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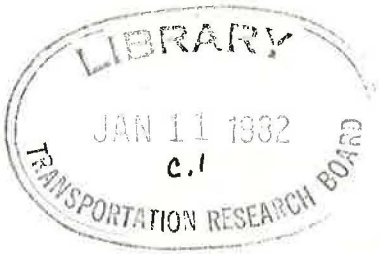
RESEARCH PROBLEM STATEMENTS: MOTORIST SERVICES

mode
1 highway transportation

subject areas
51 transportation safety
52 human factors
54 operations and traffic control



OPERATION AND MAINTENANCE OF TRANSPORTATION FACILITIES

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INTRODUCTION

Committee A3B05, Motorists Services, has recognized the identification and dissemination of research needs as one of several major activities in which to be engaged. The publication of this circular completes the cycle of communicating research needs to the transportation research community. Several research ideas have been discussed over the past three years, and these statements represent those which the committee felt to be the most important and which should be brought to the attention of transportation researchers.

In the individual problem statements an estimate of cost for doing the research study has been given. This estimate is not based upon a detailed cost review but is only a guide, and it serves to discern to the reader which of the eleven research problems would take the greatest amount of effort to complete.

PRIORITY RANKING

Although all of the problem statements in this circular are considered important, a priority ranking system was utilized in order to inform the reader which problems the committee consider the most urgent. The problem statements were received mostly in 1979 and recently ranked by the committee using the following scheme:

0 - Not Needed

1 - Low Priority

2 - Medium Priority

3 - High Priority

The result of this ranking is shown below:

Problem Statement No.	Title	Average Priority Ranking
1.	Rest Area Classification Systems	1.7
2.	Rest Area Warrants	1.5

Problem Statement No.	Title	Average Priority Ranking
3.	Promotion of Traffic Safety and Engineering in Rest Areas	1.9
4.	Opportunities for Park and Ride Travelers	2.4
5.	Effects of Warnings by CB Users on the 55 MPH Speed	2.0
6.	Standardization of CB Detection Systems	2.0
7.	Motorist Services in Winter Emergency Transportation	2.5
8.	Problems with Medical Emergency Transportation	2.0
9.	Uniform Inventory of Motorist Services Activities	2.0
10.	Variable Message Highway Signs	2.3
11.	Incorporating Commercial Services into Highway Rest Areas	2.5

AVERAGE RANK	STATEMENTS
< 2	1, 2, 3
2 - 2.5	4, 5, 6, 8, 9, 10
2.5	7, 11

RESEARCH PROBLEM STATEMENTS

PROBLEM NO. 1

1. TITLE: Rest Area Classification System

2. PROBLEM: There is no classification of rest areas, and the traveler does not know what to expect when he stops. What services are available, such as:

   (1) Essential rest rooms and water

   (2) Telephone

   (3) Picnic area/shelters/tables

   (4) Maps/displays

   (5) Attendant present, and if so the hours

   (6) Frequency of police patrol--degree of personal security, especially at night.

   In addition, the public needs to know, in advance, what to expect at the rest area.

3. OBJECTIVE: The study purpose should be two-fold:

   (1) To develop a rest area classification system, and

   (2) To recommend criteria for providing more adequate advance signing of the rest areas.

4. KEY WORDS: Rest areas, motorist services.

5. RELATED WORK: Little or none.

6. URGENCY/PRIORITY: Moderate.

7. COST: $60,000 over one year.

8. IMPLEMENTATION: This study should provide the basis for a national classification scheme for rest areas. Also, it should lead to action by the States in classifying and providing advance signing (and/or other information) for rest areas.

9. EFFECTIVENESS: The general effectiveness of this study will be a better informed traveling public, more frequent use of nighttime secure rest areas, and less anxiety for the traveler. It should also inform the States of problem rest areas.

PROBLEM NO. 2

1. TITLE: Rest Area Warrants

2. PROBLEM: Presently, there are no warrants as to location, size or type of rest area that should be provided within a highway layout. The only reference concerning rest areas, off the Interstate Highway System, is the 1965 AASHTO report, A Policy of Geometric Design of Rural Highways: Roadside Turnouts and Rest Areas.

