

DEPARTMENT OF ECONOMICS, FINANCE AND ADMINISTRATION

Organizing a Continuing Agency for a Metropolitan Area Transportation Study

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This paper discusses the functions and staffing of a continuing agency to maintain the work and data of the Chicago Area Transportation Study, and details the activities and organization by description and charts. The activities are grouped into the three logical divisions of (a) inventory and data maintenance work, (b) staff work, and (c) research work.

Consideration of the functions to be performed in these three work divisions led to a functional grouping into six major divisions into which the position requirements for staffing are resolved. The following divisions and functions are included:

1. General Services — Administration, personnel, accounting, supply, housekeeping.
2. Data Processing — Computer programming, computing, E.A.M. key punch, tabulating, calculating, other.
3. Operations (Problem Solving) — Highway operational planning, transit operational planning, computer applications, other.
4. Graphics and Publishing — Drafting, design and layout, illustrations, multilithing, photo lab, library, publicity, technical editing, proof-reading.
5. Research — Urban traffic and planning, economic, land use, trip generation, trip assignment, fiscal, physical.
6. O-D Data Maintenance — Land use, population, transportation system, economic data, trip records, other.

• MORE THAN 100 American cities have conducted origin-and-destination studies since 1940. Most of these studies resulted in proposals for new expressways and arterial street improvements. Few of these proposals have been implemented. In many instances the area developed so rapidly that the data became outdated before plans could be developed. Some of these cities have completed a second O-D study; others are either conducting or laying plans for a second O-D study to

obtain up-to-date information for route planning.

Origin-and-destination studies are expensive, and it is impractical to conduct a full-scale survey every few years to keep data current for planning. Engineers and highway planners recognized that some method for updating and continually appraising these plans had to be devised. There was also a need for keeping these data alive and in productive use.

Early in 1957 the Policy Committee of the Chicago Area Transportation Study expressed its desire to continue the work of, and maintain the data collected by the Chicago Area Transportation Study. This continuing agency was to provide staff assistance to the city, county and state and was to carry forward a program of urban research in addition to maintaining and updating data collected in the original study.

The committee directed that this agency be set up within the Illinois Division of Highways and financed under an agreement similar to that made for the Chicago Area Transportation Study. This agreement provides that the federal government pay approximately 72 percent of the cost of the study, with the state paying 14 percent, and the City of Chicago and Cook County sharing the remaining 14 percent equally.

It was agreed that this continuing study would be called the Urban Research Section and that it would become a major section of the Bureau of Research and Planning, Illinois Division of Highways.

It was essential to determine the structure and establish positions early enough that the regular employees of the study could be encouraged to remain, thus preserving the experience they had gained with CATS.

The following sections of this report show the considerations involved in creating an organization to handle the work of a continuing transportation study. First, the mission of the agency will be described; then, it will be shown how the functions and activities were grouped to form the structure of the organization.

MISSION OF THE URBAN RESEARCH SECTION

The mission of the new Urban Research Section is made up of three main parts. These are inventory and data maintenance, staff work, and research.

Inventory and Data Maintenance Work

CATS collected, coded, and translated to cards and taped records a large quan-

tity of valuable data. To be useful this data must be updated and kept current.

Data inventoried by CATS which need continual updating include the land use inventory, the transportation facility inventory, population data, car ownership data, etc. One objective of CATS is to arrange these data so that an optimum updating procedure may be proved, tested, and detailed for the use of the continuing agency. In addition to the updating activities there is an important function involving the custody of the data. An accurate accounting control must be kept and the data maintained in an orderly fashion so that they can be referred to quickly and easily. Fulfillment of requests for reports, publications, and other information gathered by CATS is an aspect of the custodial function.

Staff Work

Staff work means working for the benefit of the decision-making agencies concerned with the construction, management and operation of transportation facilities in the area. Such staff work might take many forms, but would tend to be initiated by the cooperating agencies and applied toward operating decisions. The following paragraphs suggest specific examples of staff work which might logically be undertaken by a continuing agency.

