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DOCUMENTATION CENTER

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SUMMARY REPORT

The Highway Safety Research Institute is conducting a study of the needs of a National Traffic Safety Documentation Center and of the methods for implementing such a center. This interim report is concerned with the determination of the existing situation. This was performed in two tasks:

Task A--Determination of users and their information needs (Section 2).

Task B--Determination of existing procedures for obtaining information (Section 3.0).

Highway safety per se is a mission-oriented field characterized by the interaction of numerous separate closed and/or open professional groups representing the majority of the hard and soft sciences.

Information pertinent to the mission comes from numerous subject areas. New areas are constantly being explored for information. Thus, while the highway safety mission is specific, the information base continues to widen. This multidisciplinary dispersion of information poses difficult acquisition, indexing, and retrieving problems.

As a result of the increased level of activity and concern, a wide variety of new people have been and will become involved in the highway safety mission, and all present unique information requirements. What has evolved is an urgent need for discussion across disciplines and professions, an urgent need for ready access to information and an urgent need for information packaged in new ways: The need for a vigorous National Traffic Safety Documentation Center is clear.

The central theme of Task A (Section 2) has been to determine the answers to three questions through a user study.

1. Who are the potential users?
2. What are their information and documentation requirements?
3. Which of these needs should be fulfilled?

Two general comments can be made about previous user studies. First, user studies have many limitations and cannot serve as the basis for design; their value lies in providing guidelines for planning. Second, user study methodology is poorly developed, but even the poorest study will yield considerable insight.

Recognizing the attributes and limitations of such efforts, we

proceeded to conduct both a direct survey (using flexible interviews) and an indirect survey (Highway Safety Research Information Center user requests). Having considered an exhaustive list of users and their functions, we classified users into five broad categories, according to the kinds of information they require: Researchers, administrators, practitioners, mass media representatives, and the occasional users. Survey results are discussed in Section 2 and Appendix A.

After defining the users of highway safety information by type and number, characterizing their information requests, and commenting on their knowledge and use of present information resources, Section 2 considers which of the user's needs might be met by the National Traffic Safety Documentation Center.

The central theme of Task B (Section 3) was concerned with procedures used or available for the acquisition, storage, retrieval, and dissemination of highway safety information and their strengths and deficiencies. Procedures for selection, acquisition, cataloging, subject analysis and indexing, machine indexing and retrieval, and document storage and retrieval are discussed.

Journal articles represent a very high proportion of the literature, about 75 to 80 percent. Only a small fraction of the nonjournal literature is represented by commercial books; the rest (p. 32) consists of technical reports, proceedings, etc.

A voluntary network of information centers is emerging (p. 35). A more effective method of resource sharing and coordinated communication is needed.

Full text copies of "fugitive" and limited distribution material are not available. Many bibliographies and information services are provided without recourse to full text (p. 35).

Eleven classification/indexing schemes were discovered (plus two unpublished thesauruses). Three of these came out only this year. Only two are specialized to the highway safety mission (p. 41).

The tentative conclusions and recommendations of Section 4 are summarized below. Final conclusions and recommendations are clearly inappropriate at this point in the study.

1. Users of the National Traffic Safety Documentation Center will be people from many locations and disciplines.

Users' needs must be satisfied by a flexible system capable of providing a variety of services.

Availability of services must be structured. More effort should be devoted to the needs of significant users and to the preparation and review of state-of-the-art publications in areas of current concern.

2. There is a very low usage rate for almost all present library and information services.

The training and education of primary users as well as wide publication and announcement of available services must be included in plans for documentation center activities.

3. User studies can provide a starting point in the planning of information center activities, but an operative system must remain continuously responsive to the needs of its users.

Appropriate feedback mechanisms should be established so that the user is able to influence the system.

4. The reading of journals and news bulletins is the primary mode of current awareness.

A variety of current journals should be provided. The growth of directories and news bulletins should be encouraged in areas of concern. Comprehensive notification of research in progress should be provided.

5. The availability of readily obtainable, up-to-date, factual or reference information is important.

Mechanized document retrieval systems are not as important as systems that can provide pertinent details. The screening of literature and ready supply of handbooks and reference works should be considered. Summary accident statistics compiled regularly by the National Traffic Safety Data Center should satisfy many requests.

6. Literature searches have played a major role in highway safety in the last year. Cross-pollination of multidisciplinary information has been hampered by weak indexing and coverage of the field by present bibliographic services.

Communication among highway safety centers should be improved. Techniques include, for example, development of authority lists, a union catalog, an exchange network, scanning of professional journals, and direct contact with sources for automatic distribution of material to the center.

7. Copies of "fugitive" material and limited-distribution reports are not generally available as required. There is a

corresponding concern about bibliographies being simple compilation of references without much regard for the existence of at least file copies of documents.

A secondary distribution or document clearinghouse function should be established now in conjunction with an effort to stock the clearinghouse with material for which copies are not readily available.

8. Recently, there has been a proliferation of new information center activities. (This in itself is an indication of urgency.) A voluntary exchange network of centers is evolving.

Any anticipated system should provide for inclusion of specialized information centers. The developing network of existing centers should be enhanced through direct participation of formal recognition. A meeting of all personnel concerned with the handling of highway safety information has been suggested by several people.

9. Field manuals and handbooks are needed for the application of research results and procedures/standards information.

The preparation of application handbooks (cookbooks) should be provided for.

10. Foreign materials usage is limited by lack of accessibility and familiarity, and by reluctance to read foreign languages.

Use and availability of foreign material should be improved.

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1. INTRODUCTION

The Highway Safety Research Institute (HSRI) at The University of Michigan is conducting a study of the needs of a National Traffic Safety Documentation Center and of the methods for implementing such a Center. The basic approach to the study of this problem is outlined in Figure 1.1. The functions being performed are summarized within the boxes. This interim report is concerned with the determination of the existing situation. This was performed in two tasks: Task A--determination of users and their information needs, and Task B--existing procedures for obtaining information.

After a brief look at the highway safety information system, we will attempt, in this introduction, to characterize pertinent features of the highway safety field and put forward a definition of "highway safety information." We will also consider the need for development of a National Traffic Safety Documentation Center. The remainder of the report is divided into three sections: Sections 2 and 3 deal with the results of Tasks A and B, respectively; Section 4 presents conclusions and recommendations derived from the determination of the existing situation under Tasks A and B.

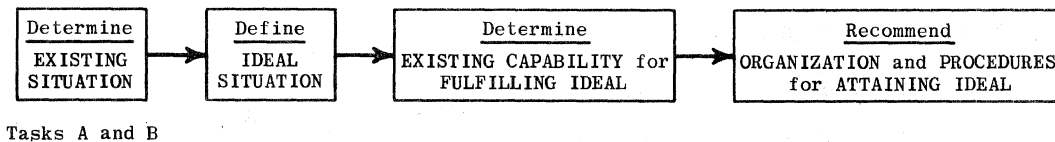


FIGURE 1.1. SCHEMATIC REPRESENTATION OF STUDY APPROACH

HIGHWAY SAFETY INFORMATION SYSTEM

The highway safety information system (Fig. 1.2) can be visualized by considering the user groups and their interactions. Research information users are frequently producers of research information. Administrators include primary standards and policy makers who produce information affecting all components. The practitioner is the man who directly affects the traffic system itself. He is the highway engineer, the police official, or the driver education instructor. While the communication between researchers is relatively strong, the linking of research results to practice is weak.

John Q. Public interacts with the traffic system and its safety features (or lack of). Beyond his direct participation, his major information source is the mass media, e.g., news articles and TV film clips. The role of the National Traffic Safety Documentation Center is to enhance and/or emphasize certain of the channels of information flow to produce the best overall improvement in traffic safety. Recommending an organizational format and procedures for attaining this ideal are the objectives of the present study contract.

The determination of each user group and its interface requirements as users and producers of information in the system is covered in Section 2, and the existing documentation procedure used in the flow of information between users is covered in Section 3. Each information flow line in Figure 1.2 is actually an intricate system in itself. The research and engineering information flow indicated in Figure 1.3 exemplifies the multiplicity of information user interfaces.

COMPARISON OF HIGHWAY SAFETY WITH OTHER FIELDS OF ACTIVITY

The highway safety field can be characterized as being open, soft, and mission-oriented as compared to the closed, hard, discipline-oriented field of, say, liquid metals. Many areas of concern have a closed group of people, or invisible college, directly associated with the area. Each of these groups develops its own channels of communications, e.g., professional journals and conference circuits. This theme is reflected in the increased specialization in our society, even in the organization of industry itself. This is not the case in the highway safety field, which is an open group of people made up of many separate closed and/or open subgroups, all of which must interact. The scattering effect is

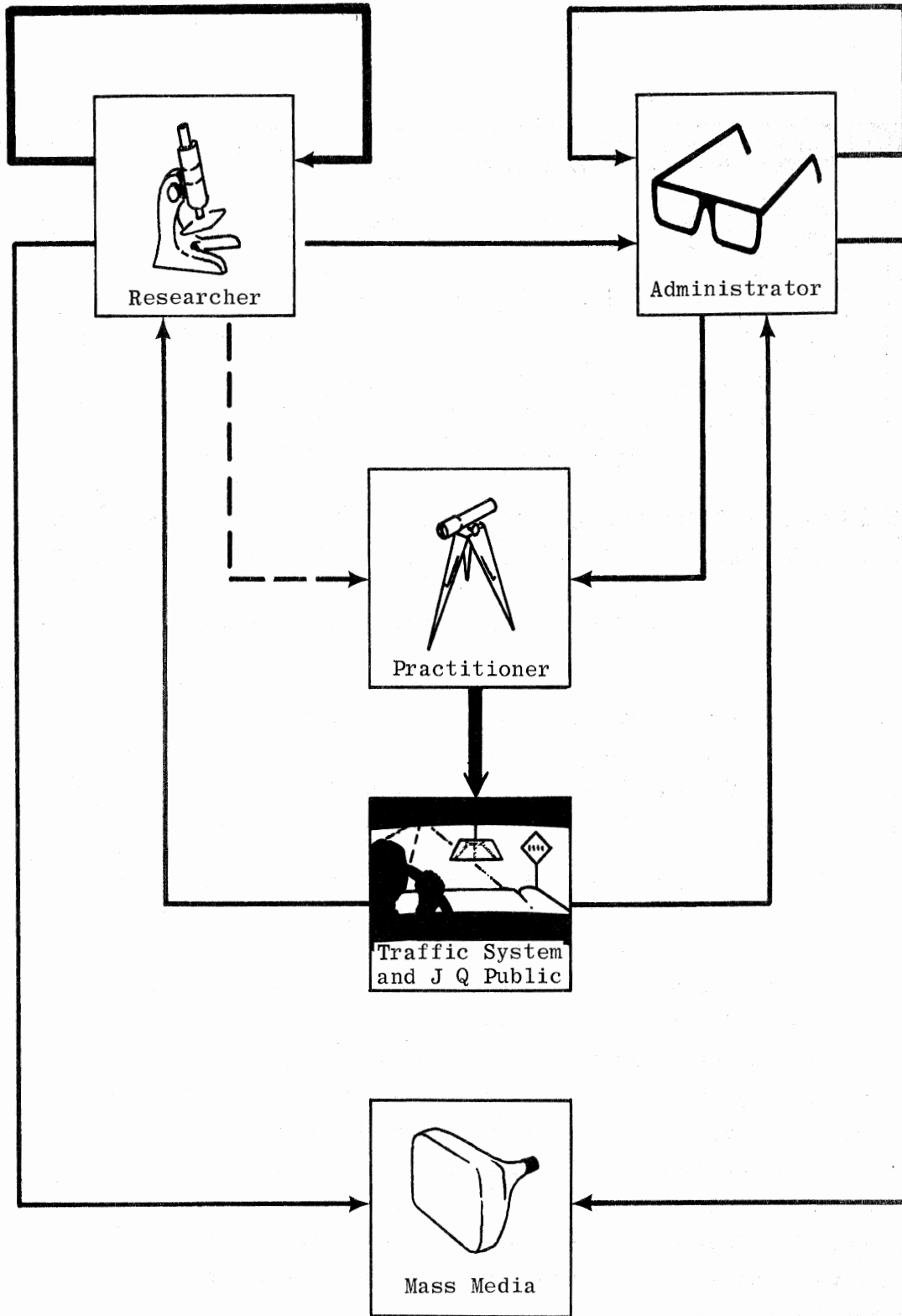


FIGURE 1.2. HIGHWAY SAFETY INFORMATION SYSTEM

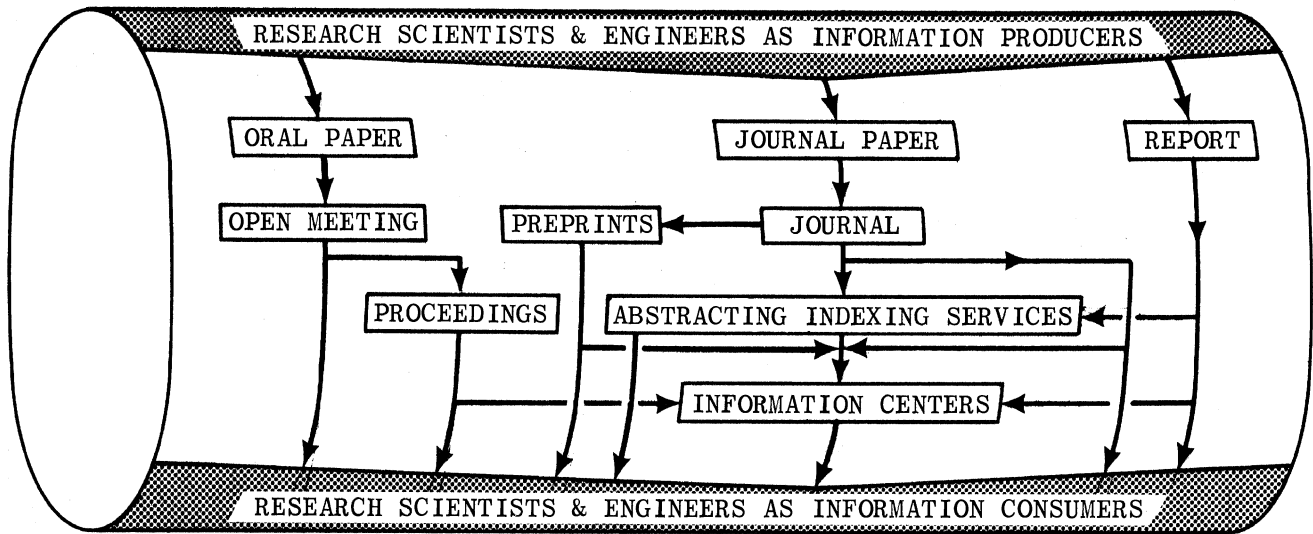


FIGURE 1.3. RESEARCH AND ENGINEERING INFORMATION FLOW

frightening: each researcher publishes his highway safety article in the journals of his own profession. Thus, we find, for example, a series of articles on periodic motor vehicle inspection in the Journal of the American Medical Association.

Most of the sophisticated study and development of information systems has been in the hard sciences and technology areas, such as aerospace. We need only reflect on the efforts of the Committee on Scientific and Technical Information (COSATI) and the Engineers Joint Council (EJC). Indexing and retrieving is relatively easily structured and well developed in the hard sciences, but not in the highway safety field. The soft sciences must also be considered. Although highway safety is fairly concise or specific, the information base is extremely broad, covering practically all subject areas--physical, biomedical, psychological, educational, legal, financial, and social. Present schemes, such as the COSATI Standard for Descriptive Cataloging (1), break down, and new specialized and comprehensive approaches are required.

The specialized information center may be oriented toward either a discipline or a mission. The discipline-oriented information

center processes subject matter pertinent to part of a recognized discipline which has its own literature and professional traditions. The mission-oriented information center covers an activity area of special interest and, therefore, one which requires an interdisciplinary approach. Highway safety per se is a mission-oriented field characterized by the interaction of numerous closed groups representing the majority of the hard and soft sciences. This setting should be kept in mind since it is a template for all considerations of highway safety information.