   Turnouts and rest areas along the roadsides are functional and desirable elements on heavily traveled roads and on those carrying recreation traffic. They are a part of the complete highway development provided for the safety and convenience of the road users. Turnouts are areas, usually surfaced, outside the normal continuous shoulder, designed to provide space for parking of one or more vehicles for purposes of bus loading, mail delivery, observing the scenery, or semi-emergency stopping (as for the driver to study a map, to check brakes, or an apparent mechanical trouble, install or remove tire chains, etc.). Rest areas are forms of turnouts used for longer periods of time. They generally are further removed laterally and provide separated parking areas and facilities for drivers to rest and eat meals, etc. Along highways other than freeways with reasonably wide, continuous and stabilized shoulders there may be little need for turnouts except for those of the separated rest area type. Along highways with narrow or non-stabilized shoulders, turnouts at frequent intervals are advantageous. In this case the turnouts may be a part of the shoulder design; see Intermittent Shoulders or Turnouts, Chapter IV.

The design and location of roadside rest areas depend much on the character and volume of traffic, type of highway, and adjacent land use. 1/ Principles of driveway and intersection design apply generally at the points of access to or from these areas. "A Policy on Safety Rest Areas for the National System of Interstate and Defense Highways," 1958, outlines location, layout and general design controls for such facilities on freeways. Most of the details are directly applicable for safety rest areas on any trunk highway.

3. OBJECTIVE: The objective will be to provide criteria for determining the placement, spacing and type of rest area facility that should be incorporated into a proposed or existing highway layout.

   The scope of the study would include the following tasks:

   (1) Survey existing literature for all pertinent documentation in this area.

   (2) Inventory current rest area designs and configurations.

   (3) Interview highway agencies to determine what is current practice.

   (4) Develop a consensus procedure and submit to review of operating highway agencies.

   (5) Develop a set of warrants for the installation, expansion and/or removal of rest areas.

4. KEY WORDS: Rest area, motorist services.

5. RELATED WORK: None.

6. URGENCY/PRIORITY: Medium.

7. COST: $90,000 over 18 months.

8. IMPLEMENTATION: The proposed research would provide standardized warrants for the need, location, construction and upgrading of rest areas.

9. EFFECTIVENESS: Development of measures of effectiveness should be included in this research.

PROBLEM NO. 3

1. TITLE: Promotion of Traffic Safety and Engineering in Rest Areas.

2. PROBLEM: Every year there are changes in the driving population, the highways, traffic control devices, and traffic laws and ordinances. Many of these changes are never communicated to the drivers. Often, the successful implementation of many good, sound, safety oriented traffic control techniques and devices fail because the driving population has not been told what the changes mean or how the devices should be used. As a result, potential safety benefits may be lost.

   Outstanding examples of drivers not knowing the intended traffic engineering meaning of traffic control devices have been reported by Texas Transportation Institute in a 1978 study. 2/ The study results were obtained from a group of 31 driver education and defensive driving professional instructors. The results suggest significant improvements are needed in increasing drivers' understanding of commonly used highway traffic control devices. In general the following eleven devices are seriously misunderstood: crossing signs, the slippery when wet symbol sign, the curve vs. turn symbol sign, the pavement width transition symbol sign, the double turn symbol sign, the climbing lane ahead sign, yield to traffic in center lane sign, the double yellow line, the solid white line, protected turn traffic signal indications, and the flashing intersection control beacon.

3. OBJECTIVE: The purpose will be to examine the feasibility of communicating traffic engineering, control, and safety information to drivers through the use of displays, slide-tape shows, etc., at major rest areas.

   The scope of the study would include the following tasks:

   (1) Determine if, in the past, the promotion of traffic engineering and safety has been undertaken in this manner.

   (2) Make recommendations on what kinds of messages should be communicated.

   (3) Estimate how many drivers might be exposed to this communication medium annually.

   (4) Structure candidate implementation packages.

   (5) Estimate the cost-effectiveness of a pilot program.

   (6) Determine which states will be interested in starting a pilot program.

1/ Parking Turnouts; Rest Areas, See Highway Research Board Special Report No. 7, 1952, Parking Turnouts and Rest Areas, based on a 1952 research study. Current adequate standards may already be in existence in fragmented and non-uniform policies. What is required is a published set of uniform warrants that could lead to the establishment of policy which could be incorporated into future AASHTO design policy.

