

A NEW APPROACH TO MOTORIST AID?

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The paper focuses on the aid aspects of a highway motorist aid system and stresses that the attention in the past on hardware elements has precluded a systems approach to design criteria. The lack of guidelines and warrants for total system design and a lack of uniform reporting of motorist needs during breakdowns are two conditions that have prevailed. This paper suggests that a systems approach be used in implementing motorist aid systems and that a state agency be charged with statewide responsibility for motorist aid. This designation should be accompanied by a policy statement on the level of service to be rendered. The agency should develop plans for the implementation of motorist aid including means of detection, response, and service. The agency should have the authority to develop new public resources or to contract with local service organizations for the operation of the system. The suggested procedure is that (a) a task force of advisors with expertise in the various aspects of motorist aid be organized, (b) a sharper awareness among state officials regarding motorists' needs during breakdown be developed, and (c) technical resources and guidance during the design and implementation of an integrated statewide system be provided.

•THE PRIMARY PURPOSE of the highway system is safe and efficient movement of people and goods. Events leading to a disruption in this safe and efficient movement represent failures in the system. With the evolution of the motor vehicle as the prevalent mode of transportation, two major and related problems have emerged: highway accidents and disabled motorists (1). As catastrophic system failures, motor vehicle accidents are highly publicized; vehicle breakdowns and stranded motorists, though system failures of a lesser degree, are not. The question arises, "Why not?" Perhaps answers may be found among the following possibilities.

The lack of central interest in this system failure scatters information on individual case histories, complaint letters, and the like in a multitude of "miscellaneous files" nationwide. Thus, data on occurrence, severity, safety hazards, and related parameters are not readily available for research analyses and dissemination. Also, stranded motorists, being a very small fraction of the traveling public, exert little impact. They are merely someone's loss of time, comfort, or convenience, a minor hazard in today's highway transportation. Without national focus and concern, solution or remedial action for this nationwide problem of disabled motorists will continue to remain tomorrow's challenge instead of today's reality.

On several occasions in recent years, Arnold G. Fisch, Director of Operations, New York Thruway Authority, has pointed up this vacuum by stressing that "... just as in rail and air transportation systems, the safe, convenient, and efficient operation of expressway facilities must be a centralized responsibility and a coordinated function. Policing, maintenance and emergency services should be a responsibility of one—not several—operating official. This message, disseminated nationwide in the 1958-59 series of traffic operations seminars conducted by the Institute of Traffic Engineers, still remains largely unheeded. It is still a lesson to be learned; a practice to be adopted."

In discussing operational responsibility for motorist aid systems, one research report (2) notes the following:

It is desirable to tie together all of these operations; however, it is difficult to categorically award total systems management to any single organization except where the highway is operated by a toll authority....A single operational system manager goes a long way toward achieving the overall coordination that is necessary to realize optimal performance.

It is little wonder, then, that the stranded motorist and his system-failure problems, frustrations, and well-being as well as exposure of the vehicle and its occupants to unsafe or hazardous situations seldom appear in the media other than as individual local news of unusual situations. Without a national focus and source of statistics for study and research, it is most difficult to assess the full importance of this safety element in the highway environment.

It has been estimated, however, that 126 million emergency stops, other than accidents, occur annually on America's highways (3). The disabled motorist, in need of aid, thus remains a significant problem for local, state, and federal highway officials whether recognized or not. Douglas B. Fugate, in commenting on the Safety Service Patrol established on the Capital Beltway for the month of August and the Labor Day weekend 1972, stated that its purpose was to provide direct person-to-person contact for motorists whose vehicles become disabled. The service, an experiment conducted by the Virginia Department of Highways on major holiday weekends for several years, operated on an around-the-clock basis to provide radio communications for motorists seeking help. No doubt similar experimental adventures have been pioneered by other concerned officials.

Based on the preceding estimate, system failures are many and number far beyond the limited response resources currently available. Such resources as are available are primarily marshalled for motor vehicle accidents and, in some localities, are not generally available for aid to disabled motorists. This lack of adequate response facilities increases the likelihood of secondary accident involvements, such as chain reactions and shoulder accidents. In addition, it leads to traffic slowdowns caused by "rubbernecking" due to disabled vehicles remaining on the traveled way and other aspects of system failures. Given the present situation of limited and dispersed response resources, a great need exists to improve emergency aid services to disabled motorists as well as to accident victims.