DEFINITION OF HIGHWAY SAFETY INFORMATION

What is "highway safety information"? "Highway" really refers to the total highway transportation system. Thus, we are dealing with system components--the vehicle, the roadway, the driver--and their interactions, a complex subject in itself. The question "what is safety?" leads deep into the game of semantics. The following is C. O. Miller's attempt to place within a single definition safety and accident prevention in the aerospace field today (2):

The objective conservation of men and equipment based on timely communications and decisions within the operational and economic requirements necessary in a progressive aerospace community.

Safety information is the communicable knowledge or data of value to the workers in the safety field. This information takes the following forms:

(1) Information about people and organizations. The who, what, and where of related activities in the field can be found in newspaper clippings, journals, extracts, attendance lists, membership lists, trip reports, telephone conversations, and conference discussions.

(2) Accident incident information. Field data on accidents, vehicle, driver, traffic, and so on, form a basis for analysis of the accident/incident environment.

(3) Procedures/standards information. Established procedures and standards reflect the results of past work in accident prevention. This information is of direct value to the practitioner. It takes the form of handbooks, manuals, regulations, codes, standards, patents, hearings, technical orders, and specifications.

(4) Science/technology information. Published material (e.g.,

books, documents, research reports, journal articles) pertinent to the mission of highway safety can be found in all subject areas.

NEED FOR A NATIONAL TRAFFIC SAFETY DOCUMENTATION CENTER

We all recognize the need to learn, to accumulate knowledge, and to have it readily available. We note the 53,000 highway deaths per year and the 10 billion dollar economic loss per year, and we recognize the importance of highway safety information:

. . . a raging epidemic of highway deaths which has killed more of our youth than all other diseases combined . . . (President Johnson)

One of the major opportunities for enhancing the effectiveness of our national scientific and technical effort and the efficiency of government management of research and development lies in the improvement of our ability to communicate information about current research efforts and the results of past efforts. (President Kennedy)

Collections of literature related to highway safety dot the map (Fig. 1.4). Information pertinent to the mission comes from every discipline and subject area. With the increased level of concern, new areas are constantly being explored for information of possible value. While the highway safety mission is specific, the information base continues to widen. This multidisciplinary dispersion of information poses difficult acquisition and indexing problems.

There has been an increase in the level of research activity and action programs as a result of growing public concern and Congressional response to the highway safety problem. A similar growth in highway safety literature is shown in Figure 1.5. As a result of this increased activity, a wide variety of new people have (and will continue to) become involved in the highway safety mission, and all present unique information requirements. These people include, for example, each of the new Governor's representatives, who will be concerned with the implementation of the 13 state standards.

What has evolved is an urgent need for discussion across disciplines and professions, an urgent need for ready access to information, and an urgent need for information packaged in new ways: The need for a National Traffic Safety Documentation Center is clear. The exploration of this need and of the methods for implementing such a center is the objective of this study.

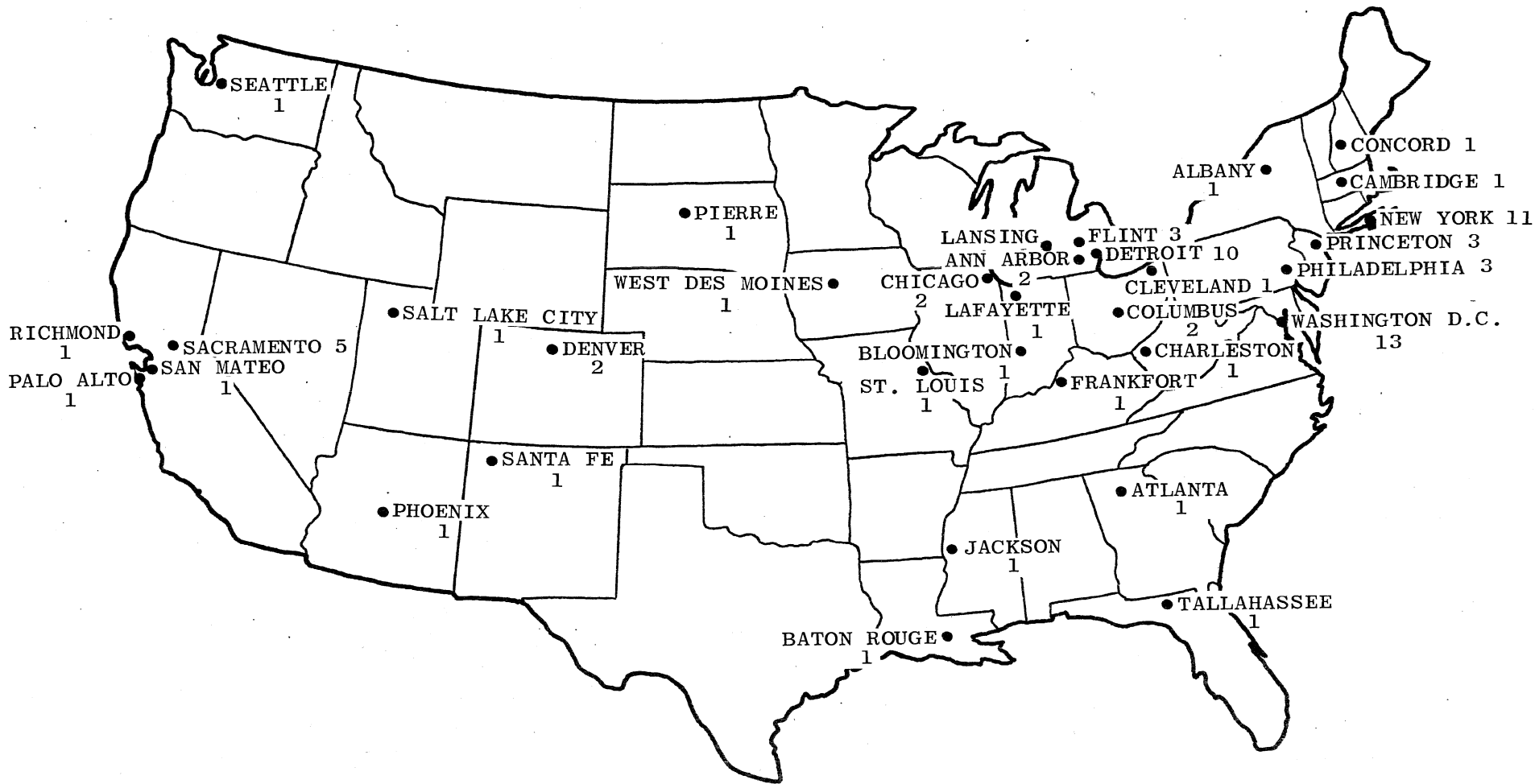


FIGURE 1.4. GEOGRAPHIC DISTRIBUTION OF HIGHWAY SAFETY RELATED LITERATURE COLLECTIONS

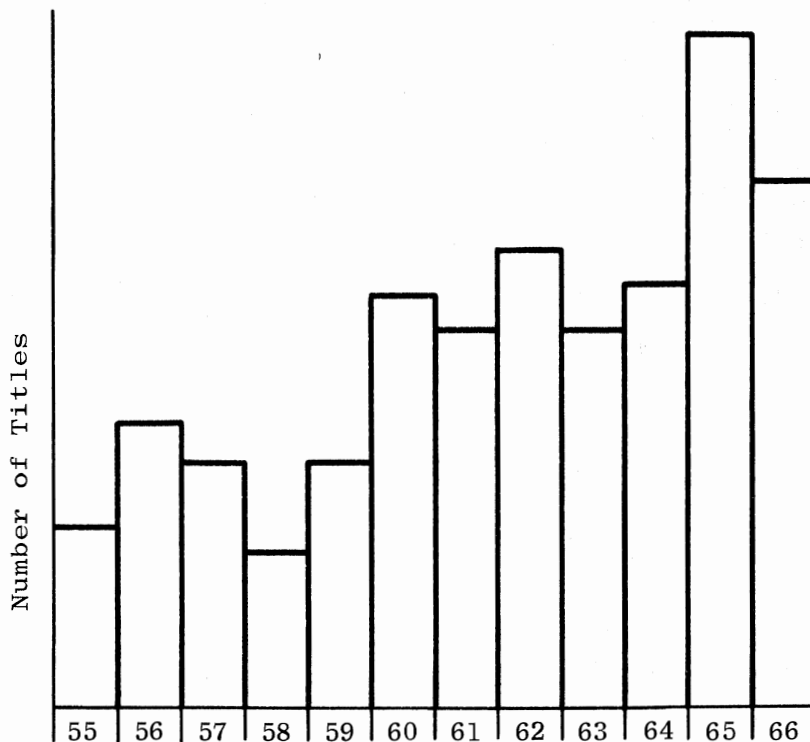


FIGURE 1.5. LITERATURE GROWTH IN HIGHWAY SAFETY. (Derived from NSC's Guide to Traffic Safety Literature.) The number of 1966 publications is necessarily short due to the natural lag in processing. A quantitative measure of the number of titles (publications) will be determined in the second phase of the contract.

REFERENCES (Section 1)

1. Committee on Scientific and Technical Information, Federal Council for Science and Technology, Standard for Descriptive Cataloging of Government Scientific and Technical Reports, Washington, D. C., October 1966, AD 641 092.
2. Miller, C. O. "The Safety Information Challenge," ASSE Journal (Technical Section), Vol. 11, No. 9, September 1966, pp. 9-16.
3. National Safety Council, A Guide to Traffic Safety Literature, Volume 10, 1955-1965, Chicago, 1966.

2. TASK A: USERS AND THEIR INFORMATION NEEDS

INTRODUCTION

Alan Rees (14) sets the stage:

The information retrieval field has been plagued for many years by busy people spending large sums of money, designing or attempting to design phantom systems for non-existent people in hypothetical situations with unknown needs. It is not surprising that large numbers of theorists, hardware peddlers and promoters have ignored the user, with the result that the needs of users are conspicuously absent in many discussions on system design and operation.

The ideal information system would serve all the people, all the time, in a pleasant, timely, effective, and efficient manner. The first step toward attaining this goal is to determine who the user is and what his information needs are. Under the present contract, the central theme of task A has been the determination of the answers to three questions:

- (1) Who are the potential users of the highway safety Documentation Center?
- (2) What are their information and documentation requirements?
- (3) Which of these needs should be fulfilled by the Center?

METHODOLOGY

Our initial effort at defining the spectrum of highway safety information users consisted of making an exhaustive list of traffic safety functions and organizations, as indicated in Table 2.I. With this as a guide, we then made a determination of the number of users in each category in order to get some idea of the magnitude of the dissemination problem. Next we attempted to define the needs of users.

In the latter endeavor there have been two classically defined approaches, the direct, and the indirect methods. The advantages and disadvantages of each have been discussed by Herner (9). We used semistructured, in-depth interviews rather than mailed questionnaires as a direct method of determining users' needs. The conversational technique has the advantage of permitting the investigator to discuss in detail the potential use of information. It is possible to inquire what the respondent does with information, what the consequences of late information arrival are, and what kinds of services he might require. The interviews were conducted sequentially so that ideas

ORGANIZATIONS	FUNCTIONS										OPERATIONAL REGULATORY					INFORMATION STORAGE & RETRIEVAL	EDUCATIONAL	PUBLIC INFORMATION TRANSMITTAL	USER
	LEGISLATIVE	ADMINISTRATIVE	LONG-RANGE PLANNING	RESEARCH	DESIGN	DEVELOPMENT	MANUFACTURING	TEST	EMERGENCY MEDICAL	BEHAVIORAL	VEHICULAR	CONTROL SYSTEM	MAINTENANCE						
FEDERAL GOVERNMENT																			
Congress	●																		
NTSB NHSB		●	●	●	●		●							●	●	●			
B.P.R.		●	●	●	●									●	●	●			
H.E.W.		●	●	●	●									●	●	●			
Military				●									●				●		
STATE GOVERNMENTS																			
Legislatures	●																		
Highway Depts.		●	●	●	●		●			●				●	●				
Motor Veh. Depts.		●	●	●	●					●				●	●	●			
Driver Licensing		●	●	●	●		●			●				●	●	●			
Educational Depts.		●	●	●	●									●	●	●			
Police		●	●	●	●				●	●	●			●	●	●			
LOCAL GOVERNMENTS																			
Road Commissions		●	●	●	●									●	●	●			
Traffic Engrng.		●	●	●	●									●	●	●			
Police		●	●	●	●				●	●	●			●	●	●			
Courts														●	●	●			
INDUSTRIAL FIRMS																			
Automotive				●	●	●	●	●						●	●				
Insurance														●	●				
Trucking														●	●		●		
Construction					●		●	●						●	●				
Fuel				●	●		●	●						●	●				
Component					●		●	●						●	●				
Bus														●	●		●		
SERVICE FIRMS																			
HOSPITALS																			
CLINICS, PHYSICIANS																			
				●	●				●	●									
EDUCATIONAL																			
Universities				●	●														
High Schools				●	●														
CONSULTING ENG. & RES.																			
				●	●														
SAFETY ORGANIZATIONS																			
				●	●									●	●	●			
PROFESSIONAL SOCIETIES																			
				●	●									●	●				
MASS MEDIA																			
														●	●				
PRIVATE CITIZEN																			
													●				●		

TABLE 2.I. Safety-Related Traffic System Functions and Organizations

and themes gained from one series of discussions could be followed up in subsequent interviews.

The direct method is limited in that the respondent cannot easily define a need which he has never experienced (such as a computer-access abstract source), but such a limitation can often be overcome by the opportunity to discuss the problem in some detail.

The indirect method consists of observing actual request and citation activity and tabulating these data. This has the advantage of providing factual information, but users often make requests for something other than what they really need, which results in what is sometimes called "the librarian's dilemma." A user asks the librarian for a book about steam engines and another on gasoline engines. The librarian can produce these. But what the user really wants is information about the efficiency of both kinds of engines, and if the request had been made in this form, the librarian might have provided a table with the required information from an engineering handbook.

Previous user and use studies have been compiled and reviewed by Columbia University (4), Davis (6), Fishenden (7), Herner (9), Johoda (10), Menzel (11), Thornudd (21), and Voigt (22). We have acquired several recently completed user studies (3, 5, 12-15, 17-19, and 23) and reviewed them for methodology and findings. For the most part, such surveys considered technical users (often the scientist-researcher) within a discipline, or at best within a limited number of related disciplines. Even with this limitation of coverage, the findings from these studies provide some understanding and guidelines which are reflected in this Task and in the Conclusions and Recommendations in Section 4.

The value of user studies has often been questioned. Taube (11) states that they "have no value as direct guides to the design of information systems," but may have other forms of value, e.g., clues as to optimum size of information units and degree of consumer indoctrination. According to a study by Herner and Company (23),

They were found wanting both on an individual and on a collective basis.

In short, while the results of user studies to date do not offer much direct guidance in planning libraries and information systems, they do indicate types of needs and uses. Such information can provide a starting point to better understand the user and to plan for future activities that will ultimately help him operate more

efficiently and effectively.

Fishenden (7) has noted that

User surveys are often criticized as producing few useful results, but the results represent a substantial body of knowledge which is likely to be of considerable value in assessing future proposals for development of new services. The investigations also lead to increased awareness of the problem.

Two general comments can be made about previous studies. First, user studies have many limitations and cannot really serve as the basis for design; their value lies in providing guidelines for planning. Second, user study methodology is poorly developed, but even the poorest study will yield considerable insight as to how to proceed in an information center design program.

Recognizing the attributes and limitations of such efforts, we proceeded to conduct both a direct survey (of a wide variety of potential users, as defined by the chart in Table 2.I) and an indirect survey (by tabulating the requests of users of the Highway Safety Research Information Center). The latter yielded information primarily about technical and scientific users, although occasional requests came from a broader population.

USERS

Having considered the exhaustive list of users and their functions, we then proceeded to classify them according to the kinds of information they require. We found five broad groupings: the researchers (with a need for detailed and in-depth information), the administrators (with a need for summary information), the practitioners (with a need for manuals or "cookbooks" in their field), mass media representatives (with a variety of needs based on their communications function), and a large group of occasional users.