2/ Rodger J. Koppa and Patricia K. Guseman, "Public Understanding of Traffic Control Devices in Texas," Texas Transportation Institute, Report 232-1F, November 1978, College Station, Texas, 77843.

4. KEY WORDS: Driver information, rest areas, traffic control devices.

5. RELATED WORK: None.

6. URGENCY/PRIORITY: High.

7. COST: $100,000 during 2 years.

8. IMPLEMENTATION: The study should result in improved availability of current driver information on the meaning and engineering interest of traffic control devices as deployed on the highways.

9. EFFECTIVENESS: The overall effectiveness of the proposed study would be hard to evaluate. Implementation of this proposal would hopefully lead to long term improvements. In order to determine the magnitude of short term improvements in drivers' understanding of the meaning of traffic control devices, some form of follow-up questionnaire evaluation might be in order. Other approaches for evaluating the effectiveness of the program could be developed during the conduct of the proposed study.

PROBLEM NO. 4

1. TITLE: Opportunities for Park and Ride Travelers.

2. PROBLEM: As urban areas have continually extended outward, and in recent years as the price and availability of fuel have worsened, there has been an increased trend of shifts to transit and to ride sharing. In order to facilitate this shift, the need for park and ride operations has become increasingly important. The problem is that some park and ride operations have been very successful while others have failed miserably. There is a need to determine the basic requirements for park and ride operations.

3. OBJECTIVE: The purpose will be to review the literature on park and ride and to determine the requirements of motorists, such as:

   (1) Locational requirements

   (2) Design and Layout

   (3) Variation in requirements for

      (a) Carpools
      (b) Van pools
      (c) Transit bus (regular)
      (d) Transit bus (express)
      (e) Subscription bus.

   Also important will be the techniques that can be used to promote additional park and ride operations.

4. KEY WORDS: Park and Ride, Fringe Parking, Energy Conservation, Air Quality Control.

5. RELATED WORK: Several Traffic Systems Management type studies and energy conservation related studies have been conducted in recent years. Typical of these studies are the following:

   (1) "Regional Park and Ride and Preferential Treatment," North Central Texas Council of Governments, July 1979

   (2) Fringe Parking Lots for Carpoolers (Draft) AMVA, FHWA, May 1980

   (3) Evaluation of Three Demonstration Parking Facilities in California, CA DOT, November 1979

   (4) "Park and Ride Design Guidelines," Ohio DOT, UMTA, January 1979

6. URGENCY/PRIORITY: Moderately High.

7. COST: $40,000 during 1 year.

8. IMPLEMENTATION: The study should assist in determining the factors important in location, size, design, layout, and operation of park and ride facilities. This could result in more effective park and ride operations and in energy and environmental benefits.

9. EFFECTIVENESS: The overall effectiveness of the proposed study will be in long term traveler shifts in driving/riding habits. The results should be energy savings, reduction of air pollution and more efficient use of the total transportation system.

PROBLEM NO. 5

1. TITLE: Effects of Warnings by CB Users on the 55 MPH Speed Limit.

2. PROBLEM: The 55 mph speed limit has had a positive effect on the reduction of traffic accidents and fatalities. Energy can also be conserved when the 55 mph speed limit is followed by the motorist. However, many recent studies have revealed that a large percentage of the motorists tend to ignore the posted 55 mph limit.

   Also, trucks (most of which are equipped with CB radios) appear to violate the speed limit in much greater proportions than cars. However, when patrols are present trucks slow down and the entire traffic stream often takes its cue from trucks. The total effect of sometimes encouraging slowing of the traffic stream, while at other times inflicting a feeling of freedom from radar observation, is not known.

3. OBJECTIVE: The objective of this proposed research is to measure the effects that the "smokey bear" warnings have on the speed of a driver. Research has established that marked patrol cars have a "halo effect" that is very noticeable when monitoring highway speeds. Using a field data collection technique, data can be collected on speeds and "smokey bear" warnings when police patrol cars are monitoring speeds. An

analysis should relate the "halo effect" to traffic volume and type of facility as well as time of day (visibility). Further, the analysis should determine both the desirable and undesirable effects of the "smokey bear" warnings.

4. KEY WORDS: CB, 55 mph, speed limit, halo effect.

5. RELATED WORK: There have been several recent studies dealing with the enforcement of the 55 mph speed limit but a search of the literature does not reveal any research on the effects of warnings by CB radio users and reductions in speed.