Continual Revision and Testing of Transportation Plans. In keeping with the continuing agency's proposed function of updating, and keeping inventories current, it would seem logical that the agency assume responsibility for periodic appraisal and revision of transportation plans for the area. This might be the most valuable service provided by the continuing agency. Certainly, planning must be a continuing process if it is to succeed.

Priorities in Construction Programming for Transportation Facilities. A metropolitan transportation system cannot be built all at once. It must be built in stages simply because there is not enough money, manpower, or resources to construct immediately a system as

large as that envisioned for the Chicago area. There will be a definite need to determine construction priorities based on available data. Differences of opinion as to building of a 10-mi suburban expressway section or a 2-mi central business district expressway section might be resolved by considering assignments of updated traffic data to both proposals and comparing benefits and costs under each alternative. The continuing agency might readily make such comparisons, upon which realistic decisions could be based.

Advice for Arterial Street Planning. Many Chicago streets are inadequate for long trips and undoubtedly must be improved by widening, grade separating, or other treatment. Arterial streets must be built or enlarged to keep pace with suburban growth. These improvements call for skilled arterial street planning. The continuing agency would have data for estimating the number of trips made daily in the Chicago area. It would also have data concerning street spacing needs in the area. Such data might be combined to derive pertinent knowledge useful for arterial street planning. It might be possible to obtain such sufficiently detailed estimates of arterial street usage that public officials could be advised as to which streets would warrant removal of parking, better signal synchronization, or other immediate improvements.

Information Helpful in Route Planning in Large Urban Redevelopments. A difficult problem in urban redevelopment projects is to decide how many streets should be constructed, how many lanes provided, and what mass transit provision should be included for moving persons and vehicles into, out of, and through a particular redevelopment area. The capacity needs created by people living within the area, in addition to those created by persons making trips through the area, must be estimated. With the travel data available to the continuing agency, it would be possible to make fairly precise estimates of the capacity needs to serve both through and local traffic.

Feasibility of Mass Transit Proposals.

There may be numerous questions as to the feasibility of extended rapid transit service or changing stops or route locations of existing facilities. Information as to the number of riders, the revenue which might be expected, and other items of significance in making such changes, could be assembled from the data available to the continuing agency.

Benefits or Losses in Construction of Transportation Facilities. Benefit-cost ratios of different locations for planned projects might be calculated. These, of course, might vary, depending on what the units completed in the total plan and the existing levels of traffic demand. Not only might such ratios help to determine priorities and construction timing, as previously noted, but they might also be useful in developing public support for the plan.

Traffic Consequences of Suburban Developments. Factories, shopping centers, race tracks, outdoor theaters, new housing, etc., can have pronounced effects on local traffic. These developments have predictable water, gas, and sewer requirements, which must be determined before the new development can function. There should be equally accurate estimates of the traffic requirements. Upon completion of these developments, the continuing agency, might make traffic consequence studies, which should prove valuable in making estimates of the traffic requirements for future developments.

Study Reports for Sponsoring Agencies. Sponsoring agencies may need particular study reports for meetings, talks, presentations, and public information in general. This requires supporting staff work, which the continuing agency might best be equipped to perform.

Other Studies. Other studies might include proposed legislation affecting traffic and transportation, estimation of parking requirements, civilian defense, and other public problems.

Other instances could be suggested where agency staff work might be valuable in the solution of public problems. It is clear that the administrator today has to deal rapidly with a great many

complex problems in metropolitan planning. He is continually under pressure for decisions. To do his work well he needs increasing staff support. A continuing agency staff servicing the participating agencies could fulfill these needs.

Research

Some research projects might be generated by the staff work for participating agencies. Other projects might be generated by the staff members themselves and by other interested researchers. Such projects often lead to better understanding of and better solutions to practical traffic problems. The following general areas for research suggest only some of the many possibilities.