Numbers in each user group (Table 2.II) were derived from a variety of sources. The number of researchers was determined by estimating the current research budget in traffic safety and dividing by the estimated cost per researcher. The numbers of administrators and practitioners were derived from directories and educated guesses based on our previous exposure to the field. There is a fine dividing line in many cases between the administrator and the practitioner. Administrators include such people as the Secretary of State, the Highway Commissioner, legislators, and standards officials. Under the

TABLE 2.II. Numbers Of Users

Research	1,000
Private	(100)
Auto Industry	(400)
Federal/State	(500)
Administrators	4,000
Practitioners	31,000
Construction/Maintenance	(4,000)
Licensing	(1,000)
Inspection/Investigation	(3,000)
Enforcement	(5,000)
Rescue/Medical	(5,000)
Teaching	(13,000)
Mass Media	300
Drivers	100 million
Driving Students	(1.5 million)

practitioner category, we counted driver education instructors, highway engineers, traffic engineers, many police officials, ambulance operators, and other people professionally engaged in activities related to traffic safety. The number of mass media representatives who are concerned with traffic safety on a nearly fulltime basis is quite small. There are a hundred or so automotive writers associated with the country's newspapers and magazines, including a large press corps in Detroit representing national media. TV and radio networks have a few people on their staffs who specialize in this field. The Society of Magazine Writers is a small group of about 250 professional writers of whom perhaps 10 are directly concerned with traffic safety writing. Thus, we have estimated this group at only 300--realizing, of course, that many more writers are occasionally interested in traffic safety and placing these under the category of occasional users. Potentially, the occasional user category could include any lawyer in the "free world" who is involved in trying a traffic case (we have received queries from an Australian lawyer seeking advice about sleepy drivers), any of a number of graduate students, any of a large number of newspaper reporters, doctors, high school principals, college professors, and so on. The total number of such individuals is not so important because we are certain that not all of them will

make use of a center.

The number of people who would use the center cannot be read directly from Table 2.II. The numbers in that table can serve only as initial guidelines for, say, determining the distribution of a particular newsletter. The estimates used in deriving the numbers of users were not intended to be exhaustive, since there are clearly more than 5,000 policemen and judges concerned with enforcement. The actual number who do use the center would be controlled by publicity and/or service charges, so that their demands would be balanced against usefulness in the promotion of traffic safety.

THE DIRECT SURVEY

Over the course of three months, we interviewed approximately 40 people to discuss their information needs in traffic safety. Table 2.III shows the categories; 30 complete interviews were conducted. These people represented an across-the-board sample but, in general, represented not so much the scientific and technical or research groups as the practitioners, administrators, mass media men, and occasional users. A discussion of results for each group of users is given in Appendix A. We asked each interviewee for questions which he would like to have answered by an information service, or for questions which he had himself asked recently of some information source. Summaries of the actual questions are given in Table 2.IV.

We have taken the liberty of grouping the questions in the form shown in Table 2.V. From this table we see that people most commonly ask for some sort of numerical or specific reference information (such as the number of people injured in Grand Rapids last month, or the wheel alignment specifications for the '66 Mustang). Next most frequent were those which we would classify as requests for advice. It is not suggested that a documentation center be prepared to answer directly such queries as, "How well is the NHSB meeting its goals?" or "Does the public really care about safety?" Such queries, however, provide important clues as to the kinds of material needed within the documentation center. Requests for specific documents were not too frequent. These would include such items as a request for a copy of the 9th Stapp Conference Report or a Traffic Survey Manual. At the bottom of the frequency tabulation were survey questions (e.g., a nationwide listing of facilities available for emergency care), and activity reports (e.g., what is your present organizational program

in traffic safety?).

Except for occasional informal discussions, personnel of the National Highway Safety Bureau were not included in the group of interviewed users. This came about primarily because, at the time of the study, the bureau was in its formative stages, and it was not possible to discuss detailed information requirements with people who were new to their jobs. Informal discussions, however, indicate that bureau personnel fall generally into two categories--researchers and administrators--and that their information needs correspond closely to those of their counterparts in other activities. Realizing that a particular purpose of the documentation center is to serve the needs of the bureau staff, we intend to follow up this area with more discussions during the remaining months of the present contract.

TABLE 2.III Categories and Numbers of Users Interviewed

Lawyers	2
Safety Organization Representatives	3
Traffic and Highway Engineers	2
Insurance Agents	2
Automobile Dealers	2
Researchers	4
Legislators (and legislative assistants)	2
Mass Media Representatives	6
Educators	3
Police and State Agency Officials	4
	<hr/>
	30

TABLE 2.IV Respondents' Questions/Requests

1. Copy of article about motorcycle accidents.
2. What is the University of Michigan doing in safety research?
3. Causes of accidents, kinds of injuries, attitudes toward safety, relationship of research labs to industry, pressures on federal government from industry.
4. What are the safety features of the Volvo?
5. Performance data on Kelsey-Hayes disc brakes.
6. Effectiveness of tire studs.
7. Effectiveness of collapsible front ends.
8. Copies of 1969 proposed standards.

(Table 2.IV, Continued)

9. Copy of Stapp Conference Proceedings.
10. Comments from insurance industry on compulsory disclosure legislation.
11. Baltimore accident data for several years.
12. County and local accident statistics.
13. Dollar loss from automobile accidents.
14. Is Periodic Motor Vehicle Inspection good or bad?
15. Number of overtaking and passing accidents in U.S. per year.
16. Projection of gross national product.
17. Number of injuries by type associated with vehicle accidents.
18. Newspaper clippings on drunk driving in Australia.
19. Design of research laboratory buildings.
20. Copy of 7th Stapp Conference Proceedings.
21. Literature search on vehicle handling.
22. Copy of SAE lighting standards.
23. Figures on recent drunk driving convictions.
24. Statistics on effectiveness of implied consent laws.
25. Information on "sleepy driver" accidents--cause of sleepiness, etc.
26. Number of drunk driver arrests last year.
27. Reason for arrest in connection with fatal accidents in 28 states last year.
28. UCLA report on Liberty Mutual safety seat.
29. List of Allstate policy holders in state.
30. City and local accident and violation statistics.
31. Copies of state legislation on traffic safety.
32. Information on fatality rates in states with and without vehicle inspection as a function of time.
33. Specification of steering adjustment on various cars.
34. Committee report on DOT appropriations.
35. What is maximum traffic load of a two-lane highway in a residential area?
36. Traffic survey manuals published by federal government.
37. Raw data on local accidents.
38. Bibliography of publications and research in progress regarding emotions, motivation, scare tactics, propaganda mechanisms.
39. Accidents per capita 10 years ago compared to those today.
40. What is the most important feasible undertaking to be supported toward reducing highway deaths and injuries?
41. Will crushable front ends work?

(Table 2.IV, Continued)

42. All statistics on enforcement of traffic laws--from apprehension to disposition.
43. A brief but incisive pamphlet for young drivers to impress them with the need for safe driving.
44. Everyone talks about highway safety; why doesn't someone do something about it?
45. Material with which to fight the local city sign ordinance.
46. Material with which to fight the local city traffic engineer's ideas.
47. Nationwide listing of facilities available for emergency care.
48. Percent of people who wear seat belts in the U. S.
49. Good statistical data relating accidents to other factors.
50. What are accident frequencies in my county, and where are they occurring?
51. How well is the NHTSB meeting its goals? What areas important to highway safety are left untouched by the present legislation?
52. How should we (the public) expend our traffic safety dollars?
53. What is the best existing piece of literature on the drunk driving problem?
54. Statistical breakdown to show whether the driver or the vehicle is more at fault in an accident.
55. Data from accident records to show which make and type of car is safest and which is most dangerous.
56. Data on crashworthiness of various vehicles.
57. Does the public really care about safety?

TABLE 2.V Categories of User's Questions

Data (facts)	32
Advice	23
Documents	11
Surveys	4
Activity Reports	2

THE INDIRECT SURVEY

The indirect survey consisted in analyzing the requests of the users of the Highway Safety Research Information Center during September 1967. These users were primarily from the research community. The bulk of the requests, about 78% (as shown in Table 2.VI) were for specific publications, and only about 10.4% were for information on or

TABLE 2.VI HSRIC Requests For September 1967

<u>Requests for Specific Publications</u>		<u>Number</u>	<u>Percent</u>
		257	78
Journal articles	86%		
Reports, proceedings	7%		
Books	7%		
 <u>Search Requests</u>			
By subject		34	10.4
About people		14	4.6
About organizations		13	4.2
All items by author		2	1.4
Broad literature searches		2	1.4
		<u>330</u>	<u>100.0</u>

about a subject. Most of the subject requests were for information on standards or specifications and accident data. An important area of inquiry appears to be information about people and organizations active in the field, following very closely the proportion of subject requests.

It may be noted here that, although there were only two requests for a broad literature search, these involved a considerable amount of staff time because of the exhaustive nature of the searches. Another observation that may be made is that research workers, in general, appear to use journal literature far more heavily (about 86%) than nonjournal literature (about 14%). Also, technical reports and conference proceedings appear to be at least as important as books and monographs. The articles used by research workers are widely scattered among the journals, and there is a wide variety of subject matter covered in these journals. Although 257 requests for journal articles referred to only 115 journals, for the most part, HSRIC's own collection of 175 journals was inadequate to meet these requests. It is apparent from Table 2.VII that the field of highway safety is strongly interdisciplinary, and that almost any subject can provide information contributing to the better understanding and advancement of highway safety. A direct survey of the primary research interests of the HSRI staff again (see Table 2.VII) demonstrates the broad subject spread of the field.

TABLE 2.VII Subject Areas For HSRI Technical Staff And
For Journals Borrowed By The HSRI Library
From Other Libraries, September 1967

Subject Field	Number of Journals Borrowed	Total Number of Requests for These Journals	HSRI Technical Staff
General	4	4	7
Science - General	4	6	1
Math and Statistics	6	11	2
Physics	5	6	3
Earth Sciences	1	1	-
Psychology	2	7	5
Child Development	1	1	-
Ergonomics	2	12	1
Physiology	2	3	2
Public Health	2	4	1
Medicine	16	29	5
Engineering — General	6	12	9
Trade Journals	2	4	4
Mechanical Engineering	11	42	14
Automotive Engineering	10	32	5
Civil Engineering	2	2	5
Highways	6	18	8
Traffic Engineering	9	17	2
Chemical Engineering	2	2	-
Aviation	1	1	-
Law	13	17	2
Operation Research/Systems/ Control/Documentation	8	26	7
	<u>115</u>	<u>257</u>	<u>75</u>

NATIONAL SAFETY COUNCIL SURVEY

One additional useful description of the spectrum of users comes from a recent survey conducted by the National Safety Council among the readership of the Traffic Safety Research Review, a publication separate from Traffic Safety but included in its 17,500 subscriptions. Approximately 80% of the readers were sent questionnaires, and 40% of those surveyed responded. The readership is obviously a group with an express professional interest in traffic safety, and while the

sample in the survey is limited, it indicates the breadth of interests in the field. Applicable results of the survey are given in Table 2.VIII*. The Percent column does not total 100, since respondents often checked more than one choice in a multiple choice question.

TABLE 2.VIII Traffic Safety Research
Review Readership Survey

		<u>Percent</u>
Readership	2,700	
Questionnaires Sent	2,100	100
Returned	850	40
 <u>Field of Career Interest</u>		
Education		23.6
Engineering		18.1
Psychology		15.0
Government		13.5
Miscellaneous (research, administration)		10.0
Medicine		7.8
Industrial Fleet Safety		5.7
Insurance		4.0
Social Science		2.0
 <u>Research Interests</u>		
Driver Behavior		49.3
Driver Education		31.2
Accident Investigation		29.4
Vehicle Design		19.8
Drugs and Alcohol		18.1
Highway Design		18.1
Transportation Systems		16.0
Other		2.2
 <u>Activity</u>		
Teaching or Training		32.1
Conducting Research		21.3
Administration: General		20.9
Safety		20.5
Research		13.8
Other		1.6
 <u>Use of Information</u>		
For General Information		67.4
In Teaching		32.4
In Research		24.5
In Program Decisions		14.9
Don't Use		1.0

*The National Safety Council plans to publish the results of this survey, which were more extensive than those in Table 2.VIII.

KNOWLEDGE OF CURRENT INFORMATION ACTIVITIES

Further information was obtained from the interviews listed in Table 2.III. In these interviews, we showed the respondent a list of active knowledge centers (libraries, services, information centers) and asked whether he knew of their existence (Table 2.IX) and whether he had ever used them (Table 2.X). A general lack of knowledge of present services was revealed. Interviews were conducted primarily in Michigan (many in Lansing), and the respondents demonstrated familiarity with the Michigan State University Library (most knew of their local library) and a lack of familiarity with the University of North Carolina facilities. The advantages of news coverage and publication are evident in that a large percentage of respondents knew of the Cornell Aeronautical Laboratory's Automotive Crash Injury Research (ACIR) program, the University of California's ITTE work, and the National Safety Council's library and information services. Northwestern University's Traffic Institute led the list of used organizations, evidently because of its program of publishing manuals useful to the practitioners in fields related to traffic safety.

The ranking (or numbers) displayed in Tables 2.IX and 2.X should not be taken quantitatively, for two reasons. First, the sample of respondents was not broad and certainly did not give each user group a fair representation. Second, the form of the question biased the results; few users knew of the Safety Research Information Service, at the Nation Safety Council, yet there is a wide knowledge of the existence of the National Safety Council, and it was this that was reflected in the results.

TABLE 2.IX Respondents Indicating Familiarity With Centers

	<u>Number</u>
✓ Safety Research Information Service National Safety Council	26
✓ Automotive Crash Injury Research Cornell Aeronautical Laboratory	24
✓ Institute of Transportation and Traffic Engineering, University of California	23
✓ Library of Congress	22
✓ Highway Traffic Safety Center Michigan State University	19
✓ Highway Safety Research Information Center Highway Safety Research Institute	18
✓ Highway Research Information Service Highway Research Board	17
✓ Northwestern University Transportation Library	17
✓ Bureau of Public Roads Library	16
✓ AAA, ASF Libraries	14
✓ Highway Traffic Safety Center University of Illinois	11
✓ Bureau of Highway Traffic Library Yale University	11
✓ NASA Information Facility	11
✓ University of Michigan Transportation Library	8
✓ Federal Clearinghouse for Federal Scientific and Technical Information	8
✓ Highway Safety Research Center University of North Carolina	7
✓ Systems on Automotive Safety Information	6
✓ Defense Documentation Center	6
University of Michigan Transportation Library	0

TABLE 2.X Respondents Indicating Use Of Centers

	<u>Number</u>
Northwestern University Transportation Library	11
Safety Research Information Service National Safety Council	10
Automotive Crash Injury Research Cornell Aeronautical Laboratory	10
Highway Traffic Safety Center Michigan State University	10
Library of Congress	8
Highway Research Information Service Highway Research Board	7
Bureau of Public Roads Library	7
AAA, ASF Libraries	6
Institute of Transportation and Traffic Engineering, University of California	6
Bureau of Highway Traffic Library Yale University	6
Defense Documentation Center	5
Highway Safety Research Information Center Highway Safety Research Institute	4
Federal Clearinghouse for Federal Scientific and Technical Information	3
Highway Traffic Safety Center University of Illinois	2
Highway Safety Research Center University of North Carolina	2
NASA Information Facility	1
System on Automotive Safety Information	0

WHICH NEEDS SHOULD BE FULFILLED?

Up to this point, we have defined the users of highway safety information by type and number, characterized their information requests, and commented on their knowledge and use of information sources. The final item in the user survey was the determination of the needs to be met by a highway safety documentation center.

Ideally, we should at this point be able to compute the value (in terms of enhanced safety or better transportation) of furnishing information to any of the potential users. Obviously, this cannot be done. We can, however, discuss the uses to which information will be put, and speculate about the effects of such uses. In a similar manner, we can make judgments about the timeliness requirements for information which will lead us to conclusions about the needs for automation.

From both the direct and indirect surveys conducted under this program, we have tabulated those materials and services most often needed or asked for by the five groups of users discussed above (Table 2.XI). From discussions with the interviewees and with their peers, we have judged some of the indicated needs to be more critical than others. These needs are indicated by ⊗ on the chart. We cannot conclude at this point that any of the services should not be provided, but simply that those indicated as most important should receive priority in the development of a center. The following comments pertain to each of the materials or services listed in Table 2.XI.