6. URGENCY/PRIORITY: The urgency and priority of this proposed research is very high since the Surface Transportation Assistance Act of 1978 required that the states become increasingly more effective in enforcing the 55 mph speed limit or else they will suffer reductions in primary, secondary and urban appropriation.

7. COST: $65,000 over 15 months.

8. IMPLEMENTATION: The results of this research could be implemented by communicating the results to the appropriate enforcement agencies of the states.

9. EFFECTIVENESS: Possible societal impacts of this research would include a reduction in the number of traffic accidents and a conservation of energy resulting from decreased vehicle speeds.

PROBLEM NO. 6

1. TITLE: Standardization of CB Detection Systems.

2. PROBLEM: Most CB radio equipment is capable of transmitting and receiving on 40 channels (frequencies). However, many motorists in CB equipped vehicles do not know which is the proper channel to use for reporting incidents or accidents that they detect. In fact, the channel designation is either not known or it may vary from one area to another. This lack of acceptance of frequencies for various purposes creates confusion, lack of reporting of detected situations (for example, to whom and on what channel should a bent guardrail or a damaged sign be reported, etc.).

3. OBJECTIVE: To develop a clear and concise system of channel designation for motorist services (reporting accidents, breakdowns, etc.) and a method of communicating this information to the motorist. In order to provide maximum benefits to the motorists, a standardized and coordinated system of designating specific channels (frequencies) for specific areas and communicating this information to the motorist needs to be developed.

4. KEY WORDS: CB, motorist service, detection system.

5. RELATED WORK: Many states have adopted specific CB channels (frequencies) to be monitored by enforcement agencies, and communicate this information to the motorist by means of informational road signs.

6. URGENCY/PRIORITY: The need for standardization of CB detection systems is urgent because of the wide proliferation of detection systems and the rapid growth of consumer owned CB radio units.

7. COST: $60,000 over 1 year.

8. IMPLEMENTATION: In the first instance, the results of this proposed study could be rapidly implemented by dissemination of information to the various state police agencies. The final implementation would be adoption by the many governmental agencies, which, in some cases, could require statutory changes or executive orders.

9. EFFECTIVENESS: The greatest impact of this proposed research would be the prompt and orderly response of appropriate services to emergency highway situations, leading to the saving of lives, reduction of severity of injuries, and to time and monetary savings due to better handling of incidents.

PROBLEM NO. 7

1. TITLE: Motorist Services in Winter Emergencies.

2. PROBLEM: Especially in the Northeast and Mid-Western parts of the U.S., motorists have had alarming experiences with the sudden freezing snowstorms that stranded uncountable thousands along blocked highways. Among the worst experiences were the emergency situations encountered by motorists stranded in unfamiliar rural areas. There are several important elements of the problem confronting stranded motorists. First, they need better opportunities for identifying their location, useful crossroads, nearby churches and other public facilities/shelters, and telephones for contacting rescue units. Secondly, special measures may be needed for protecting the elderly, very young, and physically handicapped. And thirdly, a prevailing low level of public awareness ought to be changed by using media efforts to explain the need for carrying adequate winter travel kits.

3. OBJECTIVES: In preparing for the next snowstorms, research should be initiated to determine the most practical methods for aiding stranded motorists confronted with freezing hazards. Accordingly, the scope of the research should include the following objectives:

   (1) Evaluate the practical feasibility and effectiveness of alternative methods for aiding motorists stranded in snowstorms.

(2) Determine the most practical method for installing snow emergency signing that identifies where buildings are located near rural highways.

(3) Estimate the benefits of planned public information packages which would describe the essential items for winter travel kits.

4. KEY WORDS: Snowbound motorists, aiding stranded motorists, icy highway conditions, snow emergency highway signing, snow emergency routes, and winter travel kits.

5. RELATED WORK: Most of the states have various plans for signing and snow removal along the system of snow emergency routes. In contrast, there have been few studies addressing some part of the topic concerning aid for motorists snowbound on the low priority rural highways.

6. URGENCY/PRIORITY: The research is urgently needed to reduce the number of incidents and situations contributing to suffering and casualities among snowbound motorists.

7. COST: $200,000 during 2 years.

8. IMPLEMENTATION: The study results are likely to result in more complete planning and the reordering of priorities towards the most practical and effective methods for giving protection to snowbound motorists.