To improve emergency services to stranded motorists requires that the characteristics of the stranded motorist problem be known. A uniform system of reporting such incidents must be developed and used nationwide as a basis for estimating the resources needed. As an example of the existing lack of uniformity, a comparison of data reported for four Interstate highways is given in Table 1.

It should be noted that the grouping of "stop categories" necessary to compile the available information from these four sources leaves many vacant cells and that the category items have unclear and ambiguous meanings. This absence of uniformity handicaps the highway community in taking steps toward an early definition of the problem and its solution nationwide.

The pressing nature of the problem is forcing some states to implement solutions based on fragmentary data. Highway administrators are beginning to recognize that the safety and emotional well-being of stranded motorists is a top-priority problem.

Morris Chorney, Director of the Rhode Island Department of Transportation, who for almost a decade has been a strong supporter of motorist aid, has recently been vocal in his emphasis that, first, "...highway officials have a duty and responsibility to provide the necessary motorist aid services" and that, second, "the greatest cost of any highway communication system must be borne by the State and Federal governments if it is to be uniformly accepted, used, and be available to all motorists."

In the 1930s, two decades before the "car population explosion," highway officials in metropolitan areas and toll authority operations, worldwide, recognized the need for roadside telephone systems. These covered relatively short segments of road facilities. With the growth of toll roads and turnpikes after World War II, around-the-clock police patrol with its mobile radio served as a motorist aid system.

Table 1. Percentage of disabled motorists on Interstate highways.

Stop Category	Rural		Urban	
	I-87, New York	I-94, Michigan	Harbor Freeway, Louisiana	Capital Beltway
Tire repair	19	22	17	26
Mechanical repair	43 ^a	17	27	10
Fuel, oil, or water	21	27	13	11
Towing	— ^b	19	— ^b	8
Ambulance required	— ^b	7 ^c	8	3
Fire truck required	— ^b	1	— ^b	1
Police required	12	— ^b	— ^b	— ^b
Information	5	5	29 ^d	21
Police use	— ^b	2	6	— ^b
Gone on arrival	— ^b	— ^b	— ^b	20

^aIncludes 11 percent of "other" vehicle service.

^bNot available separately.

^cMedical and tow, 1 percent; tow only, 1 percent; no tow or medical, 5 percent.

^dFalse alarms, 1 percent; miscellaneous, 28 percent.

The Interstate System, however, by virtue of its unprecedented mileage as a limited-access facility and the extremely wide range of its traffic volume spectrum, imposed conditions far beyond the available resources for police patrols as a proper response to the disabled motorist problem. However, as significant sections of Interstate mileage were placed in operation, highway administrators in the populous states recognized the need for roadside call systems.

Early installations were based on a 1962 AASHO informational report (4). This comprehensive guide has been validated by the test of time. It still stands as a tribute to the planning abilities, foresight, and scientific approach of AASHO and the committee members who prepared it. Several important insights in this report deserve our attention at this moment:

Until more experience is acquired and meaningful data are available on the characteristics, usage, and operational value of roadside . . . communications devices . . . it will not be practicable to develop guides and clear-cut warrants to govern such installations.

The sole purpose of an emergency communication system is to save time—that is, to reduce the time that a motorist in distress has to wait for assistance and . . . that other highway users might be subjected to accident hazards and delays to traffic movement.

In analyzing the propriety of emergency communications devices along a given Interstate highway, the following are listed:

1. Characteristics of the freeway,
2. Surveillance,
3. Installation, maintenance, and operational costs, and
4. Safety to eliminate the often hazardous walk to a roadside call station.

The installation of an emergency communications system places a considerable amount of responsibility and financial obligation on the agencies concerned—State, county, and municipal police and highway departments. Round-the-clock operation . . . must be assured, and provision must be made for immediate dispatching of help. This requires advance arrangements with suitable automotive service stations, fire companies and ambulance stations to respond to calls.