Current awareness bulletins are generally considered vital by researchers. Early notification of the output of colleagues in related fields is important in guiding one's own research effort as well as minimizing unnecessary duplication. Current awareness services for administrators and practitioners are of somewhat less value, although several people requested them. Practitioners request information when they need it, rather than making a continuous effort to stay up to date in a field. Consequently, there is some question as to whether a current awareness service directed at them would have a significant effect.

Annotated bibliographies are essentially research works in themselves. Typically, they result from a researcher's long efforts in a field and represent his attempt to consolidate knowledge in something a little less sophisticated than a state-of-the-art report. While

TABLE 2.XI. The Information Materials and Services
Required by Various Types of Users

Materials and Services	Researchers	Administrators	Practitioners	Mass Media	Occasional Users
Current Awareness Bulletins	⊗	X	X		
Annotated Bibliographies	X				
Union Catalog	⊗	X		X	
Research in Progress Reports	⊗	⊗		⊗	
People/Organizations Directories	X	⊗		X	X
Newsletters	X	X	⊗	⊗	
Literature Searches	X				
Request Bibliographies	⊗	⊗		X	
Reviews/Summaries	X	X		X	
State-of-the-Art Reports	X	X			
Field Manuals			⊗		
Accident Statistics	X	X	X	X	X
Reference Information	X	X	X	X	X
Audio-Visual Material		X	X	X	
Selective Dissemination	⊗	X			
Referral Services	X	X		⊗	
Documents/Lending Services	X	X	X	X	X
Copies	⊗		X	X	

such documents are not generally useful to a large segment of even the research population, it appears that their preparation should be encouraged.

The Union Catalog is, in theory, a complete list of literature related to traffic safety. As indicated above, there will always be literature relevant to traffic safety which will lie in hiding (fugitive); but an aggressive acquisition program by the several principal agencies involved can build up a rather extensive joint catalog of the primary literature. Its need to researchers is obvious, and its availability almost certainly would assure its use by administrators and writers.

The need for research in progress reports has been specifically noted by researchers, administrators, and writers. All of these people want to know what is going on in the world, albeit for different purposes. Researchers indicate that, given the normal publication delays of professional journals (and the propensity of some of their colleagues not to publish when they should), they must attend many conferences and meet their peers to find out what research is underway. But conference activity is not enough to keep everyone informed. Administrators need similar information to help guide their programs, and writers need it because they must anticipate readers' desires. All things considered, this is probably the most important need we have found, and while there is some work being done to meet it, much more could be done.

Directories of organizations and people already exist in many of the subfields of traffic safety, e.g., lists of expert witnesses and members of the Society of Automotive Engineers. They seem to be of particular value to administrators, with peripheral value to others. It is likely that certain new directories specializing in traffic safety could be useful byproducts of any documentation center activity.

Newsletters are desired by and no doubt are useful to all but the occasional users. While some newsletters already exist, the field is not completely covered, and short, concise reports of current activities in the field are welcomed by most users. Biased reports are better than none, and it is likely that the users would prefer to hear their side of the stories. Consequently, there is some doubt as to whether a federal agency should undertake the publication of a newsletter; it might be better to make sure that relevant material is

available to the writers for subsequent dissemination.

Request bibliographies are compiled in response to a specific request. Our judgment is that they are likely to be most useful to the administrator (say the state official in charge of licensing drivers) but also of considerable value to the researcher and writer.

Literature searches, reviews and summaries, and state-of-the-art reports are useful summaries of particular subjects listed in order of increasing depth and sophistication. There is a mixed feeling among researchers about state-of-the-art reports--many would prefer to do their own. It seems obvious, however, that serious summarization within a field is useful from time to time.

Field manuals (also called cookbooks) are most important to the practitioner. Perhaps the most notable publisher of such manuals in the traffic safety field is the Northwestern University Traffic Institute. Over 3,000 manuals covering such subjects as the improvement of the present system of traffic accident records and police traffic supervision as an aid to drivers have been published under the aegis of Northwestern, and several major compilations of these manuals have appeared. There seems to be no question that one of the major problems in the traffic safety field (as in others) is getting research results into usable form for the practitioner, and good handbooks are a likely answer. Whether such efforts should be performed by the documentation center or merely endorsed is not clear at this writing.

Accident statistics seem to be of some value to everyone. Researchers need them to prove a point; administrators need them to sell a program, etc. They are often requested as material for a speech, a magazine article, or other public utterance. How much effort should go into making them available for the general public is undetermined, but many users will ask for them. Summary statistics produced by a data center are an obvious input to an information center.

Audio-visual material--strip films, training movies, etc.--are currently available from numerous sources. Timely availability is often a problem because of waiting lists, and there seems to be no unified directory for this material.

Selective dissemination of material is the distribution of documents and/or abstracts to users on the basis of their indicated needs

or interest profiles. It has been requested by a number of researchers and administrators for essentially the same reason: reading everything to find a few useful items is too time-consuming, and some preselection is often desired. A congressional assistant's in-basket on a certain day may contain 100 separate documents, letters, folders, etc; he cannot read it all, yet the same amount of material may come in again the next day.

Referral service (a switching system) of primary value to the researcher and writer. Referrals are made to experts, sources of information, or documents, and are a normal function of an information center.

Documents/lending services indicates that there are reference libraries containing copies of documents. All kinds of users require this service occasionally, though generally from a local source. Copies of documents are of most value to researchers, who seem to prefer having their own copies for as long as needed. If a copying service is set up for researchers, it will undoubtedly serve the less demanding needs of practitioners and writers as well.

Taking only the priority items (marked by⊗) into consideration, Table 2.XII shows their present status and projects a desired frequency for each service. The list of current activities is selective. These priority items will be given full consideration in the latter phase of the contract, so the contents of Table 2.XII are in no way exhaustive or comprehensive.

TABLE 2.XII Status Of Priority Items

<u>Materials and Services</u>	<u>Estimated Desired Frequency</u>	<u>Selected Current Activities</u>
Current Awareness Union Catalog	Monthly	HRB, NSC
Research in Progress People/Organizations Directories	Semiannually	HRIS, SRIS
Newsletters	Annually	HSRIC (Professional)
Request Bibliography	Biweekly	Insurance Institute for Highway Safety, Automotive News
Field Manuals	As Needed	HRIS, Others
Selective Dissemination	As Needed	Northwestern, IIHS, Publishers
Referral Services	Monthly	HRIS
Document Copies	As Needed	Informal
	As Needed	Federal Clearinghouse for Scientific and Technical Information

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3. TASK B: EXISTING PROCEDURES FOR OBTAINING INFORMATION

Task B is concerned with procedures used or available for the acquisition, storage, retrieval, and dissemination of highway safety information and the strengths and deficiencies of these procedures. The major operations involved are locating relevant documents, acquiring them, recording them, analyzing their subject contents, storing them for future use, and retrieving them from store to fulfill the needs of users. There are a number of other related activities and routines, such as checking against library catalogs and order files to avoid duplication, accessioning, labeling, etc., which must be carried out for the successful execution of these operations; however, we have confined our attention only to the major operations noted above.

A review of directories (5-9) revealed over 80 libraries/information centers (see Appendix B) which appeared to be concerned with highway safety or some aspect of it. There were two procedures available for discovering the current practices followed in these libraries in regard to acquisition, storage, and retrieval. One was to mail a questionnaire to all, or to a large sample of these libraries; this had been done previously (2), with rather limited success. The other, which we chose, involved the following steps:

(1) A review of the literature.

(2) Visits to a few selected libraries (see Appendix B) to study their operations and gain a deeper knowledge of the problems involved, to talk with their personnel, and to evaluate the effectiveness of their operations.

(3) A visit to Case-Western Reserve University Bibliographic Systems Center to examine their collection of library classification schemes.

(4) Correspondence with a few libraries that we couldn't visit.

It may be noted that the main objective of all acquisition, storage, and retrieval activities is to ensure that a user can get all the relevant information he needs without delay, no matter where and when it originated. In the field of highway safety, this presents a complex problem, for a number of reasons. The first, and most important reason, is the interdisciplinary nature of highway safety--almost any subject may provide information that contributes to the better understanding and advancement of highway safety. Second, until re-

cently, most of the work done in this field has been scattered throughout the literatures of various disciplines. Third, there is a wide variety of users of highway safety information, with heterogeneous backgrounds and educational achievements, who often require the same information in different forms and often in subject fields other than their own specialization. Fourth, the pace of research activity in this field, and consequently the demand for information, has increased rapidly. Finally, the nature and origin of highway safety literature also presents a problem. As is obvious from Table 3.I, journal articles represent a very high proportion of this literature, about 75 to 80 percent. Also, as shown in Table 3.II, only a small fraction of the nonjournal literature is represented by books published by commercial presses; the rest consists of reports sponsored by universities, research institutions, state and federal government agencies, conferences, societies, and foundations. Such publications, though relatively inexpensive or free, are seldom announced in book-trade journals and tend quickly to go out of print. Most of them, particularly the scientific and technical reports, are distributed automatically to a predetermined list of recipients, and a library that does not appear on that mailing list may find it often difficult to learn about the existence of a report, let alone obtain it.

SELECTION

For these reasons, the librarian's traditional book selection tools, such as publishers' announcements, book-trade journals, general review media, are proving rather ineffectual and need to be supplemented by more effective methods. Two methods which appear to be the most fruitful are regular scanning of professional journals, and direct contact with as many of the producers of literature of interest as possible in order to facilitate automatic receipt of such literature upon publication. The National Bureau of Standards has compiled a list of 314 organizations active in motor vehicle and traffic safety research. The list is obviously selective since there are a number of other organizations which produce information of interest to workers in highway safety. The System on Automotive Safety Information of General Motors (SASI) maintains a list of about 1,000 safety oriented organizations; the Highway Safety Research Information Center (HSRIC) of The University of Michigan maintains a list of about 1,500 agencies; and the Highway Research Information Service (HRIS) of the Highway Research Board maintains a list of over 2,200 sources, including

TABLE 3.I. Nonjournal Requests

Proportion of Requests for Journal and Nonjournal Publications Received by HSRI Library During September 1967

Journal Articles	86%
Reports, Proceedings, etc.	7%
Books	7%

Announced Publications

Proportion of Journal and Nonjournal Publications on Highways and Highway Safety Announced in Certain Journals

Journal	Journal Publications	Nonjournal Publications	Total	Percent Journals
Traffic Safety				
September 1967	73	24	97	75
October 1967	58	13	71	82
November 1967	104	11	115	90
Highways: Current Literature				
March 15, 1967	88	38	126	70
September 27, 1967	99	38	137	72
Current Literature in Traffic & Transportation				
September 1967	191	67	258	74

TABLE 3.II Origin of Nonjournal Publications

Journal	Regular Books	Federal Govt.	State	Local/Regional	Univ./Res. Institute	Society Foundation	Trade Assn.	Industry	Service Society	Management Firms
Traffic Safety Sept 1967	-	-	1	-	-	11	-	-	-	-
Oct 1967	2	5	2	-	4	14	-	1	-	-
Nov 1967	-	3	2	1	-	4	-	-	1	-
Highways: Curr Lit										
15 Mar 67		6	9	3	7	5	6	2	-	-
27 Sep 67		16	7	-	6	6	-	2	-	1
Curr Lit Traf Trans Sep 1967	8	27	1	3	15	8	2	2	-	1
Total	10	57	22	7	32	48	8	7	1	2

journals. HRIS and the Safety Research Information Service of the National Safety Council (SRIS), besides maintaining quite extensive source lists, also try to contact research workers whenever they learn of a new research project.

Another problem area is presented by "fugitive" materials such as reports, speeches, and proceedings of conferences and symposia. Only a few libraries make any determined effort to obtain such materials. HSRIC maintains a list of Forthcoming Meetings* of interest to highway safety personnel, subscribes to a clipping service, and encourages its professional and research staff to file reports on their own trips.

It may also be noted here that, in some cases, these methods are being supplemented by formal or informal exchange agreements with other libraries/information centers to share information about their acquisitions and other operations. Thus, there is emerging a kind of informal network of information centers in highway safety (Figure 3.1). This network, as we see it, has seven parts, as follows:

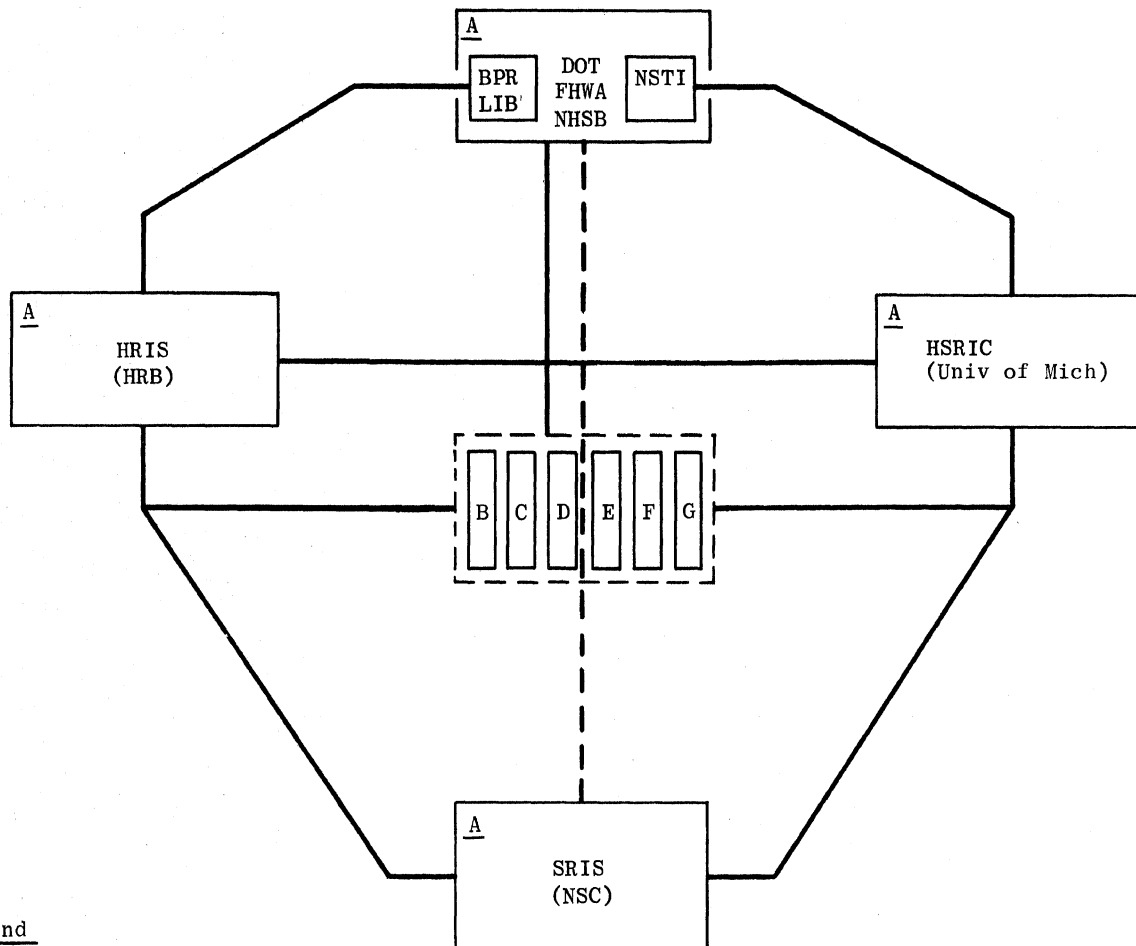
A. Four primary information centers:

- (1) National Traffic Safety Institute (NTSI)
- (2) Highway Research Information Service (HRIS)
of the Highway Research Board
- (3) Safety Research Information Service (SRIS)
of the National Safety Council
- (4) Highway Safety Research Information Center
(HSRIC) of The University of Michigan

each of these four major information centers maintains a large document collection and, in general, has access to a relatively large and professional staff in their field of interest. These centers use other specialized centers and/or collections (the six other parts of the information network listed below), to obtain information and act as sources of information for them.

B. Specialized information centers, such as the Highway Traffic Safety Center (HTSC) on the System of Automotive Safety Information (SASI) and Michigan State University; and information centers set up and supported by NASA, such as CAST (Wayne State University).

*Forthcoming Meetings is also issued as a monthly bulletin.