Traffic and Planning Research. Use of traffic counter data might include the development of methods for converting traffic counter records directly to computer storage, or the exploration of experimental uses of count data previously not computationally realistic; scientific assessment of the best locations and times for counts; testing of short count accuracy, determination of daily traffic variations on various facilities and a variety of land use areas. The exploration of count data to verify the accuracy of assignment techniques, or to expand origin-and-destination data, are further possibilities.

Traffic flow theory still requires much work before urban traffic flow is fully understood. Detailed studies of the flow patterns, speeds, spacing and peaking characteristics, as related to the kind of facility, time of day, and other variables, almost certainly would lead to a better understanding of traffic flow.

The construction and development of an analog network simulator might make it possible to do instantaneous assignment of traffic to facilities in the area.

An important research project might include analysis of measurable effects of changes in transportation facilities on land values and land use, and other economic and sociological characteristics. A continuing agency that has access to comprehensive land use and traffic data might answer questions related to such

changes quite readily, and furnish information valuable in planning, programming, preliminary engineering, design, operation and maintenance.

Studies to improve planning techniques might include detailed studies of land use and traffic generation, traffic forecasting, testing of assignment, and the development of better objective standards for urban transportation planning.

General Studies of Economics and Finance. This is a broad field which might include research in the following areas:

1. Economic activities and forecasts.
2. Benefit-cost analyses.
3. Direct and indirect cost of transportation facilities.
4. Financing transportation systems.
5. Fiscal ability for developing transportation systems.

Other Research Projects. Many traffic research projects can be attacked by so-called laboratory testing, permitting precise measurement of many urban traffic phenomena. Considerable research effort might be directed toward model building. By means of mathematical representation changes and adjustments in traffic flow can be examined at low cost. With accurate models, it is possible to predict the consequences of proposed policies or recommendations. Additional research effort might be directed to the study of public transportation policies. Administrators are becoming increasingly aware of the importance of public transportation in metropolitan areas. Its exact importance in the future role of urban transportation is a question which is not yet fully answered.

Obviously there are many areas of profitable research dealing with urban phenomena. Although the possibilities for research are too numerous to outline in full, a few projects have been mentioned to give some idea of the research potential of the organization.

DEVELOPMENT OF ORGANIZATIONAL STRUCTURE

Organizational Principles

Once the mission of an organization is known, the next step in developing the

organization is the grouping of similar functions into producing units. The essence of organization is proper grouping of functions and activities.

Several considerations are involved in determining the functional organization of a group. The first consideration is that of the formal grouping of functions, processes, people and machines which are similar or perform like kinds of work. The second is the recognition that there is an informal as well as a formal structure in any organization. The formal structure represents what management thinks is a desirable organization to achieve its mission. It sets the framework for the organization. But, because persons are involved and because of incompleteness and ambiguities in the formal prescribed relationships, an informal organization develops. The blending of the formal and informal relationships can spell success or failure of an organization. The third consideration is the "span of control." This refers to the number of units that report to the top and concerns the limits of an individual's ability to devote his attention simultaneously to a variety of different persons or activities. Much traditional theory of administration states that no top administrator should supervise more than five to seven unit chiefs.

It should also be emphasized that a grouping of functions or activities is not mutually exclusive. Of necessity there are some specialists in this continuing study. The work they do crosses boundaries of authority and responsibility of other units. Thus, the functionally created units are always closely interrelated.

Grouping of Functions and Activities

With these considerations in mind six groups were established (Fig. 1).

Operations. This is the group which is to handle the special staff work.

O-D Data Maintenance and Collection. This group is charged with the custody of and with maintaining and updating the data collected by CATS.

Research. This group is charged with initiating and carrying out the research work for the section.

The Urban Research Section will operate as a self-sustaining organization in its own quarters, thus three housekeeping and support groups are necessary.

General Services. This group is to provide the housekeeping functions of administration, personnel, payroll preparation, office management, etc.

Graphics and Publishing. This group is to be charged with the preparation of illustrations, drawings, map drafting, multilithing and publishing needed to support the operations and research group.

