TRANSPORTATION RESEARCH

Number 234, December 1981 ISSN 0097-8515

CIRCULAR

Transportation Research Board, National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington, DC 20418

RESEARCH PROBLEM STATEMENTS: TRAFFIC LAW ENFORCEMENT

mode 1 highway transportation

subject areas

51 transportation safety

52 human factors

54 operations and traffic control



IERARI

OPERATION AND MAINTENANCE OF TRANSPORTATION FACILITIES

Patricia F. Waller, Chairman Group 3 Council University of North Carolina, Chapel Hill, North Carolina

> Committee on Traffic Law Enforcement (as of July 1, 1981)

> > Newman W. Jackson, Chairman Cedar Creek, Texas

James K. Williams, Transportation Research Board Staff

Dr. Gil W. Bellamy George W. Black Dr. Quinn Brackett Roy F. Carlson Stephen S. Caruso William E. Clark Dr. Olin K. Dart, Jr.

INTRODUCTION

Committee A3B09, Traffic Law Enforcement, has recognized the identification and dissemination of research needs as one of the major committee functions. The committee has identified and described five problem areas which are considered to be timely and urgent. This circular is intended as a means for communicating the research problem statements to the transportation research community.

PRIORITY RANKING

While each of the problem statements is considered important, the committee ranked problem number 1 as the highest priority, problems number 2, 3, and 4 as high priority, and problem number 5 as medium priority. The priority assignment given to each problem statement represents the committee's judgment as to the relative importance of the problems to be addressed by further research.

Dr. Mary Beth Marks Dr. Judson S. Matthias

Norman Darwick

Nancy A. David

Dr. Mark L. Edwards

William D. Glauz

Kent B. Joscelyn

RESEARCH PROBLEM STATEMENTS

PROBLEM NO. 1

1. TITLE: The Interaction of Speed Law Enforcement and Accidents.

Raymond C. Peck

Richard A. Raub

Marvin H. Wagner

Major Robert F. Siek

Gene Roberts

J. E. Smith

Paul R. Tutt

2. PROBLEM: The continued emphasis on speed control of the traffic stream since the advent of the 55 MPH NMSL has led to a resurgence of questions regarding the relationships among speed, accidents and enforcement. Of particular interest is the effect of speed enforcement on fatal accidents. There has been a reasonable consensus that the 55 MPH NMSL contributed to the fatal accident reduction experienced in the 1973-1974 period. However, what is unclear is the extent to which enforcement has and/or can be expected to sustain that contribution.

- OBJECTIVE: This research effort would have as its objective the definition of the interaction of speed law enforcement and accidents.
- 4. KEY WORDS: Speed and Accidents, Speed Enforcement, Enforcement and Accidents.
- 5. RELATED WORK: Individual states have conducted various task force projects, operation CARE with groups of states working together on holiday weekends, etc., but it is unknown if a detailed study of the type proposed has been conducted. The Highway Safety Research Center at the University of North Carolina evaluated a CARE operation over the Memorial Day holiday weekend in 1978. New York has been evaluating a "Controlled Access Highway Task Force" under a NHTSA grant over the past three years.
- 6. URGENCY/PRIORITY: This project should have the highest priority since many states are being required to increase enforcement levels for speed compliance purposes, while limiting other enforcement activity.
- 7. COST: Estimated cost: \$400-500,000.
- IMPLEMENTATION: The implementation of this research effort would necessitate the following steps:
 - Jurisdictions/sites that vary in terms of enforcement, but are similar in other respects (type of sanctioning, surrounding population, weather) should be selected. Subsequently, differences between these areas regarding accident rates and compliance should be associated with the various enforcement levels/procedures studied
 - (2) Regular speed monitoring on a scientific sampling basis should be conducted at the selected sites. Conditions of measurement (time, weather, etc.) should be comparable
 - (3) If possible, spot speed stations should be at or near permanent traffic counting stations and both sets of data should be classified as to type of vehicle. Speed measuring devices should be concealed to provide the most accurate speed data possible
 - (4) Accident data should be studied along the same routes as speeds and counts are obtained
 - (5) Speed enforcement records should be collected with location noted carefully as to county and road type with direction, time, weather and other pertinent vehicle and driver descriptions included. Data as to prosecution and adjudication of these citations should also be obtained.
 - (6) Analyses should be conducted to ferret out the real contribution of speed enforcement to the control of speed and the reduction of accidents.