Legend

- | | |
|--|---|
| <p>A Primary information centers, such as HRIS, HSRIC, SRIS.</p> <p>B Specialized centers, such as HTSC, SASI, (GM), CAST (Wayne State Univ), etc.</p> <p>C Other highway safety/transportation collections, such as Yale, Northwestern, ITTE, etc. Also state highway departmental collections.</p> | <p>d Related federal agencies, such as NBS, NIH, NLM, DDC, ERIC, SIE, NASA, NRCST (LC), etc.</p> <p>E Societies and foundations.</p> <p>F Other people/organizations active in the field of highway safety.</p> <p>G Foreign information centers, such as IRRD, RRL, CGR, MIRA, Excerpta Medica, etc.</p> |
|--|---|

FIGURE 3.1. EXISTING MODEL OF HIGHWAY SAFETY RESEARCH INFORMATION NETWORK

C. Other highway safety/transportation collections, such as those at Yale, Northwestern, and ITTE; state highway departmental collections, large public libraries, etc.

D. Related federal agencies, such as the National Bureau of Standards, National Institute of Health, National Library of Medicine, Educational Information Research Center (ERIC), and the Library of Congress.

E. Societies and foundations

F. Other People and organizations active in the field of highway safety.

G. Foreign information centers, such as the International Road Research Documentation, Road Research Laboratory, Canadian Good Roads Association, Motor Industry Research Association (MIRA), and Excerpta Medica.

Although there is some obvious duplication and overlapping in their activities, each of these centers also has an area or areas of special interest. Thus, HRIS is obviously interested in highway engineering and design, and SRIS in traffic safety and its psychological aspects.

The resources of the various parts of this network, their collections and their services, will be examined more closely in the second phase of this contract. However, it must be stressed that this network has come into existence primarily on a voluntary basis, with the resultant uncertainty in service and failure to exploit fully the best available collections for a given purpose.

ACQUISITION

After a document has been located and selected, its acquisition is a relatively simple matter, except that often, by the time an order for it is placed or a request made, the document in question may already be out of print and no longer available. During our visits to libraries and our contacts with research workers, we often heard complaints about the lack of full texts of documents which they had identified as pertinent to their needs. Some information centers collect or retain only abstracts and refer to their users other collections, such as Bureau of Public Roads (BPR) library, for the actual documents. This problem is particularly serious with respect to foreign documents. Thus there is a need for an adequate system of secondary distribution of research publications.

It may be observed here that, although the total volume of highway safety literature is relatively small compared to that for other sciences and engineering fields, it is difficult for a single library or information center to be self-sufficient because the subject matter is dispersed among various disciplines. There is, therefore, a great need among highway safety libraries to share resources and develop tools, such as a union catalog of highway safety literature; the feasibility of compiling a union catalog will be further explored in the second phase of this contract.

CATALOGING

Once documents are acquired, they must be recorded in catalogs and their subject contents analyzed and indexed if they are to be used. The first part of this activity is concerned with what is known as descriptive cataloging. Although the task of descriptive cataloging is rather mechanical and, to some extent, routine, problems arise, particularly in handling report literature and in determining the correct term of entry for corporate bodies. Most of the libraries we visited used either the Library of Congress Rules for Descriptive Cataloging or the American Library Association (ALA) Cataloging Rules for Author and Titles entries. They also used Library of Congress catalog cards; however, these cards were available only for a very small fraction of their acquisitions. Some of the information centers, such as SASI and SRIS, are using, or planning to use, the Standard for Descriptive Cataloging of Government Scientific and Technical Reports, published by the Committee on Scientific and Technical Information (COSATI). SRIS has developed its own cataloging procedures, which are similar to the COSATI Standard of the Federal Council for Science and Technology.

There are some basic differences between the COSATI Standard (followed by the HSRIC rules) and the LC or ALA rules, particularly in their handling of entries of corporate bodies. The general COSATI rule is "catalog from the report in hand, using only those organizational elements that appear on the report." The LC rules require the cataloger to search and provide additional information if not available from the report in hand. The COSATI Standard omits "U. S." before headings, i.e., Bureau of Public Roads and not U. S. Bureau of Public Roads. City or state names which repeat part of the name of the main element are omitted. If the subelement includes a geographic

name, this is repeated as part of subelement, as

Massachusetts Institute of Tech., Cambridge

Rochester University, N. Y.

When more than two organizational elements are displayed in imprint, the corporate author heading includes only two, the largest and smallest. If a corporate author changes its name, the COSATI Standard recommends that both old and new forms of names be retained, with cross references made between them. The COSATI Standard also permits rearranging the title to put less significant parts last, such as "quarterly progress report," or "6th annual." Some of these differences are shown in Figure 3.2.

ERIC has found the COSATI Standard somewhat lacking in the handling of educational publications and, using it as a basis, has set up its own Guidelines for Descriptive Cataloging. For any specific factors not covered by these guidelines, the cataloger is advised to consult the COSATI Standard, and for items not covered by the COSATI Standard, the cataloger may refer to the ALA Anglo-American Cataloging Rules.

An important development with respect to descriptive cataloging has been the publication of the new edition of Anglo-American Cataloging Rules this year by ALA. The new AA Code makes a number of important changes in the handling of corporate entries and is in remarkable harmony with the COSATI Standard. However, the need here is not only to adopt or formulate an ideal set of cataloging rules, but also to encourage and develop a standard and uniform practice among all libraries and information centers in the field of highway safety. The number of such libraries/information centers is increasing, and if they have to cooperate with one another in interlibrary loan and resource sharing, as they must, it is desirable that they speak a common language by recording their document citations in a uniform way. A beginning in this direction, can, perhaps, be made by developing jointly a common corporate authority list.

A related question is the physical form of catalog entry. Although most libraries use the standard 3" x 5" card, a few, namely SASI and HSRIC, have begun to use a 5" x 8" card. BPR Library uses a 4" x 6" card for its periodicals index. However, we believe that more important than the size of the catalog card is the form of the catalog. Since the users of highway safety information are scattered all over

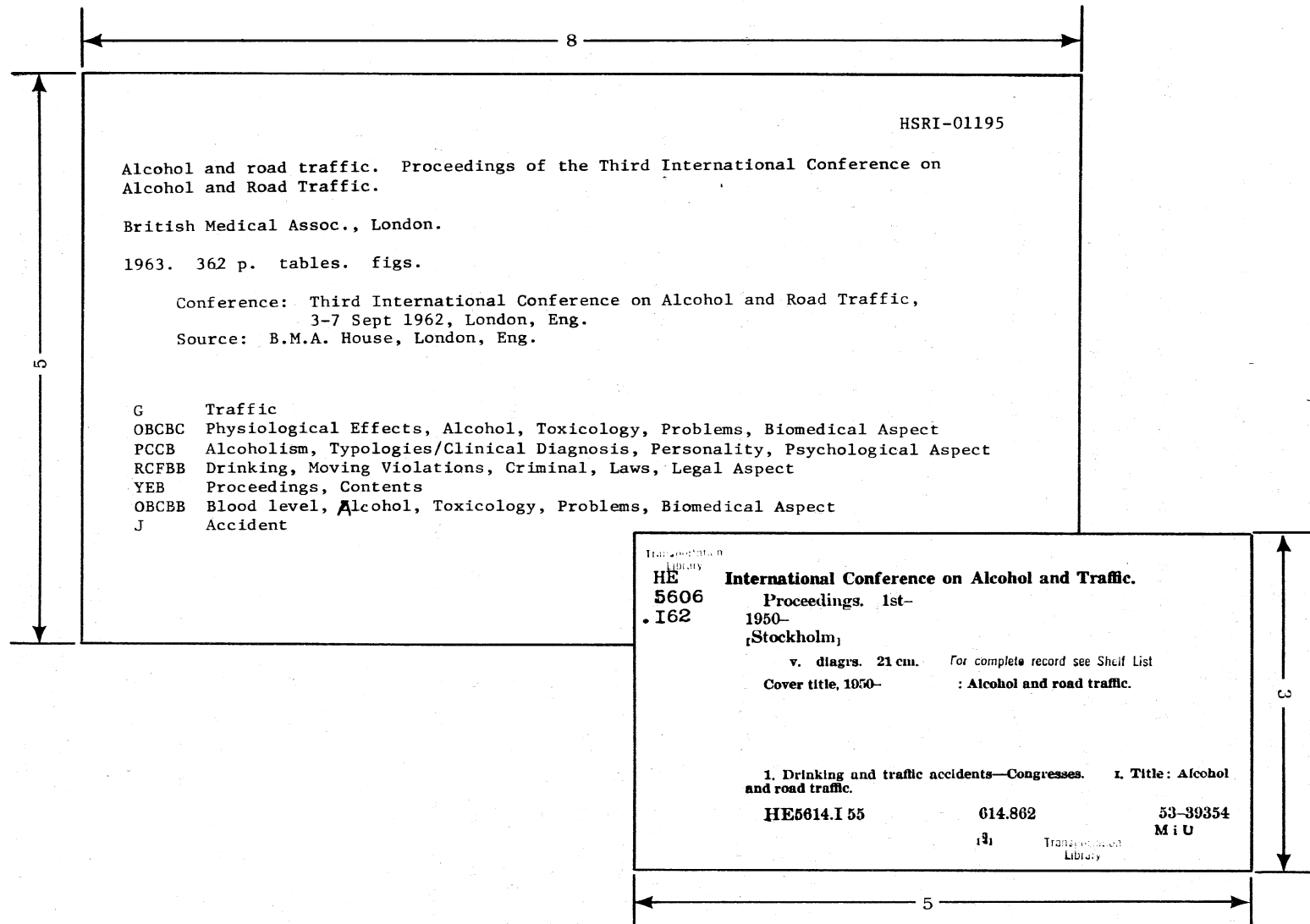


FIGURE 3.2. LC vs HSRIC CATALOG CARDS

the country, a catalog should be in a form which is more or less equally accessible to all of them. This seems to be possible only with a periodically updated computer-based book catalog. This question will be further explored in the second phase of the contract.

SUBJECT ANALYSIS AND INDEXING

Fundamental to the problem of information retrieval in libraries is the process of analyzing the text containing information and describing it in an indexing language. This is usually done by adopting--very often, adapting--a standard classification system or a thesaurus, or it may require the devising, and subsequent development and control, of a new indexing language especially designed for the specific field or mission.

There are several reasons why existing general systems are unsatisfactory for particular libraries/information centers. First, most of them do not give adequate details for accurate specification of the highly complex subjects in papers and reports that such libraries/information centers must handle. Second, despite the comprehensiveness and variety of certain general schemes, they do not fully cater to the viewpoints of each particular library. Third, even if they are varied in viewpoints, they do not sufficiently provide for the flexible combination of terms which highly specific subjects demand. Fourth, they achieve flexibility only by unnecessarily lengthy or complicated notational means. Finally, they fail to provide optimum helpful filing order.

The continued proliferation of new special classification schemes and thesauruses is evidence enough that such criticisms are felt to be valid. Through visits to various transportation/highway safety libraries and to the Bibliographic Systems Center of the Case-Western Reserve University, we discovered 11 such systems (plus two unpublished thesauruses), which are listed below:

1. American Automobile Association, Library Subject Heading List, Washington, D. C.
2. Automobile Manufacturers Association, Patent Department, Classification Used by the Library, Detroit.
3. - - -Subject Headings Related to Patent Library, October 1965.
4. Bureau of Public Roads, A Classification Scheme for Highway Engineering; Adapted from Library of Congress Scheme, Addenda and Revisions, August 1965.

5. Kathryn Childs Cassidy, and Joy Redfield, Library Classification and Related Bibliography of Traffic Engineering Literature. Bureau of Highway Traffic, Yale University, New Haven, 1948.
6. Colorado, Department of Highways Library, List of Subject Headings, March 1955.
7. Highway Research Board, Highway Research Information Service, HRIS Thesaurus, Washington, D. C., March 1967.
8. Joseph C. Marsh IV, Rameshwar N. Paul, and Michael L. Thall, Highway Safety Research Information Center Subject Index Facets, Ann Arbor, September 1967, Highway Safety
9. National Safety Council Library, Filing System for Safety Publications, Chicago.
10. National Safety Council, Safety Research Information Service, Developmental Thesaurus of Approved Terms in Safety Research, compiled by Rosemary A. Buckley, Jean L. Hoffman, and Gerald Driessen, Chicago, August 1967.
11. Pennsylvania University, Wharton School of Finance and Commerce, Lippincot Library, Classification (An Adaptation of Dewey Decimal Classes 310, 330, 368, and 380), Philadelphia, 1963.

Four of the 11 systems are classification schemes, and the rest are subject heading lists or thesauruses for subject indexing. In conventional libraries, classification is used to arrange documents on shelves, and subject heading lists are used to provide an alphabetical approach to the subject contents of these documents in catalogs. The classification scheme most commonly found in libraries seems to be the Library of Congress scheme or some adaptation of it. In newly developing information centers such as HRIS and HSRIC, for which the users are likely to be scattered geographically and the bulk of the collection consists of materials not published in book form, the documents are usually shelved in simple accession order or some variation of it; the subject approach to the contents of documents is provided through subject indexes or catalogs. Thus, the subject heading lists and thesauruses assume an added significance. Three of the seven thesauruses listed above, namely items 7, 8, and 10, came out only this year, which is, incidentally another indication of increased activity in this field. Let us examine these thesauruses more closely.

HRIS Thesaurus

The HRIS Thesaurus lists about 15,000 terms. It contains uni-term-type single terms such as Inflow, Informal, Infrared, Intact, Integers. There are phrases, such as Initial Tangent Modulus, Follow-up Investigation, Driving under the Influence, Distance Measuring

Equipment, 85-Percentile Speed. There are also precoordinated subject headings or descriptors, such as Distillation/Refining Process, and Regional Planning/Transportation. There are 32 terms beginning with the word pile or piles, which explains, to some extent, the size of this thesaurus.

Despite its size, there are some serious omissions in this thesaurus in certain areas of highway safety, particularly in biomechanics, injury/trauma, and vehicles. A few of these are noted below:

(1) Although INJURY is an authorized term, there seems to be no provision for injuries to various parts of the body. Thus, while NECKING is an authorized term, Neck Injury or Neck is not. Nor is Whiplash. HEAD and FOOT appear as authorized terms and can probably be coordinated with INJURIES, but there is no mention of Abdomen, Ear, Nose or other parts of the human body. There is BACKLASH, but no Back.

(2) ANTHROPOLOGY is an authorized term, but Anthropometry is not.

(3) There is no mention of Prosthesis.

(4) There is no provision for Pregnancy, Pregnant Women, Woman Driver, or, for that matter, women at all. Incidentally, there are 35 terms beginning with the word "Driver."

(6) Child and Children are unauthorized terms and they must be entered under the authorized term MINOR. There is no mention of Infants nor Adolescents.

(6) There seems to be no provision for Dashboard nor Instrument Panel.

(7) There is no provision for Probation. Although there are six terms beginning with SUSPENDED, SUSPENSION, or SUSPENSIONS, there is no provision for simple Suspension or Suspension of Driver's License.

(8) While there are five authorized terms beginning with GLASS, there is no mention of Glasses, Spectacles, or Corrective Lens.

(9) BLOOD is an authorized term, but there is no mention of Blood Level.

This list of omissions or inconsistencies in the HRIS Thesaurus could be expanded further. This is not to indict the HRIS Thesaurus, but merely to point out that the size of a thesaurus alone, or the addition of a few terms here or there without an adequate mechanism for vocabulary control do not solve the problem of information retrieval. The limitation of such a thesaurus becomes obvious when one makes a comprehensive and exhaustive search on a subject. For example, to

make a comprehensive search on accidents would require 58 or perhaps more of the following descriptors:

HRIS Authorized "Accident" Terms

Accident Causes	Head-On Collisions
Accident Investigation	Investigation (Traffic Accidents)
Accident Prevention	Motor Vehicle Accidents
Accident Rates	Pedestrian Vehicle Conflicts
Accident Severity	Single Vehicle Accidents
Accident Severity Rate	Traffic Accident Analysis
Accident Type	Traffic Accident Causes
Accidents	Traffic Accident Economic Effects
Collisions	Traffic Accident Reporting
Construction Area Accidents	Traffic Accidents
Fatal Accidents	

There is no clear distinction among the terms accidents, collisions, motor vehicle accidents, and traffic accidents. There also does not appear to be a simple way of determining all the relevant descriptors on a given subject except by making an exhaustive search through the whole thesaurus, which, in view of its size, can be quite a time consuming operation. A generic-specific capability would be convenient.

