories:

TABLE 7

RESPONDENTS' INDICATION IF WRONG-WAY
DRIVING IN TEXAS MERITS MORE CONSIDERATION
THAN IT IS NOW RECEIVING

Response	Respondents		
	Engineering+ (%)	Law Enforcement* (%)	All Respondents (%)
Yes	57	63	59
No	33	32	33
Undecided	10	5	8

+ 30 respondents.

* 19 respondents.

1. Signing - Standard "DO NOT ENTER", "NO LEFT TURN", "NO RIGHT TURN", and "ONE-WAY" signing was usually indicated although the City of Dallas has used "WRONG-WAY" signs in some instances. Maintenance of existing signing and additional signing to supplement that signing already present were also indicated.
2. Pavement Markings - The use of both painted and raised, reflective directional arrows on main lanes and ramps is a technique used by many respondents to indicate right-way direction.
3. Geometric Design - The use of buttonhook ramps where two-way frontage roads existed was indicated as well as median barriers at locations where vehicles were found to be crossing a median.
4. Enforcement - This was generally indicated by law enforcement personnel. Methods used included publicity of wrong-way accidents, freeway patrols to apprehend wrong-way violators, and enforced attendance of driver education short courses for wrong-way drivers. Law enforcement personnel also indicated that highway locations which appeared to have a wrong-way driving problem were reported to the Texas Highway Department.

Other possible solutions indicated by the respondents included:

- a. Stricter penalties for wrong-way violators
- b. Detection and warning devices
- c. Elimination of two-way service roads
- d. Illuminated signing
- e. More driver education and publicity of wrong-way driving accidents

APPENDIX A

WRONG-WAY DRIVING IN TEXAS

Questionnaire Survey

Given by

Texas Transportation Institute

In Cooperation With

Texas Highway Department

Texas A&M University
College Station, Texas

Wrong-Way Driving: The act of driving illegally in a lane of opposing traffic flow. Please consider freeways, expressways, other divided highways, exiting on on-ramps, entering on off-ramps, and frontage roads.

1. What percent of the total traffic accident problem do you feel is due to wrong-way driving?
2. Do you believe that wrong-way driving is increasing, remaining fairly constant, or decreasing?
3. What percent of wrong-way driving maneuvers do you feel are due to:

	%
1) Driver confused by signing, design, etc.	()
2) Driver drunk, had been drinking, or drugged	()
3) Driver deliberately drove wrong way	()
4) Other	()
5)	()

4. If you were charged with the responsibility to reduce the number of wrong-way accidents in Texas, what percent of your budget would you allocate?

	%
Engineering	()
Education	()
Enforcement	()
Research	()

5. Do you feel that this problem of wrong-way driving on our highways merits more consideration and research than it now is receiving?
(Yes, Undecided, No)

6. What are the present approaches to the solution to wrong-way driving in your area? Approaches used on particularly unique or previously persistent cases would also certainly be of interest.

7. What are your suggestions as to other possible solutions to the problems of wrong-way driving?