9. EFFECTIVENESS: Implementation of the completed research should substantially reduce the number of snowbound motorists who are left to suffer the effects of freezing conditions.

PROBLEM NO. 8

1. TITLE: Problems with Medical Emergency Transportation.

2. PROBLEM: An examination of the problems with medical emergency transportation should readily prove to be beneficial. What is needed is an abbreviated study which combines the findings available from numerous individual research projects. An extensive number of previous studies have been limited to describing just one medical emergency transportation (MET) feature within one geographic study area. There remains a need to apply a more comprehensive approach for the purpose of summarizing and comparing MET alternatives. Using this approach would be the most effective means of providing answers for the following types of questions. What types of MET alternatives have been implemented? Which are the most useful MET performance measures? And, which MET alternatives have proven to be highly successful?

3. OBJECTIVE: Both a literature search and a supplemental questionnaire survey should be conducted in order to: (a) identify the problem elements and characteristics of the medical emergency transportation system, (b) describe items useful as system performance measures, (c) recommend alternatives for improving system operations and (d) propose strategies for better adjusting to deficient emergency transportation conditions with countermeasures such as public information releases.

4. KEY WORDS: Hospital communication network, mobile radio devices, police/fire communication network, paramedical operations, medical patient transportation and helicopter evacuation activities.

5. RELATED WORK: A great number of studies have focused upon some part of the problems with medical emergency transportation. What has been clearly lacking is a study drawing the information from these into one summary.

6. URGENCY/PRIORITY: Apparently there has not been an urgent need for the proposed study. Regardless, a high priority should be assigned because it has become a question of how long the results of pertinent research should remain dispersed among reports without any effort to summarize the relationships between their major findings.

7. COST: $60,000 during 1 year.

8. IMPLEMENTATION: The results of the proposed study would provide those responsible for medical emergency transportation operations with information for making decisions about manpower and equipment changes.

9. EFFECTIVENESS: A successful study would result in a better allocation of manpower and equipment in parts of the medical emergency transportation system.

PROBLEM NO. 9

1. TITLE: Uniform Inventory of Motorist Service Activities.

2. PROBLEM: There is a need to develop a uniform national inventory of the motorist services operated along primary highways by both governmental and commercial owners.

Essentially, the problem derives from the absence of a system for identifying which regions across the states have reasonably good access to motorist services. The lack of a national inventory makes it difficult for the public to keep informed about the status of motorist services along alternative highway routes. Paucity of information continues to be the cause of numerous side trips in search of motorist services.

The implementation of a national inventory would facilitate the analyses of major gaps between the geographic regions which have adequate motorist services. Keeping this type of analysis up to date should provide a basis for preparing media releases about the highway corridors which have the best access to motorist services. One effect of such media releases should be a corresponding reduction in the number of side trips in search of motorist services.

3. OBJECTIVE: The research objective will be to plan a motorist services information system which would concisely identify the geographical areas where there is convenient access to: (a) roadside telephones, (b) emergency medical aid, (c) vehicle towing and mechanical repair, (d) gas stations, (e) safety parking areas, (f) public rest rooms, (g) food items, (h) lodging, and (i) travel information.

4. KEY WORDS: Motorist services information system, highway signing for motorist services, roadside telephones, motorist services performance measures, driver rest areas, and travel information.

5. RELATED WORK: Several plans for this type of study have been discussed but never implemented.

6. URGENCY/PRIORITY: A number of proposals for similar research have been advanced but postponed for years. Until a higher priority is assigned to this research, the benefits of a system for monitoring the status of motorist services will not be realized.

7. COST: $100,000 during 3 years.

8. IMPLEMENTATION: The research results should be used to implement a national system for monitoring changes in the status of motorist services in geographical subregions.

9. EFFECTIVENESS: A successful system for monitoring the changes in the status of motorist services would provide a basis for giving recognition to the geographical areas where improvements in services are initiated and would draw attention to the needs for improving the gaps in areas where minimal services are available for motorists.

PROBLEM NO. 10

1. TITLE: Variable Message Highway Signs.

2. PROBLEM: Variable message signs have been installed for the purpose of providing special motorist information at key points along urban expressways. Reviewing the literature shows there is an absence of information describing how these signs are being used to inform motorists.