The large size of the thesaurus does not necessarily increase its usefulness; in fact, it seems to hinder indexing and retrieval efficiency. It may also be noted here the HRIS, besides using authorized terms, also uses a list of "identifiers" almost as long as the authorized list itself, thereby increasing the size of the thesaurus and its complexities. The identifiers also include trade names, proper names, and candidate terms for the authorized list.

HRIS "Accident" Identifiers

Accident Avoiding Behavior	No Accident Record
Accident Costs	Non-Fatal Accidents
Accident Free	Non-Ejection
Accident Inducing Characteristics	Non-Fatal
Accident Liable	Non-Intersection Collisions
Accident Proneness	Principles of Accident Effect Reporting
Accident Victims	Random Traffic Incidents
Anti-Collision	Secondary Collisions
	Side Impact Collisions

SRIS Developmental Thesaurus

The SRIS Thesaurus is the second thesaurus to appear this year. The introduction states that it represents a shift from the narrower Yale Traffic Engineering Classification to a broader, more efficient coordinate indexing system using uniterms. The system has been applied to 800 documents added between April and July 1967. Another 5,000 remain to be indexed. This thesaurus is rather short, with less than 600 terms in all, and, despite the introduction, the terms are anything but uniterms. There are a number of precoordinated subject-heading terms or descriptors. Thus, there are 32 terms beginning with ACCIDENT or ACCIDENTS and 13 terms beginning with SAFETY.

Because of the size of the thesaurus, details are often lacking, and most documents on specific or specialized subjects have to be indexed under broader terms. Thus, Merging Traffic goes under TRAFFIC CONTROL AND OPERATIONS and/or TRAFFIC FLOW; Door Latches goes under SAFETY DEVICES and/or SAFETY FEATURES. Except for HEAD INJURIES, all other injuries seem to go under INJURIES. Thus, Chest and Knee Injuries go under INJURIES, as do Blasting Injuries. There is no separate provision for Neck Injuries or Back Injuries or, for that matter, injuries to other parts of the body. There is no heading for child or children. Children's Accidents is under ACCIDENT-CHILDREN; Children's Emergency Services is under EMERGENCY SERVICES; Children's Injuries is under INJURY; Children's Safety Devices is under SAFETY DEVICES and/or SEAT BELTS; and Children's Seat Belts go under SEAT BELTS, and/or SAFETY DEVICES, and/or PASSENGER SAFETY.

HSRIC Subject Index Facets

The third and the latest of these thesauri is the HSRIC Subject Index Facets which follows a faceted approach to subject indexing. This approach seems to provide the most effective means for vocabulary control as well as for coordinate indexing with specific and generic searching capability and has been adopted by a number of thesauruses which have appeared recently. (1)

As in descriptor indexing, a composite document is broken down into simpler concepts or ideas that jointly depict the document's subject contents, what questions the document is likely to answer, and how it is likely to be asked for. The second step is the coding of the document according to the concepts it presents by selecting as many codes from the HSRIC subject index facets as required to adequately describe the document's contents. Here the faceted approach

is better than a straight alphabetic listing of descriptors. The emphasis is on indexing (and retrieval) by concepts and generic structure, so that one does not become entangled in the semantic conflicts resulting from the fact that some words are used in a variety of disciplines.

The indexer selects terms (subject codes) by a "table of contents" approach (see below) rather than a dictionary and cross-reference approach. The indexer can look at a document, see an idea or concept (in his mind's eye), turn to the code page, refine the idea, and select a code, without worrying about word usage or semantic links to authorized term usage across disciplines.

Table of Contents to Highway Safety Subject Index

COMPONENTS (Objects, Physical Entities of the System)

- Materials
- Ways (Roads)
- Vehicles
- People
- Society (Organizations of People)

OPERATIONS (Verbs, Actions of the System)

- Traffic
- Regulation and Control
- Services
- Accidents (includes Injury)

ENVIRONMENT (Natural Environment)

- Space (Geography)
- Time
- Weather

ASPECTS (Perspectives, Points of View of the System)

- Physical
- Biomedical
- Psychological
- Educational
- Legal
- Socioeconomic

TOOLS

- Disciplines
- Methods
- Equipment
- Report Type

The index then, is a set of structured term groups. Figure 3.3 is an informal depiction of the relationship of facets i.e., a "stick figure" table of contents. Figure 3.4 shows a method of picturing motor vehicle inspection from the legal and physical standpoints; subject terms are not precoordinated during indexing but are joined (coordinated) for retrieval.

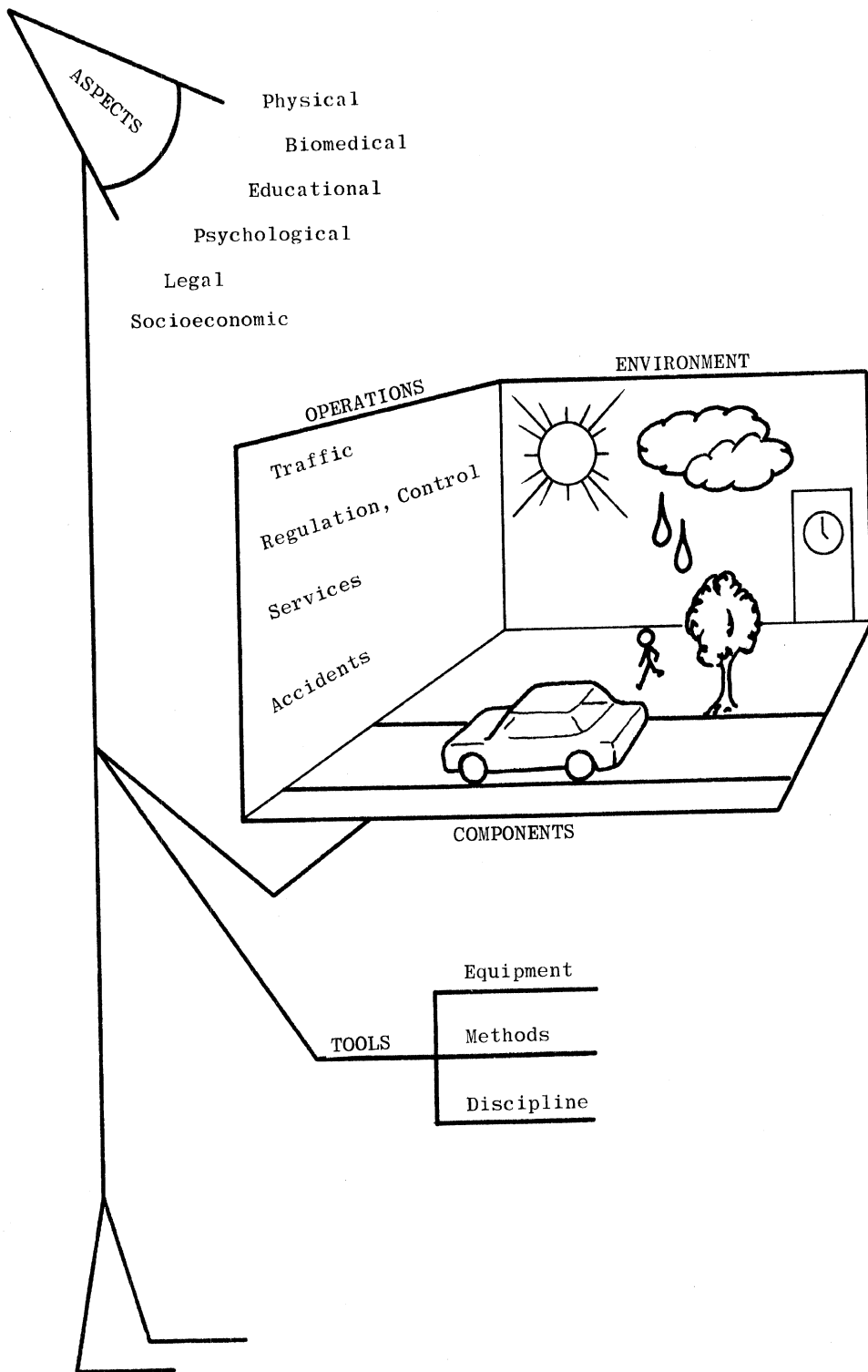
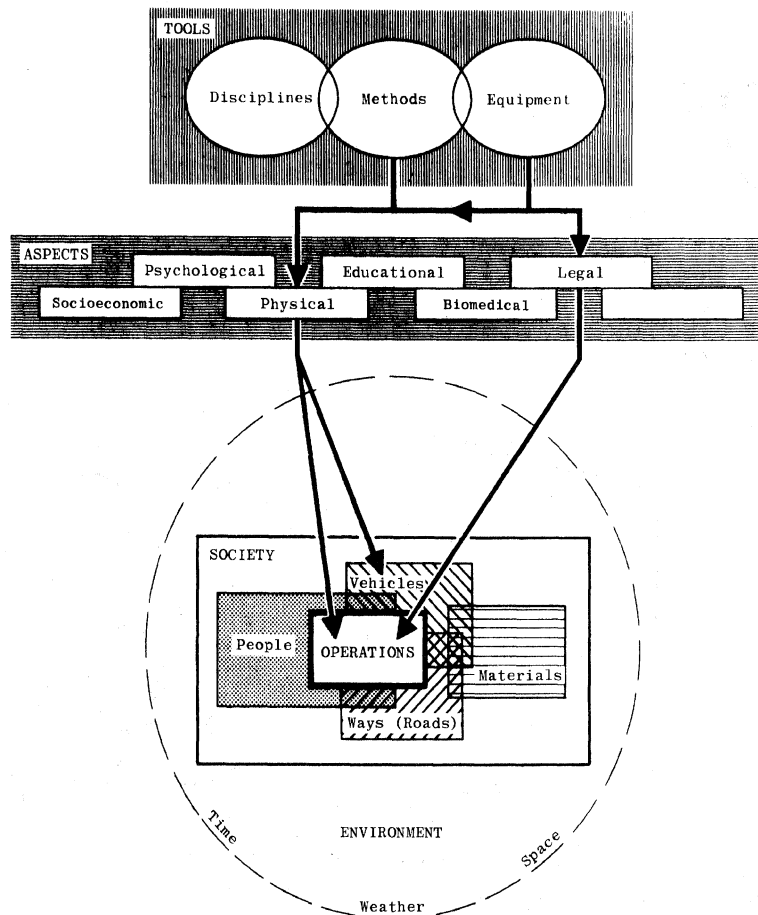


FIGURE 3.3 HIGHWAY SAFETY COORDINATE INDEXING FACETS



COMPONENTS: Components are the tangible items, things, or entities that make up highway transport system. The three key components are People, Vehicles, and Ways (or Roads). Vehicles and Roads are made of Materials, and People manifest themselves in the form of Society (communities, corporate bodies, and governments) which provide an organizational background for highway transportation operations.

OPERATIONS: Operations are the "verbs," that is, the actions and interactions of the components. Here we find traffic jams and accidents.

ENVIRONMENT: Environment refers to natural environment of Space, Time, and Weather, that affects all components and all operations.

ASPECTS: Aspects are points of view or perspectives with which one can look at highway safety.

TOOLS: These facets comprise the problem solving tools. Disciplines are the traditional academic areas of study such as Mathematics, Medicine, Highway Engineering. Methods consists of theoretical procedural techniques, such as Statistical Analysis, that may be used to study the problems of highway safety. Equipment consists of hardware necessary to conduct a program, experiment, or study.

FIGURE 3.4 HSRIC FACETS

The HSRIC Thesaurus has been applied to over 2,000 documents at HSRIC. Among the advantages claimed are the following:

- (1) It is especially designed for indexing and retrieving information on highway safety.
- (2) Emphasis is on retrieval by concepts and generic structure, bypassing the semantic problems in a multi-discipline mission.
- (3) A generic-specific capability is provided; thus, deep indexing still permits browsing.
- (4) It provides an effective mechanism for vocabulary control.
- (5) Since only the basic concepts are listed, the system is relatively stable and can easily accommodate new subjects. However, this does not prevent precoordinating heavily used subjects.
- (6) The system can be easily adapted for computer use.

The Thesaurus is under continuing development and will contain an alphabetic index to all the terms.

MACHINE INDEXING AND RETRIEVAL

At present, the only computer-based operational information retrieval system in the field of highway safety seems to be the Highway Research Information Service. The system is an off-line operation and is used to store and retrieve index and abstract files of documents. HSRIC is engaged in developing a prototype of an on-line computer system of index retrieval.

Outside the field of highway safety, a number of computer-based on-line information retrieval systems, such as COLEX at the Systems Development Corporation and TIP at the Massachusetts Institute of Technology, are now in operation. These systems and the feasibility of a similar system for use by the National Traffic Safety Documentation Center (NTSDC) will be explored as a part of Task C in the second phase of the contract. It should be noted that most of these mechanized information systems deal only with the storage and retrieval of document citations and, sometimes, abstract files, and that the processing of information into storage and the contents analysis of documents are still done manually. Also, a common feature of most mechanized information systems is the consistent under-utilization of the search capabilities originally advanced as the major rationale for system implementation. NASA and MEDLARS (Medical Literature Analysis and Retrieval Systems), two of the most publicized

systems, are reported to be devoting only a small portion of their total capability to performing searches (10). Surveys have shown that only a small fraction of all inquiries are suitable for machine searching (4). Thus mechanized service can only supplement a conventional service. Relatively more useful and quantitatively greater tasks performed by these systems appear to be in publications announcements and lists.

STORAGE AND RETRIEVAL

The problem of storage is essentially that of providing access to documents. A library may provide the needed document from its own collections, or, as it happens sometimes, it may have to depend on outside sources. Traditionally, libraries have tried to solve this problem through interlibrary loans, which is, and will probably remain, the most effective way to meet demands for certain types of documents, such as those out of print, relatively old, or needed only infrequently. Reliance on interlibrary loan by itself, however, is unsatisfactory for a number of reasons. The system is dependent on the generosity of a few large libraries that appear to be doing most of the lending. Thus, the Bureau of Railway Economics Library reported lending over 900 items and borrowing only about 20 items in 1966; a similar report was made by the Bureau of Public Roads Library. Another difficulty is the lack of duplicating facilities in libraries, e.g., the Bureau of Public Roads Library, which often have the desired documents; this presents a problem when a document is needed simultaneously by a number of libraries. It is desirable, therefore, to supplement interlibrary loan with a system of secondary distribution of publications, such as the Clearinghouse for Federal Scientific and Technical Information or the Educational Research Information Center (ERIC). The problem of secondary distribution, the adequacy of existing facilities such as the Clearinghouse, and various alternatives will be further explored in the second phase of the contract.

This also brings up the problem of copyright. It is the practice of many libraries at the present time to make single copies of journal articles to meet individual requests. The National Medical Library, which makes available single photo copies of articles through interlibrary loan, also has plans to develop a graphic image, storage, and retrieval system to be operated parallel with MEDLARS. This system would store micro-images of the texts of individual articles, and would be the basis for providing users with hard copies of articles

whose citations have been retrieved by computers. This is far from being a uniform or universal practice at present, and the legal status of such services, which is not clear under existing law, depends upon the definition of "fair use." An ad hoc Task Group on Legal Aspects involved in information systems, set up by COSATI, recommended in July 1967 "that further study of this problem be made" and "that a commission be established to study the problems of the copyright law as applied to computers and to information systems"(3). This problem will be further examined in the second phase of the contract.

Another aspect of the problem of storage is the regular removal of rarely used documents, or "dead weight," from the shelves and catalogs to improve collections and service. These documents, however, should be available to users if and when needed. The need could be met by setting up an archive or storage collection at one of the participating libraries, thereby expediting interlibrary loan and bibliographic work and ensuring that researchers will have the necessary information. Because of the nature of highway safety literature, such a storage collection would be established in a library which already has a comprehensive collection and also has adequate copying and reproduction facilities.

SUMMARY

Although the literature of highway safety is relatively small compared to that of other fields in science and engineering, it is scattered among the literatures of various other subject fields. Books published by commercial publishing houses form only a small fraction of the total literature of the field. Journal articles constitute about 75 to 80 percent of the titles requested by research workers as announced by libraries in their accession lists. A major portion of the literature not published in journals consists of reports published by societies, foundations, universities and research institutions, and state and federal government agencies.