Where do we stand in relation to these goals? Ten years after the AASHO recommendation, guidelines and warrants have still not been developed. Should the responsibility rest with AASHO, FHWA, NHTSA, a new Department of Public Safety? Will it take another 10 years to decide?

The need is now. This the public has a right to expect, as it does other uniform highway safety features. Otherwise, continued proliferation and uncoordinated or "individual-insulated" state actions, with and without federal aid, taken in response to public demands, may soon preclude (by the very high cost of changeover) a planned, uniform, and coordinated nationwide operational motorist aid system.

In one report, 13 agencies are listed as potential users of electronic communications (5). Another report (2) states that "The challenge to highway agencies is first to learn exactly what the motorists' needs are and how best to provide for those needs. Then, agencies can provide aid systems that quickly detect stranded motorists, offer a means by which specific needs are communicated, and provide a timely and appropriate response." The summary in this same report presents the following conclusions:

1. Aid to motorists on the highways is an existing need,
2. Motorist aid and emergency communication systems should be coordinated with other statewide communications needs, and
3. Highway agencies should establish a function covering highway communication management.

It goes on to say, "There is a definite need for a coordinated effort to provide direction and to establish guidelines for planning, designing, and operating a motorist aid system." This coordinated effort should resolve the following issues and questions:

1. Among the safety features included in highway designs are wide shoulders, medians, protective systems, and aesthetic elements. Should not motorist aid systems be considered as essential safety elements in future designs for controlled-access highways?
2. Because motorist safety, comfort, and convenience are used to describe quality of service (6) and are basic to good highway design, construction, and operation, should not motorist aid systems be included in new construction and added to existing roads?
3. What is the relative benefit-cost of expenditures such as grass cutting, bare pavements, and aesthetics when compared to motorist aid as a safety feature?
4. What impact can we expect from present activities such as emergency medical services for motorists and statewide communications for law enforcement, health, pollution, and the like?
5. What do we know about the real life, real-time experiences of disabled motorists? Should not national statistics on stranded motorists be available to the media and others as readily as accident statistics?
6. Inasmuch as controlled-access highways are generally isolated and insulated from the areas they traverse, should not some form of motorist aid be provided for the physical and emotional safety of highway users who become stranded?

The thesis of this paper is that a design for a motorist aid system should start with a plan for organized, efficient, adequate, and prompt response resources, which we call software. It then proceeds with the call system or hardware. This is true whether we are considering a uniform nationwide policy or are planning an installation for a section of Interstate highway.

We emphasize that requirements or constraints, if any, derived from the software plan are requisite inputs to the design of a call system's hardware. Basic to system specifications for hardware is a need for a method for uniform comparative analyses of total costs (installation, operation, maintenance, etc.) over a specified time period (10 years, for example). This is an important element in selection of hardware from among available alternatives. Other elements include forecasts of future developments in equipment, public demand, engineering-executive judgment, and the like.

As system specifications or nationwide performance guidelines or warrants are evolved, we feel certain that our industrial and electronics associates will be able to supply the appropriate hardware systems with little difficulty. No doubt they would welcome a preliminary nationwide statement on guidelines and warrants. Possibly their representatives would aid in development of such guidelines or even system specifications for nationwide use.

The key criterion for the software design of a total motorist aid system is the "response-time" objective. On the average, what should be the maximum time that a motorist in distress should expect to wait for assistance? Should it be constant for all highway sections? Should it vary inversely with traffic volume? In a sense, this is a determinant of the quality of service to be provided to meet motorists' needs. Other facets to be considered include the following: What organization(s) will be designated

to receive the call for aid on a round-the-clock basis? How will the requisite type of assistance be dispatched? How will reasonable service rates be set and enforced? How and by whom will system performance (service rendered the traveling public) be measured, reported, and evaluated to ensure conformance with established "response-time" and other criteria?

A basic aspect of software system effectiveness is inherent in a response to the question, Will the system distinguish between varying degrees of distress: on one hand, a salesman or a truck driver, and on the other, a young mother with two infants and a stalled station wagon? What are the effects of time of day (darkness versus daylight) and weather (winds, rain, snow, sleet)?

