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1974 NATIONAL TRANSPORTATION STUDY

WORKING/DISCUSSION PAPER NO. 1

DEFINITION AND ANALYSIS OF
ALTERNATIVE TRANSPORTATION PROGRAM STRUCTURES

STATE OF MICHIGAN

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1.0 DEFINITION AND ANALYSIS OF ALTERNATIVES

1.1 INTRODUCTION

The purpose of this paper is to diagram options available for alternative program structures for the PBES transportation program for review and discussion by the NTS Coordinating Committee, State Agencies, and the Bureau of Programs and Budget.

The alternatives developed include consideration of the hierarchial stratification of the transportation program structure from the major program level to the element level; program measures including impact indicators, element outputs and element need/demand estimators; and representative goals and objective statements for consideration by the NTS Coordinating Committee. Program measures are presented here as a mixture of generic classes and measures and will be subject to further refinement during the course of this study.

Alternatives have been examined in terms of their utility as a framework for program evaluation as well as their framework for program budget cost assignment/allocation and their implications with respect to conceptual, operational and policy issues.

It has become evident through the course of this study that there are several levels of PBES transportation structure refinement which must be considered. At the first level are refinements which can be immediately implemented, and utilize currently available data. Far more significant, however, in terms of the overall objectives of PBES, are refinements which

will require substantial commitment to the collection and analysis of relevant data. It is through these refinements that PBES would seem to offer the greatest opportunities to enhance the decision making process, particularly with respect to the identification and presentation of relevant program information to concerned decision makers and the development of more systematic analysis and evaluation tools. It is likely that this process of refinement will span many years, and thus considerable attention has been given during the course of this study to implications relevant to possible future transportation program structure development.

Many conclusions and recommendations based upon previous study tasks are made with respect to the transportation program structure within this paper in the process of reducing the problem of defining and analyzing alternatives to a manageable size. These conclusions themselves are far less important than the process by which they were reached. A major objective of this paper is to clearly define what PBES can and cannot do with respect to transportation decision making.

1.2 APPROACH TO ALTERNATIVE STRUCTURE DEFINITION AND ANALYSIS

Initial attempts to define and analyze alternative PBES transportation structures were focused upon the development of alternatives at the program, sub-program and category levels. Subsequently, these alternatives were synthesized into a number of different possible structural combinations which seemed likely candidates for further analysis.

The structural alternatives considered were hypothesized from a wide variety of sources including 1) the current transportation program structure, 2) structures obtained as a result of a review of the transportation program structures in other states which have a program budgeting system, 3) notes and other documentation resulting from discussions and interviews with executives responsible for a wide spectrum of the activities of the State Department of Highways and Transportation, including those responsible for the overall planning function, advanced planning, urban planning, environmental impact analysis, urban mass transit, ports development and railroads, 4) structures which had been previously proposed for the transportation program in Michigan and rejected for one reason or another, and 5) "original" structures.

It soon became apparent that the number of possible combinations of structural alternatives which seemed to exhibit a basic cohesion was almost infinite. Thus it was necessary to develop a filtering process which reduced this to a manageable set of alternatives with which to work. The mechanism used for this "filtering" consisted of a careful definition of constraints which had been identified on the structure which have been either defined or implied by results of the conclusions of the first three tasks of this study. The necessity of carefully defining other constraints

and considerations relative to the structure stemming from the basic characteristics of transportation facility development and operation was also recognized.

The development and definition of these constraints resulted in a preliminary definition of certain features of the structure as well as guidelines on preferred structural stratification and these allowed a consolidated set of eleven alternatives to be developed for further analysis.

Evaluation criteria were then developed which provided the basic frame of reference and decision rules for consideration of the consequences and implications of each alternative. These evaluation criteria provided a means of focusing the attention of the analysis on the most significant considerations, and allowed for later refinement of the details of the structure.

As a consequence of the definition of constraints on the structure and evaluation criteria, it became clear that there were several considerations which overwhelmingly would indicate the nature of the framework in terms of program, program category, sub-category and element definitions.

Program measures, including impact indicators, outputs and need/demand estimator alternatives were developed by a "shopping list" approach from all sources previously mentioned plus the data element requirements for the 1974 National Transportation Study. These generic program measures should not be considered as fixed or final. However, as will be discussed later, they should be considered as alternatives to be discussed and considered by the State Department of Highways and Transportation and the NTS Coordinating Committee.

1.3 BASIC PBES TRANSPORTATION PROGRAM CONSIDERATION

The first consideration in any analysis is a careful definition of the problem. The definition and subsequent analysis of alternative structures for the Michigan Transportation and Communication Program is a multi-dimensional program with an almost endless number of possibilities, requiring consideration of many subtle but important implications of any alternative considered. This definition and analysis performed must be in the framework of the recognition of the purpose which the program structure itself is intended to serve.