It is obvious that traditional acquisition procedures are not adequate to meet the challenge of this kind of literature. The most effective procedures seem to be regular scanning of journals and direct contact with the producer of highway safety information. In the second phase of this contract we intend to take a closer look at agencies that generate information likely to be useful to workers in highway safety.

It is also obvious that, because of the subject spread of highway safety literature, no single library can acquire all the materials needed by workers in the field of highway safety. There is a need, then, for a system of resource sharing among various libraries/information centers to be facilitated by the compilation of a union catalog. Such cooperation should lead to a system or network of information centers. Such a network is already beginning to emerge. However, at present, it exists primarily on a voluntary basis, which results in less than maximum efficiency in service and in failure to exploit the best available collection for a given purpose. The following factors contribute to the problem:

- (1) Absence of a union catalog of literature on highway safety
- (2) Communication difficulties
- (3) Lack of adequate facilities for secondary distribution of full text copies
- (4) User restrictions

To increase cooperation and communication among the various constituents of this network, there is a need for coordination of certain library procedures, particularly regarding rules for descriptive cataloging and, if possible, indexing. The COSATI Standard, supplemented by the new Anglo-American Cataloging Rules for any specific factors not covered by it, may be adapted for descriptive cataloging. On the basis of our experience and a critical examination of the existing thesauruses, we recommend that a thesaurus based on faceted principles be considered. Cooperative cataloging and retrieval should also be explored.

Mechanized information systems can, at present, only supplement a well-conceived system; they cannot replace it. They can perform relatively more useful and quantitatively greater tasks in the production of publication announcements and lists. The feasibility and potential extent of their use by the National Traffic Documentation Center will be explored in the second phase of this contract as a part of Task C.

To provide users of highway safety information with all the documents they might need, a system of interlibrary lending should be encouraged; this should be supplemented by a system of secondary distribution of publications and an archive containing materials that are rarely used.

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4. R. M. Fishenden, "Information Use Studies", Journal of Documentation, Vol. XXI, September 1965, pp. 163-176.
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10. Melvin J. Weistock, et al., A Recommended Design for the United States Medical Library and Information System, Herner & Co., Washington, D. C., 1966.

4. CONCLUSIONS AND RECOMMENDATIONS

These interim conclusions and recommendations should be regarded as tentative, and are presented as potentially fruitful themes developed during Tasks A and B. Final conclusions and recommendations would be clearly inappropriate at this point in the study.

1. Users of the National Traffic Safety Documentation Center will be people from many locations and disciplines, with different interests, educational levels, and system demands (e.g., response time, format).

Users' needs must be satisfied by a flexible system capable of providing a variety of services while evolving new services to meet new demands. A major failure of earlier information systems design is that once the design was established, it was viewed as an unchangeable mechanism. Information systems, to be useful, must be organic, i.e., capable of change.

Availability of services must be structured. More effort should be devoted to the needs of significant users and to the preparation and review of state-of-the-art publications in areas of current concern. An explicit definition of "significant user" cannot be derived, but such a user can be characterized by his value to the mission or company and the likelihood that his increased knowledge will be passed on to his co-workers and to practitioners in the field. The publication of services available and fees can be used to structure services.

2. There is a very low usage rate for almost all present library and information services. When faced with extensive literature search requirements, the user does not know where to turn or what procedures to follow.

The training and education of primary users as well as wide publication and announcement of available services must be included in plans for documentation center activities. The system must be simple and not burdened with procedural details if the user is to understand and employ it with a minimum of difficulty. According to Mooers' Law, ". . . an information retrieval system will tend not to be used whenever it is more painful and troublesome for a customer to have information than for him not to have it."*

*C. N. Mooers, "Mooers' Law, or Why Some Retrieval Systems Are Used and Others Are Not," Technical Bulletin No. 136, Zator Co., December 1959.

3. User studies can provide a starting point in the planning of information center activities, but an operative system must remain continuously responsive to the needs of its users.

Appropriate feedback mechanisms should be established so that the user is able to influence the system. Further development and extension of direct and indirect study techniques and continued user analysis will be required for the healthy growth and establishment of any information activity. The staff of the system should constantly view the users as constituting a group of customers, the satisfaction of whose needs is the basis for the establishment and continued existence of the system and for the creation and maintenance of any particular service.

4. Current Awareness. The reading of journals and news bulletins is the primary mode of keeping abreast (probably through habit). Each user reads the journals of his own profession or discipline.

A variety of current journals should be provided at each local information activity based upon local users' requests and backgrounds. Multiple subscriptions to popular titles and notices of current articles and meetings of interest should be considered. The growth of directories (e.g., of people, organizations, audio-visual materials) and news bulletins should be encouraged in areas of concern. Mechanisms for comprehensive notification of research in progress should be provided. While the user should be led to explore new material and sources, he should not be swamped; techniques of selective dissemination will be considered during the second phase of the contract.

5. Reference. The availability of readily obtainable, up-to-date, factual information is important. This category subsumes the bulk of the requests (in terms of numbers) the center will have to answer. (See conclusion and recommendation 2, on structuring the availability of services.) Such detailed information takes many forms and has a variety of sources.

Mechanized document retrieval systems are not as important as systems that can provide pertinent details. This problem is considered in Task B (existing procedures) and will be expanded in Task C (center organization and functions). The screening of journals, newspapers, newsletters, and readily available

handbooks and reference works should be considered. Summary accident statistics compiled regularly by the National Traffic Safety Data Center should satisfy many requests.

6. Literature searches have played a major role in highway safety research in the last year as new projects and users come into this mission-oriented field from a variety of disciplines, and a high degree of cross-pollenization of information has been required. There are two problems here: (1) weak indexing and coverage of the field by present bibliographic services (see Task B) and (2) weak utilization of present services (see conclusion 3).

Communication among highway safety centers should be improved. There are several techniques for strengthening indexing and coverage, and these will be explored as part of Task C. They include, for example, development of authority lists, a union catalog, an exchange network, scanning of professional journals, and direct contact with sources for automatic distribution of material to the center.

7. Copies of "fugitive" material and limited-distribution reports are not generally available as required. There is a corresponding concern about bibliographies and information services being simple compilations of references without much regard for the existence of at least file copies of documents.

A secondary distribution or document clearinghouse function should be established now in conjunction with an effort to stock the clearinghouse with material for which copies are not readily available. Copyright restrictions remain unresolved. Skepticism should be expressed about any information scheme that cannot provide the user with a full text. Notification of publishing sources and availability could be integrated with bibliographic citations. On the other hand, the system should have a purging mechanism to remove "dead weight" to archive storage where it could still be retrieved but would not burden the system.

8. Recently, there has been a proliferation of new information center activities. (This in itself is an indication of urgency.) An informal exchange network of centers is evolving. There appears to be a need for a variety of types of information centers in highway safety.

Any anticipated system should provide for inclusion of specialized information centers based on three main criteria: subject need, the existence of an ongoing research program at a school or research institution in the subject area, and the presence of a large library. The developing network of existing centers should be enhanced through direct participation and formal recognition. Techniques for the enhancement of resource sharing will be considered in the contract's second phase. A meeting of all personnel concerned with the handling of highway safety information has been suggested by several people.

9. Field manuals and handbooks are needed for the application of research results and procedures/standards information. While information storage and retrieval within the researcher-to-researcher cycle is relatively well developed, the flow of information from researcher to practitioner is weak (though this is not so in the highway engineering field).

The preparation of application handbooks (cookbooks) should be provided for. Whether these should be sponsored by or prepared by the documentation center is not clear and will probably have to be decided on an individual basis.

10. Foreign materials usage is limited by lack of accessibility and familiarity, and by reluctance to read foreign languages.

Use and availability of foreign material should be improved. The documentation center should consider limited translation services, review papers of foreign materials, and selective acquisition from a wide variety of foreign sources.

A P P E N D I X A

SUMMARY OF INTERVIEW RESPONSES

The respondents have been grouped according to their professional functions, and the responses summarized to present a general picture of the needs expressed by each group.

1. Mass Media Representatives
2. Legislative
3. Automobile Dealers
4. Insurance Agents
5. Traffic and Highway Engineers
6. Safety Organizations Representatives
7. Researchers
8. State Officials
9. Police Officials
10. Driver Education Instructors

1. MASS MEDIA REPRESENTATIVES

This group of five people represented some 50 years of writing experience related to highway safety. None of them receive any form of government support. All get considerable information by direct personal contact; most have had no experience with microforms, and those who have did not find them convenient.

Only one of the five saw Traffic Safety regularly; their normal operation most often involved "calling the original source." Several had used the National Safety Council for data or referral to other sources. A major television network has its own information center, but of course, its coverage must be broad and has only a limited capability in traffic safety.

Most members of the press are avid readers of news magazines and newspapers as well as of general background reading material.

With regard to timeliness of information it is necessary to consider that there are two kinds of reporting: the first is "responsive reporting," the timely reporting of events as they happen. This is ordinarily done without any in-depth searching and lack of information does not seem to be a handicap. Efforts are often made to provide some back-up for a story, but the need does not seem to be critical. The other type of reporting is investigative--explanations of causes rather than descriptions of events. In this work it is difficult and often impossible to get needed information, but the reporter usually has some weeks to do the research and write the material.

These media representatives look forward to a single good source of highway safety information. They would like information available in a convenient, cross-indexed form so that intelligent answers could be obtained in a one-day turnaround time. Television workers would appreciate a film clip file from which they could borrow material as

necessary. Magazine writers (and others who do investigative pieces) would like information about research in progress in time to produce articles on the results in a timely fashion.

Typical queries from media people include, for example: What are the Volvo safety features? How effective are tire studs? How effective are collapsible front ends? What are the safety features of all the new cars [for preparation of a table]? What is the best [most authoritative/comprehensive] existing piece of literature on drunk driving? Do accident record data show which car is the safest/most dangerous?

2. LEGISLATORS AND LEGISLATIVE ASSISTANTS:

Two people were interviewed, one with a ten-year interest in traffic safety, the other with a two-year interest. Neither was fully involved in this field, but both estimated that 10 to 15% of their time during a given year would be devoted to this subject. Neither had used microforms much, but given the notorious volume of paper-handling at the federal level it seemed an attractive format.

As in other fields, these potential users subscribe to and read professional journals related to their occupations--the Congressional Quarterly and State Government, and law and accounting journals. Newsletters in areas of current interest are found useful regardless of their point of view or bias. Personal contact is a major means of acquiring information, often obtained directly because of a wide circle of acquaintances, but also occasionally obtained by referral from a friend or organization. These people are fairly avid readers of periodic news reports--Time, Newsweek, several daily papers. They receive a fair amount of both solicited and unsolicited information from lobbyists, who are considered valuable sources.

Their principal outputs are speeches, bills, and amendments, with only occasional articles written for magazines or newspapers.

Their information problem is one of handling too large a volume of unfiltered information. Congressional journals, books, magazines, pamphlets, etc., add up to thousands of pages per day which cannot be read but must be at least scanned. Some selection process to indicate "required" reading is certainly needed here.

Typical queries from legislative people: What is the accident frequency in my county [for a Kiwanis Club speech]? Is periodic motor vehicle inspection good or bad? How well is NHTSA meeting its goals? What areas important to highway safety legislation are left untouched by the present legislation?

3. AUTOMOBILE DEALERS

One foreign dealer and one American make dealer were interviewed. Both are self-supporting. Both stated that they had been interested in highway safety "for a long time" (20 years for one, 30 years for the other). When asked what percentage of their time was devoted to highway safety activities, one said 0% and the other said less than 1%. Neither had requested any information lately from anyone regarding highway safety problems, and both felt reasonably happy with what the company brochures provided.

Regular reading material includes the local and National Auto Dealers Association publications, service magazines (free magazines with tips to mechanics, etc.), and Automotive News (which is read regularly in detail).

Timeliness of safety-related information did not seem to be a problem. Dealers are happy to pass along the company's safety brochures to prospective customers. One dealer had a short film strip indicating the safety features of his new model. Neither was much impressed by the safety furor...one stated that "Safety features are not going over very strong...style is most important."

When asked what question he would like to direct to an all-powerful information center, one respondent wanted material with which to fight the local city sign ordinance (which was currently requiring him to tear down an expensive sign and replace it with another), and material with which to fight the local city traffic engineer's policies (because a recent change in one-way street assignments had affected his business potential negatively). Automobile dealers seem to be most interested in the business effects of auto safety--e.g., they would favor a PMVI program that permitted only new car dealers to perform inspections, and they strongly support the establishment of standards for junking old cars. One dealer is currently conducting his own "safety" program, which consists of catching "unsafe" items on a normal service check of a car, recommending repair to the owner, and then noting the defects on the bill if the owner declines to have the work performed.

4. INSURANCE AGENTS

We talked with two local insurance agents--one an agent for a single national company, the other an independent agent. Both were interested in auto safety primarily because of their jobs. Neither had used microforms of any kind. Neither had requested any highway safety information from anyone recently.

Their normal information sources include professional journals, e.g., The National Underwriter's Weekly, and the Journal of Insurance Information. They occasionally hear a highway safety speaker at an insurance association meeting. Company pamphlets supply some safety information, and association publications keep them up to date on legislation which affects their business.

Timeliness of information seems to be no problem as they have essentially no requests. Their output, in safety-related fields, is

primarily the dissemination of company-provided information. They are active in local safety council work at times, and are occasionally called upon to speak.

Response to queries about how they might use an information center devoted to highway safety indicated that they would not be likely to make many requests. They might, on the other hand, receive and transmit literature provided to them.

5. TRAFFIC AND HIGHWAY ENGINEERS

Two traffic engineers, one at the city level and one at the county level, were interviewed. Length of time interested in highway safety was stated as 7 and 17 years respectively, indicating essentially the length of their professional careers to date. They were supported by local government funds. Both had made use of microforms, and in general liked them.

Their recent requests for information included requests for traffic survey manuals published by the federal government, material on 1969 vehicle standards, appropriation reports, and data on maximum traffic capabilities of certain highway types. In general, their needs were for a mixture of administrative and engineering information, the city engineer being more concerned with administrative matters.

Regular reading material for these people include Traffic Quarterly, Public Works, Rural Roads, and AASHO publications. They also see the IIHS Newsletter, the HRB Publications list, several trade magazines, and both had several personal contacts in the Federal Highway Administration and the State Department of Highways.

With regard to timeliness of information, one stated that things are usually received on time, but that since there is often no notice

that some particular information or material exists, it is hard to miss having it.

A principal problem for local traffic engineers is that accident records are not prepared in a form that is useful to them. In addition, they desire good summaries of new information available in the field of traffic engineering. One respondent noted that employee time losses from accidents is a serious problem [these are off-the-job traffic accidents]. He proposes to present the National Safety Council's Defensive Driving Course to employees as a countermeasure.

6. SAFETY ORGANIZATION REPRESENTATIVES

We interviewed four representatives of safety organizations. One had been concerned with traffic safety for 12 years, the others for only a few years each. All were supported by nonprofit foundations, and devoted 80% to 90% of their time to highway safety problems. One of the four had used microforms and found them convenient; the others had never used them.

Professional journals read by this group included the Institute of Traffic Engineers Journal, the IACP publications, the SAE Journal, and Automotive Review. This group read several newsletters avidly, but used library services very little. Personal contact seems to account for most of their information input, much of this occurring at conferences, some by telephone and letter.

With regard to timeliness of information, it was noted that there is often a serious delay in getting documents through regular government channels. Legislative news is often received later than desired, although newsletter services tend to keep them informed here. Obtaining knowledge of the existence of reports is often a problem.

Output of this group includes articles and pamphlets for legislative support in the traffic safety field, periodic "traffic facts"

documents, talks to various safety groups, news releases, and considerable personal and telephone contact.

They would like to see rather complete bibliographies of material in the field of human communications--including reports of progress in research on emotions, the use of scare tactics, propaganda mechanisms, etc. A summary of their suggestions for improved information service includes:

1. An inventory of traffic programs [for my state]
2. Quarterly index and bibliography of literature in traffic safety
3. Weekly abstracts [with sources indicated]
4. Weekly newsletters
5. One good centralized library to which I can make requests
6. Availability of materials for demonstrations, talks, and presentations
7. Current reports of research in progress

7. RESEARCHERS

Although we interviewed only a few researchers completely, we had direct contact with a large number; the responses of both groups are summarized here.