   Essentially, the problem is that the variable message signs which have been used successfully in various U. S. communities have not been carefully considered for use elsewhere. Consequently, information and data are needed for answering the following types of questions. Has an attractive return been received from investments in weather related signs which denote such conditions as icy bridges, gusting winds, and slippery pavements? What types of variable message signs have improved the safety of highway reconstruction zones? And, what are the most economical means for providing peak hour signing on reversable, high occupancy vehicle and contraflow traffic lanes?

3. OBJECTIVE: The study purpose should be two-fold: (a) to design and conduct a national survey for describing the types, quantity, unit costs and usage of variable message highway signs and (b) to prepare a series of case study reports concerning the successful operation of variable message signs.

4. KEY WORDS: Time of day traffic signing, emergency traffic signing, changeable message signing, variable message signing.

5. RELATED WORK: Several studies of changeable message signs (CMS) have been conducted in the past decade or so. Most of them have been related to urban congestion (and familiar drivers). Use of CMS for intercity travel needs some attention. Some of the most notable studies include:

   (1) Human Factors Requirements for Real-Time Motorist Information Displays

   Volume 4 - Bibliography and Selected Annotations: Visual Systems, February 1978.

   (2) Dudek, C. L., "State-of-the-Art Related to Real Time Traffic Information," Texas Transportation Institute Report 139-2, 1970.

   (3) Knapp, B. G., J. I. Petris & D. A. Gordon, "Human Factor Review of Traffic Control and Diversion Projects," FHWA-RD-74-22. 1973.

   (4) Gover, A. L., "Bulb Matrix Changeable Matrix Signs Operational Characteristics," AASHTO, 1973.

   (5) Bogdanoff, M. A. & P. R. Thompson, "Evaluation of Warning and Information Systems, Part I, Changeable Message Signs," Report 75-5, California Department of Transportation, 1975.

   (6) Mast, T. M. & J. A. Ballas, "Diversionary Signing Content and Driver Behavior," FHWA paper for TRB presentation, 1976.

   (7) TRB: (a) Research Record 533, 1975
   (b) Circular 147, 1973

   (8) HRB: (a) Research Record 59, 1964
   (b) Research Record 366, 1971

6. URGENCY/PRIORITY: The research should be given a high priority because the benefits and problems with variable message highway signs are familiar to just a small number of highway professionals.

7. COST: $75,000 during 1 year.

8. IMPLEMENTATION: The completed research would provide information that should be the basis for either justifying, revising, or cancelling plans for installing variable message highway signs.

9. EFFECTIVENESS: Following completion of the research, motorists should encounter increased opportunities to respond to efficiently managed variable message signs.

PROBLEM NO. 11

1. TITLE: Incorporating Commercial Services Into Highway Rest Areas.

2. PROBLEM: Legislative restrictions generally prohibit a state transportation agency from leasing a highway rest area facility to a firm which agrees to provide a combination of commercial and public services. Thus, state highway officials are unable to transfer any of their obligation for the escalating expenses associated with operating and maintaining rest areas. If the legislation were revised, states could initiate contractual agreements for the purpose of sharing certain costs with commercial firms while concurrently adding to the scope of available services at rest areas. For example, commercial firms might be attracted to participate in constructing additions to and/or maintaining a facility combining a quick meal shop, picnic tables, rest rooms, telephones, vending machines, an exhibition stall and road information displays. Such an expansion to the availability of rest area services should prompt more motorists to make safety stops during long trips.

3. OBJECTIVES: The study should have a threefold purpose:

   (1) Identify the types of legislation which prohibit state transportation officials from commercializing highway rest areas

   (2) Estimate the benefits and other effects that could result from rescinding or revising restrictive legislation

   (3) Prepare sample legislation showing how to change the restrictive codes.

4. KEY WORDS: Commercial highway rest areas, highway service centers, road information displays.

5. RELATED WORK: Similar studies have often been proposed but not implemented.

6. URGENCY/PRIORITY: Because there are potential cost savings, service improvement, and highway safety benefits, the study should warrant a high priority.

7. COST: $80,000 during 15 months.

8. IMPLEMENTATION: The study should lead to revisions of federal and state legislation so as to permit the incorporation of commercial services into highway rest areas.

9. EFFECTIVENESS: The impact of the study should lead to an increase in the proportion of highway funds remaining available for roadway improvements.