Data Processing. This group is to be staffed with personnel and machines required to process and summarize the data for operational problem solving, research work, and data maintenance.

Staffing the Organization

A minimum number of position levels was established in order to encourage delegation, speed of operation, quick communication, and development of subordinates who can accept responsibility.

Job descriptions were written for each job showing duties, responsibilities, and desirable qualifications. In all, 38 positions were established and allowance was made for a maximum of 50 persons. Through the cooperation of the Illinois Division of Highways and the State Department of Personnel the positions have been classified and salary levels determined. The transfer of personnel from CATS to the Urban Research Section began in August 1958. To date 28 persons have been transferred. Others will be transferred at regular intervals to accomplish a gradual transition from CATS to the Urban Research Section. This will be the first instance where experienced employees familiar with all the data collected in the initial study are retained on a permanent basis. The importance of carrying over persons familiar with the way the original data were collected and processed cannot be overemphasized.

The original CATS was geared to a continuing study operation. Many of the data were collected and the inventories were designed with an eye toward a continual updating and renewal. Because of this feature some research projects have

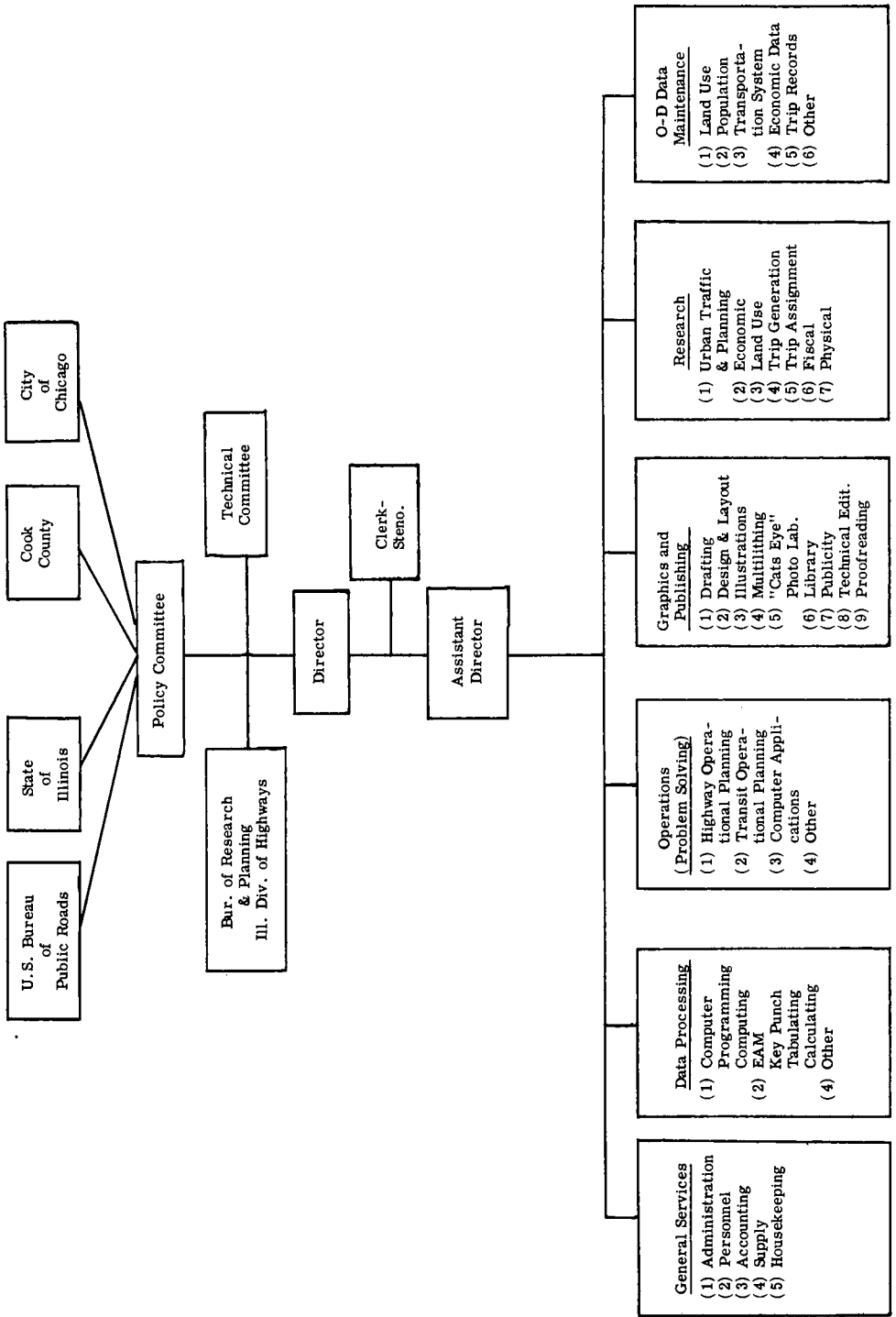


Figure 1. Functional structure of the Urban Research Section, Illinois Division of Highways.

been deferred to be worked on as projects of the continuing agency. Ideas for continued research are being reviewed and stored for future projects.

Supervision of the Organization

Figure 1 shows the complete functional structure of the Urban Research Section, illustrating the lines of authority and responsibility. This structure is unusual in that it shows a triple authority over the Urban Research Section—the Policy Committee, the Technical Committee, and the Bureau of Research and Planning of the Division of Highways. This raises a question as to authority and control of the Section.

The Urban Research Section is part of the Bureau of Research and Planning. As such it is responsible to the Engineer of Research and Planning, as are the other sections in this Bureau. CATS was responsible to the Policy Committee. CATS had its own budget appropriated for its use, and the core staff was on a contractual basis. The other employees were state employees. The housekeeping (accounting, personnel, etc.) was monitored by the Bureau of Research and Planning.

The Bureau of Research and Planning will now have a more definite authoritative role. All persons will be employees of the state and the budget for the Section will become part of the larger budget of the Bureau of Research and Planning.