Levels of Analysis

The major function of the PBES structure is to provide a program budgeting and program evaluation process through which decisions on the allocation of state funds can be more clearly identified with the impacts which will accrue to people, the environment and other institutions. This approach clearly will result in more rational and better decisions. There are several ways a cohesive PBES structure can contribute to the achievement of this goal from the evaluation standpoint.

At the "ideal" level one can, at least theoretically, envision a process whereby all potential impacts could be quantified, with commensurate units of measure (dollars, utils, etc.), and mathematical transforms developed which would quantify interrelationships between resource expenditures and impacts. Resource allocation to activities would then be made on the basis of that combination of inputs which resulted in the highest social benefit output level. This is clearly not presently, and possibly never,

an attainable goal because of the inherent inability of defining an acceptable single unit of measurement which would measure, for example, both the social disbenefits associated with transportation facilities and the economic benefits of a highway improvement project.

Recognizing this problem, the next level of analysis which would be postulated as being important to the decision making process would consist of a linkage (or mathematical transform) between resource allocation to an activity and the change in some surrogate measure (i.e., an impact indicator) for social or economic benefits or disbenefits, such as transportation fatalities. Trade-offs between these factors would be a subjective process, based upon values of society and the decision makers. In our society "standards" often play this role by prescribing maximum levels of impacts tolerable, i.e., air quality standards promulgated by the Environmental Protection Agency. For some expenditures, the quantitative definition of the output/impact relationship is an achievable objective with currently available data; for some transforms, data could be readily collected; others would require a massive study effort to collect and analyze requisite data; still others are not amenable to quantification at all. The latter category would include all benefits (or disbenefits) which accrued differently to various socio-economic strata of the population. These impacts are by their very nature subjective, and thus not amenable to quantification.

A third level view of the program evaluation and analysis process would be one which advocates the proposition that even though data is not available with which analytical linkages can be established between expenditures and impacts, or even though the measures chosen may be somewhat

subjective, the greater the amount of relevant information which is brought to bear on the decision making process the higher the probability that better and more rational decisions will result.

Starting from a base of very little information on which to base decisions, marginal benefits to be obtained from small increases in information available can be very significant. If some cause-effect transforms can be derived from available data, so much the better from a decision making standpoint.

It has become clear during the course of this study that the latter view of possibilities for enhancement and refinement of PBES represent the only realistic expectation from this study effort. Where possible, information requirements have been scoped with a view toward the future when more comprehensive assessment tools will be available (for example, a Michigan Regional Input/Output Model for analysis of economic impacts).

The problem of the definition and analysis of alternatives was thus focused on scoping what information is relevant to bring to bear on the decision making process and developing a program structure which provides a logical interrelationship between these levels of information. The structure itself should be stratified in a manner to provide a large incremental amount of relevant information through the cost assignment/allocation process by displaying the level of effort, in terms of dollar and people resources, which are to be brought to bear on problems and issues of state concern. The structure must thus provide a framework for focusing the attention of this cost assignment on a stratification which parallels the hierarchy of policy responses to important transportation issues and problems.

Transportation System/Socio-Economic Conditions Interrelationships

Another important conceptual consideration in the definition of alternative structures must be the recognition that transportation systems are not an "end" in and of themselves, but are rather a means of accomplishing other social and economic objectives. This observation has three immediate and important implications. First of all, ultimate impacts are probably not to be gleaned even through massive data collection and analysis efforts. For example, the availability of port facilities will provide a basic economic viability to the location of certain types of industries in the State. These industries will be predominantly those which use as inputs, or process, commodities or raw materials with a low cost per ton. One must consider seriously whether or not the expansion of these industries is to be encouraged or discouraged from the standpoint of the contribution of the relationship of these types of industry to the social, economic and environmental climate of the state.

The second implication of this observation is that the resulting transportation program structure, if defined properly, will necessarily have vastly different characteristics than the program structure for a program such as protection of persons and property, where the "end" objective of reduction in crime may be unambiguously defined, quantified, is not controversial and progress toward achieving the objective can be measured. This difference is clearly pointed out by the impasse resulting from previous efforts by State agencies, the NTS Coordinating Committee and the Bureau of Programs and Budget to define and agree upon transportation objective statements and impact indicators.