Among those fully interviewed, interest in traffic safety had spanned anything from two weeks (for an economist recently assigned to a federal project) to 30 years (for a senior research administrator). Most of these people were supported by federal funds, at least in part. All got a fair amount of information by direct personal contact--from meetings and from discussions with their colleagues. Half of them had used microforms, and all considered them inconvenient for their use.

Each of these people regularly reads two or three professional journals relevant to his field of interest (psychology, economics, etc.). In addition, most were familiar with and read Traffic Safety (including the research review) regularly. Most of these people are regular readers of newspapers--particularly the New York Times--and of a scattering of news magazines (U.S. News and World Report, Time, and others).

Regarding timeliness of information the biggest problem seems to be keeping informed on current research. While many researchers feel that duplication of efforts is not necessarily a bad thing in the research phase, they would like to know what kinds of things their peers are up to, and to be able to communicate with them to discuss methodology and early results. Normal journal publishing delays in most fields of research are from six months to two years. When the author's research time, writing time, and administrative delays are added, it is not surprising that two parallel research programs (which might well have gained from intercommunication) frequently do not learn of each other's existence until the program is completed. Technical society meetings help to keep researchers informed about current research, but since these are usually intradisciplinary they do not do the whole job.

Timeliness of response of library systems (for reprints, distribution copies of privately printed reports, etc.), is usually acceptable. Several researchers felt that there were unnecessary and harmful delays here too. Many times the requested material is just not available (e.g., limited distribution, out of print).

Researchers' principal outputs are reports to sponsors, journal articles addressed to professional colleagues, and occasional informal talks to civic or professional groups. Results of research are often reported to the general public through public information offices, although the researchers themselves seldom exploit this medium.

Typical questions from researchers are dominated by requests for factual data. For example, what is the number of passing accidents in the U.S. per year, what is the projection of the gross national product, how many illnesses and injuries (by type) are associated with vehicular accidents? Such requests often take the form of a request

for a particular paper--usually a journal article, and usually from a journal not likely to be stocked by a small library. One researcher was concerned with measuring the efficacy of certain injury counter-measures, and wanted to determine the percentage of seat-belt use in the United States. In order to determine this, however, he had to request numerous articles whose titles suggested they might lead to the information.

Specific suggestions from researchers include the requirement for a broad capable library nearby (at least in the same city if not in the same building). In general, the researcher desires hard copy which he can peruse at his desk, and he wants the full text of articles rather than a brief abstract. Abstracts are useful in leading him to the right document, but before he draws conclusions he will probably want the article itself. Additionally, an augmented research-in-progress reporting system such as now exists in the Traffic Safety Research Review and the Highway Research Information Service's Research in Progress, is much desired.

8. STATE AGENCY OFFICIALS

In this category we have grouped together representatives of a number of state agencies vitally concerned with the traffic safety problem. This includes the governor's traffic safety representative, the chairman of the state safety commission, the driver education administrator, and representatives from the highway department, the health department, the public service commission, and the department of state (which in this state is responsible for vehicle and driver licensing). All but two of the people estimate that 100% of their time is spent in activities related to highway safety, and their average experience in this work is 16 years. Most are supported by state funds, although a few receive a part of their support from fed-

eral sources. Most had seen microforms of some kind, but did not like to use them because they could not take the material home easily. One had used it extensively for record storage, but not for ordinary printed material. He found it useful in that service.

Recent queries made by these people were often for (1) advice (e.g., what is the effectiveness of a given state advisory committee, are air pollutants from cars a serious health hazard in this state); (2) data (where are mobile hospital sites in the U. S., what are the Washington State motorcycle injury statistics); and (3) documents reporting other states' activities (report of Wisconsin driver education curriculum, vehicle codes of all the states, copies of implied consent forms from other jurisdictions).

Most keep up to date in their special field of interest by reading a few professional journals: AAMVA Bulletin, Journal of American Insurance, JAMA, Journal of Trauma, Medical Economics, Traffic Safety Digest. Most see and use Traffic Safety (and the research review). They seem to use personal contacts less for information than some of the other users, although this is still an important source.

Information is often not timely enough to help in making necessary decisions. At the level at which these gentlemen operate, decisions are likely to be important ones, and they often require good supporting evidence regarding other states' experience in the same area. Such reports are often not received in time (e.g., for this year's legislative session), but the lateness is more often caused by lack of knowledge about research projects or reports than it is by the mechanical delays of procuring the reports. In general, the higher the station of the individual the more concerned he is about "on-line" retrieval. Conversely, this individual usually wants summarized results and conclusions, rather than little pieces of data, or raw research reports.

These individuals generally produce summary reports concerning activities for which they have been responsible. In addition, they frequently help prepare legislation and serve as staff to the elected officials at the state level in getting together support material for legislative action. Technical reports, administrative memorandums, financial plans, and program planning documents are often actually produced by other people in their employ at slightly lower levels, although they may be signed by the officials.

When asked what single question they might address to an all-powerful information service, most wanted advice, or relatively deep evaluative answers to difficult questions. For example, one official would like to see a report on the status of scientific evidence supporting the standards promulgated by the secretary of transportation; one wanted all information which shows that driver education makes a difference; and one would like to know by what percent highway mortality could be reduced by an improved highway medical care program.

Specific suggestions for improvements include a national and regional clearinghouse for highway safety information; a more sophisticated indexing system; improved methods for dissemination; translations of foreign material (including some selective dissemination of same); better summaries of studies and better abstracts; newsletters restricted to the bare essentials to facilitate rapid assimilation of relevant information on current work in the field; directories of individuals engaged in highway safety work; compilations of laws relevant to the field; accessibility of documents in interdisciplinary areas; and better and speedier retrieval service.

9. POLICE OFFICIALS

Two police officials, with an average of 19 years experience, were interviewed. One was a department head at the state level, the other

performed a similar function in a city of 80,000 residents; both are entirely supported by tax moneys. They both considered that nearly all their time was spent in traffic safety activities; neither had made any use of microforms except for record-keeping.

Recent requests for information in the field of highway safety included (1) how serious is the motorcycle problem, locally and comparatively; (2) how can we get the most for the money in street lighting; (3) what kind of driver education programs are available for school bus drivers; (4) what are the federal and state standards regarding motorcycle helmets; and (5) can something be done to control the rent-a-car?

Professional journals read include the Journal of the International Association of Chiefs of Police; the International City Manager's Association series, and Traffic Quarterly. Regularly read are the IIHS Newsletter and the state traffic safety legislative newsletter. Traffic Safety is scanned regularly. Some use is made of the local library, and occasional requests have been directed to the Traffic Institute at Northwestern and the Institute of Traffic Engineers. Travelers Insurance Company literature, and National Safety Council books and posters are welcomed.

Information needed or requested is usually received in a timely fashion.

Output of senior police officials such as these is often in the form of radio and TV spot announcements, speeches to civic clubs, participation in safety conferences, and newspaper releases.

Their recent important requests include the following: (1) Provide us with information that the driver (or other factor) is more of a contributor to accidents than any other; (2) Is it the social

drinker or the alcoholic that is the greatest problem?

Items of particular interest--the city policeman wanted to see national accident data in a form that would permit him to compare his town's performance with other towns of similar population and structure. Both wished for a catalog of papers and films in highway safety.

10. DRIVER EDUCATION INSTRUCTORS

Interviews were conducted with both commercial and high-school driver education instructors, and also with the organizers of a truck driver training school taught in conjunction with junior college programs. Each of the people interviewed had been in the driver instruction field for more than five years, and considered their work to be directly related to the traffic safety problem. The commercial school was supported by fees, the high school teacher by local school taxes (plus a state subsidy for driver education), and the truck driving program was supported initially by a federal grant and later by a combination of state and student support.

None of these people had used microforms enough to form an opinion as to their usefulness.

Sources of information for driver education teachers include journals--Safety Magazine, Traffic Safety and newsletters from local driver education associations or the national association (ADTSEA division of NEA). There is often a mixture in the journals of material on driver safety and school safety. The teachers interviewed seldom used library services for printed material, but did draw upon film libraries for 16-mm sound films. Printed material for distribution to the class is more often obtained from the AAA, from various automobile and oil companies, and from other special groups (alcohol associations, etc.). AAA and NEA publish source lists indicating where school teachers can obtain free material simply by writing for

it. Abstract services in this field do not seem to exist except incidentally in connection with magazines or newsletters.

Most information requested is received in a timely fashion. One notable exception to this is borrowed or rented films, which often must be scheduled 4 to 6 months in advance. Larger high schools purchase films (cost is typically \$200 for a 20-minute 16 mm film with sound), but smaller schools must depend on rental sources or kind automotive manufacturers.

A particular problem seems to exist in the lack of a comprehensive source list for movies. Knowledge of the existence of films seems to come about in a sort of random fashion, and the few compilations which do exist go out of date quickly. One instructor felt that the films used in the Aetna and Allstate simulators were particularly good, and that they could be used without the simulator for classroom presentation if available. A few good strip films (with audio accompaniment) are available at modest cost, but these too have no central listing.

Cost appears to be a real problem in driver education programs. Most are operated with some state support, but the school cannot generally afford expensive rentals or purchases and tends to use free material whenever it can. Alcohol and drug education is often incorporated within the driver training program and several good free sources of information in this field are available.

There are many texts available for driver education, although the most popular seems to be Sportsmanlike Driving. There is no universally acceptable curriculum guide--some states have adopted one and promulgated it for guidance of instructors in the jurisdictions, but others simply require that a course be taught without providing much

guidance as to its content. Each teacher had some strong personal opinions as to what should be included in the curriculum, but none seemed to have any evidence to support his opinions.

Programmed learning materials are scarce in the driver education field, although a recent effort by the AAA has brought forth some. The U.S. Air Force has sponsored the development of a series of training films presented in a multi-media system which are well thought of, but not available to the general public or high school teacher.

APPENDIX B

HIGHWAY SAFETY/TRANSPORTATION LIBRARIES AND INFORMATION
CENTERS IN THE UNITED STATES

(Asterisks Indicate Libraries Visited)

Agricultural and Mechanical College of Texas
Texas Engineering Library
College Station, Texas

American Trucking Associations Library
Washington, D.C.

Arizona State Highway Department Library
Phoenix, Arizona

Automobile Club of Philadelphia Library
Philadelphia, Pennsylvania

Automobile Manufacturers Association Library
Detroit, Michigan

*Automotive Safety Foundation Library
Washington, D.C.

Borg-Warner Corporation
Roy C. Ingersoll Research Center Library
Des Plaines, Illinois

*Bureau of Public Roads Library
Washington, D.C.

*Bureau of Railway Economics Library
Association of American Railroads
Washington, D.C.

California State Department of Public Works Libraries
Sacramento, California

California (State) Division of Highways
Bridge Department Library
Sacramento, California

California (State) Division of Highways
Materials and Research Department Library
Sacramento, California

California (State) Division of Highways
Planning Library
Sacramento, California

Campbell-Ewald Company Library
Detroit, Michigan

Chrysler Corporation, Engineering Division
Engineering Library
Detroit, Michigan

Colorado Department of Highways Library
Denver, Colorado

Connecticut State Highway Department
Research and Development Division Research Library
Wethersfield, Connecticut

Dallas Public Library Science and Industry Department
Dallas, Texas

Delavan Manufacturing Company Engineering Library
West Des Moines, Iowa

Denver Public Library Sociology and Business Department
Denver, Colorado

Detroit Public Library, Automotive History Collection
Detroit, Michigan

Detroit Public Library, Science and Technology Department
Detroit, Michigan

Flint Public Library
Automotive Collection
Flint, Michigan

Florida State Road Department, Specification Office
Engineering Library
Tallahassee, Florida

Ford Motor Company Engineering Staff Technical Information Section
Engineering Library
Dearborn, Michigan

General Motors Corporation
Public Relations Library
New York, N. Y.

General Motors Corporation
Public Relations Staff Library
Detroit, Michigan

*General Motors Corporation
Research Laboratories Library
Warren, Michigan

General Motors Corporation, AC Spark Plug Division Research Library
Flint, Michigan

General Motors Corporation, Cadillac Motor Division Engineering Library
Cleveland, Ohio

General Motors Corporation, Chevrolet Motors Division
Engineering Center Library
Warren, Michigan

General Motors Corporation
Harrison Radiator Division Library
Lockport, N.Y.

General Motors Institute Library
Flint, Michigan

Georgia Institute of Technology
Price Gilbert Memorial Library
Atlanta, Georgia

Greater New York Safety Council Library
New York, N.Y.

Harvard University Library
Baker Library Transportation Room
Cambridge, Massachusetts

*Highway Research Board Library
Washington, D.C.

*Highway Research Information Service
Highway Research Board
Washington, D.C.

*Highway Safety Research Information Center
Highway Safety Research Institute
University of Michigan
Ann Arbor, Michigan

*Highway Traffic Safety Center
Michigan State University
East Lansing, Michigan

Illinois Division of Highways
Bureau of Research and Planning Engineering Library
Springfield, Illinois

Indiana University Business Library
Bloomington, Indiana

Institute of Traffic Engineers Library
Washington, D.C.

*Institute of Transportation and Traffic Engineering Library
University of California
Richmond, California

*Insurance Institute for Highway Safety Library
Washington, D.C.

*International Association of Chiefs of Police Library
Washington, D.C.

Interstate Commerce Commission Library
Washington, D.C.

Jam Handy Editorial Library
Detroit, Michigan

Kentucky (State) Department of Highways Library
Frankfort, Kentucky

Livingston Free Public Library
Livingston, N.J.

Long Island Automotive Museum
Automotive Research Service
Glen Cove, N.Y.

Louisiana (State) Department of Highways Library
Baton Rouge, Louisiana

Mack Trucks Research Department
Technical Information Service Library
Plainfield, New Jersey

Mississippi State Highway Department
Traffic & Planning Division Technical Center
Jackson, Mississippi

National Association of Motor Bus Owners Library
Washington, D.C.

National Auto and Truck Wreckers Association Library
San Mateo, California

National Automobile Dealers Association
Research and Legal Library
Washington, D.C.

National Highway Users Conference Library
Washington, D.C.

National Museum of Transport Reference Library
St. Louis, Missouri

National Professional Driver Education Association (NPDEA) Library
Chicago, Illinois

*National Safety Council Library
Chicago, Illinois

New Hampshire Department of Public Works and Highways Library
Concord, New Hampshire

New Mexico State Highway Department, Planning Division Library
Santa Fe, New Mexico

New York Public Library Science and Technology Division
New York, New York

New York State Department of Motor Vehicles Library
Albany, N. Y.

New York-New Jersey Transportation Agency Library
New York, N. Y.

*Northwestern University
Transportation Center Library
Evanston, Illinois

Ohio State University Aeronautical-Civil Engineering Library
Columbus, Ohio

Ohio State University Commerce Library
Columbus, Ohio

Oklahoma (State) Department of Highways
Technical Library
Oklahoma City, Oklahoma

Philadelphia Free Library
Philadelphia, Pennsylvania

Port of New York Authority
New York, N.Y.

Princeton University
Bureau of Urban Research Library
Princeton, New Jersey

Purdue University Library
Lafayette, Indiana

Ross Roy-B.S.F. and D. Library
Detroit, Michigan

*Safety Research Information Service
National Safety Council
Chicago, Illinois

Seattle Public Library Business and Economics Department
Seattle, Washington

South Dakota State Highway Commission
Research Division Library
Pierre, South Dakota

*Stanford University Library
Hopkins Transportation Library
Palo Alto, California

Suffolk Museum & Carriage House
Stony Brook, N. Y.

*System on Automotive Safety Information
General Motors Research Laboratories
Warren, Michigan

Transportation Association of America Library
Washington, D.C.

Tri-State Transportation Commission
New York, N.Y.

University of California
Bureau of Public Administration Library
Berkeley, California

University of Michigan
Transportation Library
Ann Arbor, Michigan

Utah State Road Commission, Department of Highways
Technical Library
Salt Lake City, Utah

West Virginia State Road Commission
Reference Library
Charleston, West Virginia

Yale University
Bureau of Highway Traffic Library and Transportation Library
New Haven, Connecticut