In addition to its responsibility to the Engineer of Research and Planning, the Section will still be responsible to the Policy Committee. This represents a hazard of having divided authority which will be tested "under fire." To date there have been no conflicts due to this structure. This is probably due to a history of cooperative intergovernmental activities in the Chicago Area. The force of common interest will do much to overcome the weaknesses which might develop.

The Policy Committee and Technical Committee are carry-overs from the original CATS organization. Each performs a separate function. The Policy Committee, composed of the Chief Highway En-

gineer of the Illinois Division of Highways, the Superintendent of Highways for Cook County, the Commissioner of Public Works for the City of Chicago, and the Division Engineer of the Bureau of Public Roads, makes major policy decisions for the agency. For example, it decides how financing will be arranged, what the geographical jurisdiction will be, what kind of work will be undertaken, who the director will be, and other problems of this nature. This group meets about once every six months.

The Technical Committee operates on a more frequent and informal basis. This group provides close technical liaison between the participating agencies and the continuing agency and is kept informed on general progress and the status of specific research problems. In addition, technical problems are brought up and discussed with this group, an exchange which is helpful in crystallizing ideas. The group meets whenever there is a particular problem needing its attention—usually every six to eight weeks.

Both of these committees serve a useful and different purpose. Both are vital to a properly functioning productive unit. One of the greatest values of having these groups is the close liaison created between highway interests in governmental agencies, a liaison that certainly stimulates intergovernmental agreement and cooperation.

SUMMARY

This paper has pointed out the reason for creating a self-sustaining Continuing Transportation Research Agency in the Chicago Area. It has shown what the mission of the agency will be and what services it can perform. The grouping of functions and activities leading to the creation of the formal organizational structure has been explained. A few of the possible pitfalls have been explored.

The principal point in this paper is that this agency was created to carry forward urban transportation research and to keep alive the data already collected by applying it to everyday planning and

transportation problems. This would not have been possible without the creation of the Urban Research Section.

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