9. EFFECTIVENESS: The impact of research in this area could lead to a refinement of traffic laws and traffic enforcement. Measures of the effectiveness of results would include the development of sound speed-enforcement-accident relationships which could, in turn, lead to reductions in accidents by more efficient allocation of resources.

PROBLEM NO. 2

- 1. TITLE: Energy Rationing and Enforcement.
- 2. PROBLEM: Gasoline rationing has appeared possible on several occasions since the energy crisis of 1973. Congressional enactment of a standby emergency rationing plan has formalized the basic federal approach to gasoline rationing. Some states have developed energy emergency plans which are consistent with this federal rationing plan.

A traffic law enforcement agency could be responsible for a variety of activities related to gasoline rationing or energy emergencies. These activities would generally be dependent on the severity of the emergency, the federal and state emergency plans, and the resources of the enforcement agency. Especially it the emergency is of some duration, the agency resources diverted to emergency activities are likely to decrease the overall capability of the agency to perform its normal functions, e.g., traffic safety.

- 3. OBJECTIVE: The basic project objective is to determine the traffic safety impact of diverting enforcement agency resources to energy related emergency activities. To do this, alternative scenarios will have to be developed which are based on existing or expected state/federal plans and which estimate the impact of the plans on the resources of enforcement agencies.
- KEY WORDS: Gasoline Rationing, Enforcement Resources, Energy Rationing, Enforcement Efficiency, 55 NMSL Enforcement Requirements.
- RELATED WORK: Related work would include state energy emergency plans, enforcement requirement of the 55 NMSL and operational studies of limited fuel supply for enforcement agencies.
- URGENCY/PRIORITY: This study should have a high priority because of possible future shortages.
- 7. COST: Estimated cost \$100-200,000.
- 8. IMPLEMENTATION: The findings of this research effort could be disseminated to state, county and municipal law enforcement agencies, which in turn could prepare adequate contingency plans to prepare for the event of gasoline rationing and other energy emergencies.
- 9. EFFECTIVENESS: The measure of effectiveness would be the ability of law enforcement agencies to cope with a rationing situation and the extent to which this research would contribute to that ability.

PROBLEM NO. 3

- 1. TITLE: Speed and Accidents.
- 2. PROBLEMS: The speed/accident relationship needs to be reexamined in light of changes in the speed law (55 MPH), and highway and vehicular safety improvements and changes. It is possible that previously established parameters are no longer valid. Information of this kind would be useful for enforcement policy decisions and possible reconsideration of speed limits.
- 3. OBJECTIVES: To quantify the relationship between speed on 55 NMSL highways and fatal/major injury accidents, considering the effects of both speed distribution and absolute velocity. To assess the impact of general enforcement activities (excluding speed enforcement) on these accidents.
- KEY WORDS: Speed and Accidents, Speed Enforcement, Enforcement and Accidents, 55 MPH NMSL.
- RELATED WORK: There is no recent authoritative quantification of the effect of freeway speeds on accidents. David Soloman's work in the early 1960s is an excellent historical reference.
- URGENCY/PRIORITY: Relatively high given the continuing controversy over the benefits of the 55 NMSL.
- 7. COST: Estimated cost \$800,000.
- 8. IMPLEMENTATION:
 - Establish speed monitoring stations on a sample of each type of highway
 - (2) Collect detailed accident data from collisions occurring on the sample roads
 - (3) Develop speed/accident parameter relationships

The proposed research will result in information which could be used potentially in support of the 55 NMSL, the procurement or deployment of enforcement resources, and as a base for program evaluation and further research.

9. EFFECTIVENESS: This research should improve highway safety through improved allocation of enforcement and engineering resources as well as through greater compliance with speed laws. Measures of effectiveness would include public acceptance of speed laws and freeway accident rates.