Can the system distinguish degrees of accident severity, e.g., fender benders, major property damage, injuries, fatalities, multiple-vehicle accidents? Should possible combinations of these parameters be postulated and a single weighted index of "response action" be evolved?

Acceptance of operations responsibility among highway and transportation departments is growing, though much too slowly. The experience encountered some time ago by a state traffic engineer when he attempted to apply his prior operating experience and toll road practices to highway department operations is a case in point. At an early staff meeting, he created a considerable reaction when he announced that he expected district traffic engineers to be present at the scene of serious accidents whenever they occurred, night or day, good weather or bad.

How often has the thought occurred, "What if a woman, while stranded on a rural section of a freeway, were robbed, raped, or murdered?" The May 19, 1972, slain librarian story is not the first newspaper account! When and where are the others? Are they buried in miscellaneous files of local governments or glossed over in the obituary columns?

Recently, a first step was taken toward evolving a potential channel for attaining such information. The newly revised FHWA Instructional Memorandum 20-1-72 provides that "To be eligible for Federal aid funds, every proposed (motorist-aid) system shall have a complete operational response plan." FHWA's Highway Planning Program Manual (7) makes the statement:

It is evident that there will be a continued and increased need for expanded and improved highway services. Population growth, the increasing number of vehicles, multiple-car families, and the steady upward trend of the Gross National Product all point to highway service demands far beyond the present level.

It is, therefore, important that legislators and administrators not only be furnished with adequate data concerning the future physical needs of the highway, road, and street systems, but also be advised of the fiscal ability of the governmental units involved to meet such needs.

In line with this statement, we propose that the following actions be taken:

1. A joint meeting of appropriate highway, police, and emergency medical service agencies should be convened to discuss the problems of disabled motorists and action should be taken to
 - a. Address a request to appropriate federal officials for allocation of funds to develop a uniform method (nationwide) for reporting the occurrence of disabled motorists and
 - b. Suggest the issuance of periodic statistical reports using the preceding format and system, either separate or as part of FHWA's current statistical reporting.
2. A task force should be appointed to prepare a set of nationwide guidelines, formulate standard operating procedures for a series of "stopped vehicle" surveys to identify local needs, coordinate the conduct of these surveys, analyze the data, and disseminate the results and findings. Thereafter, an executive summary report and a film report should be prepared for presentation to congressional committees, federal and state agencies, and state legislators concerned.
3. Federal-aid funds should be provided for motorist aid software and hardware development.

4. Operations of the total motorist aid system should be monitored to ensure conformance with the prescribed level of service.

It is our firm conviction that highway users have a right to expect a facility that provides for their physical and emotional safety to ensure

1. Freedom from fear (of being stranded on a highway in daylight or darkness, in good weather or bad),
2. Freedom from pain (physical pain as well as mental anguish from being hurt in a crash or "lost" at the bottom of a highway slope or stranded with a child or infant in a disabled vehicle on a highway shoulder), and
3. Freedom from death (because no one saw the accident or a helpful motorist's rush for help took too long or because aid was late).

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REFERENCES

1. McFarland, R. A. Psychological and Behavioral Aspects of Automobile Accidents. Automotive and Air Safety Symposium on Man and Transportation, American Assn. for Advancement of Science, Annual Meeting, New York, 1967.
2. Motorist Aid Systems. NCHRP Synthesis of Highway Practice 7, 1971.
3. Pogust, F., et al. Means of Locating and Communicating With Disabled Vehicles. NCHRP Rept. 6, 1964.
4. Committee on Planning and Design Policies. An Informational Report on Roadside Telephones and Emergency Communication Devices for Motorists on Interstate Highways. AASHO, 1962.
5. Telecommunications for Highway Administration and Operations. NCHRP Synthesis of Highway Practice 12, 1972.
6. Measurements of the Quality of Traffic Service. HRB Spec. Rept. 130, 1972.
7. Highway Planning Program Manual. Federal Highway Administration, Vol. 6, Ch. 1, Para. 1, July 10, 1972.