PROBLEM NO. 4

- 1. TITLE: Measuring the Effectiveness of Enforcement.
- 2. PROBLEM: Traffic law enforcement agencies perform many useful and noteworthy functions

including traffic control, post-accident service, license regulation, and crime prevention. However, the traditional measure of effectiveness for all activities has been the reduction of accidents. Accidents apparently can either be idiopathic or systemic. Idiopathic accidents are spontaneously generated in a random fashion and virtually defy prevention through enforcement. Systemic accidents result from circumstances relating to the transportation system which may or may not be subject to amelioration by enforcement efforts. Neither type of accidents serves as a good indicator of enforcement efforts. This does not mean that enforcement does not have the potential for reducing accidents. It means that the state of the art in accident analysis does not lend itself to the identification of those particular types of accidents that can be reduced through enforcement efforts.

In that regard, two approaches to the solution of the problem seem feasible. The first would involve an attempt to identify those accident types that could be reduced by active enforcement then using only those types to measure effectiveness. Failing this, the second approach, which does not use accidents at all, could be employed.

This approach would involve the development of new methods of measuring effectiveness such as the reduction in incidence of certain on-road behaviors associated with accidents (speeding, DWI, etc.).

- 3. OBJECTIVE: The objectives of this two-stage research effort would be the identification of those accident types subject to reduction through enforcement efforts and/or the development and evaluation of new methods of measuring effectiveness of traffic law enforcement.
- KEY WORDS: Measure of Effectiveness, Criteria for Effectiveness, Performance Assessment, Accidents and Enforcement, Accident Analysis.
- RELATED WORK: Unsafe Driving Acts (UDA), Speed Control & Measurement.
- URGENCY/PRIORITY: This project should be given a high priority since positive results would have a direct influence on utilization of resources.
- 7. COST: Estimated cost \$100-200,000.
- IMPLEMENTATION: Successful results from this project could be directly applied to any traffic law enforcement or other safety effort which proposed to use accident reduction as a measure of effectiveness.
- 9. EFFECTIVENESS: Since this research involves the development of an effectiveness measure, its application would depend on the ability of the technique developed to discriminate between productive and non-productive enforcement techniques.

PROBLEM NO. 5

1. TITLE: Pre-arrest Influence of Enforcement on

Driver Behavior.

 PROBLEM: The manpower limitations of law enforcement agencies tend to restrict their efforts to after-the-fact enforcement. As such, these efforts serve to punish the offender rather than to prevent the offense from occurring.

Many programs have attempted to influence driver behavior prior to the commission of a violation. These include public information and education campaigns, highway engineering, driver licensing, and vehicle design efforts. These programs have been designed to increase the awareneos of motorists about general and specific driving hazards. In addition, enforcement and public information campaigns have tried to raise the subjective probability of risk of detection and apprehension either artificially through media blitzes or in reality by temporarily supplementing existing manpower.

However, few programs have tried to optimize scheduling and patrol techniques to present highly visible patrol symbols to the greatest numbers of drivers. There have also been very few attempts by enforcement agencies to reinforce good driving behavior. Programs of this type rely upon the visible presence of the patrol vehicle to control traffic behavior. There is a subtle distinction to be made between controlling through presence and actively enforcing the law. It is always understood that without the threat of enforcement, the ability of a symbol to control is lost. The distinction is one of emphasis, that of generating high levels of ticketing activity by covert means such as moving and camouflaging enforcement vehicles versus reduced ticketing activity but more extensive

traffic control through overt means. Both have influence on behavior; however, in the active enforcement, covert cases, it is after the fact. In the visible, overt case, the presence precludes violation.

Although most law enforcement agencies use both methods to some extent, little information is available about the short and long term effects of pre-arrest influence and the techniques that could be used to enhance those effects.

- 3. OBJECTIVE: The objective of this research effort would be the determination of effective methods of influencing driving behavior which do not involve after-the-fact enforcement.
- 4. KEY WORDS: Driver Behavior, Enforcement.
- RELATED WORK: Selected Traffic Enforcement Programs (STEP), Public Information Programs, Innovative Enforcement Programs.
- URGENCY/PRIORITY: This project is anticipated to require several stages of development. It is a long-term, low-yield effort with a medium priority level.
- /. COST: Estimated cost \$300,000.
- IMPLEMENTATION: The determination of methods for preventing inappropriate driving behaviors from occurring would lead to application as long as they were cost effective and did not prohibit after-the-fact enforcement.
- 9. EFFECTIVENESS: The measure of effectiveness of any driver behavior modification techniques would be the reduction in the frequency of occurrence of the undesirable behavior.