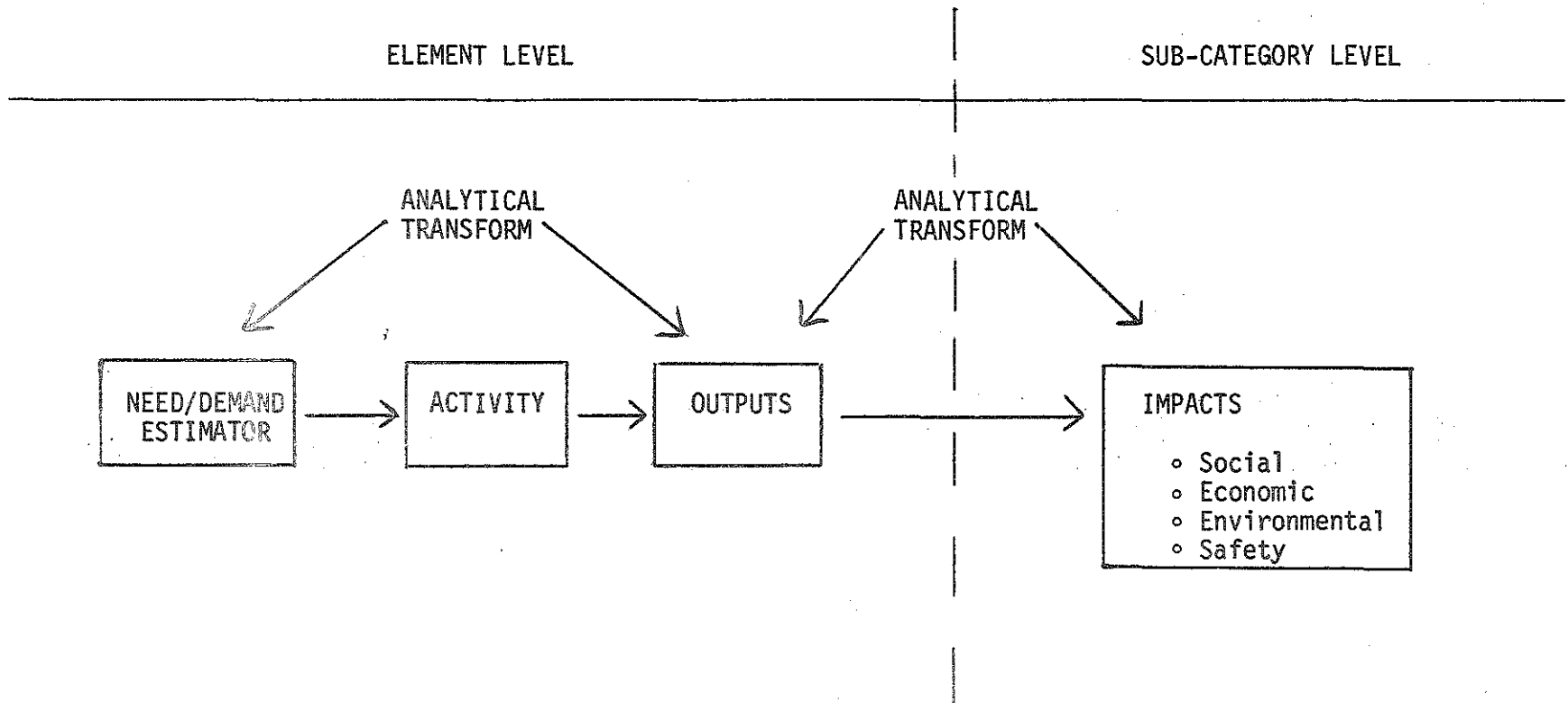
The reason for the importance in distinction is that cause-effect relationships between a transportation system and socio-economic parameters are not unilateral; they are interactive and bilateral.

Examples of this bilateral interaction are endless. High population density in an urban area necessitates some form of mass transit; implementation of a mass transit system will tend to encourage still greater population density. A highly interconnected interurban highway system is necessary for existing industry to retain its competitive advantage vis-a-vis similar industries in other states; the development of this interconnected network will allow new industries to achieve a competitive economic advantage and will thus locate along the system; these new industries in turn place additional demands on the system necessitating further development, etc., etc.

The implications of these observations on PBES for the transportation program are quite clear. First of all, because of the bilateral interaction between the transportation system and the economy and the interaction between the transportation system and social well being, the unidirectional analytical framework of PBES, as shown in Figure 3-1, may present a considerably less than complete picture of social and economic impacts of the State's transportation system. This would seem to be an oversight in the development of the "principles and logic" of PBES. As we shall see, however, this drawback should not significantly diminish the utility of PBES to improve the transportation resource allocation/decision making process. It does, however, imply that the concept of impact "targets" is not relevant to social and economic objectives for transportation. It is relevant to safety and environmental impacts, however, as discussed in Section 1.8.3.

FIGURE 3-1

PBES ANALYTICAL RELATIONSHIPS

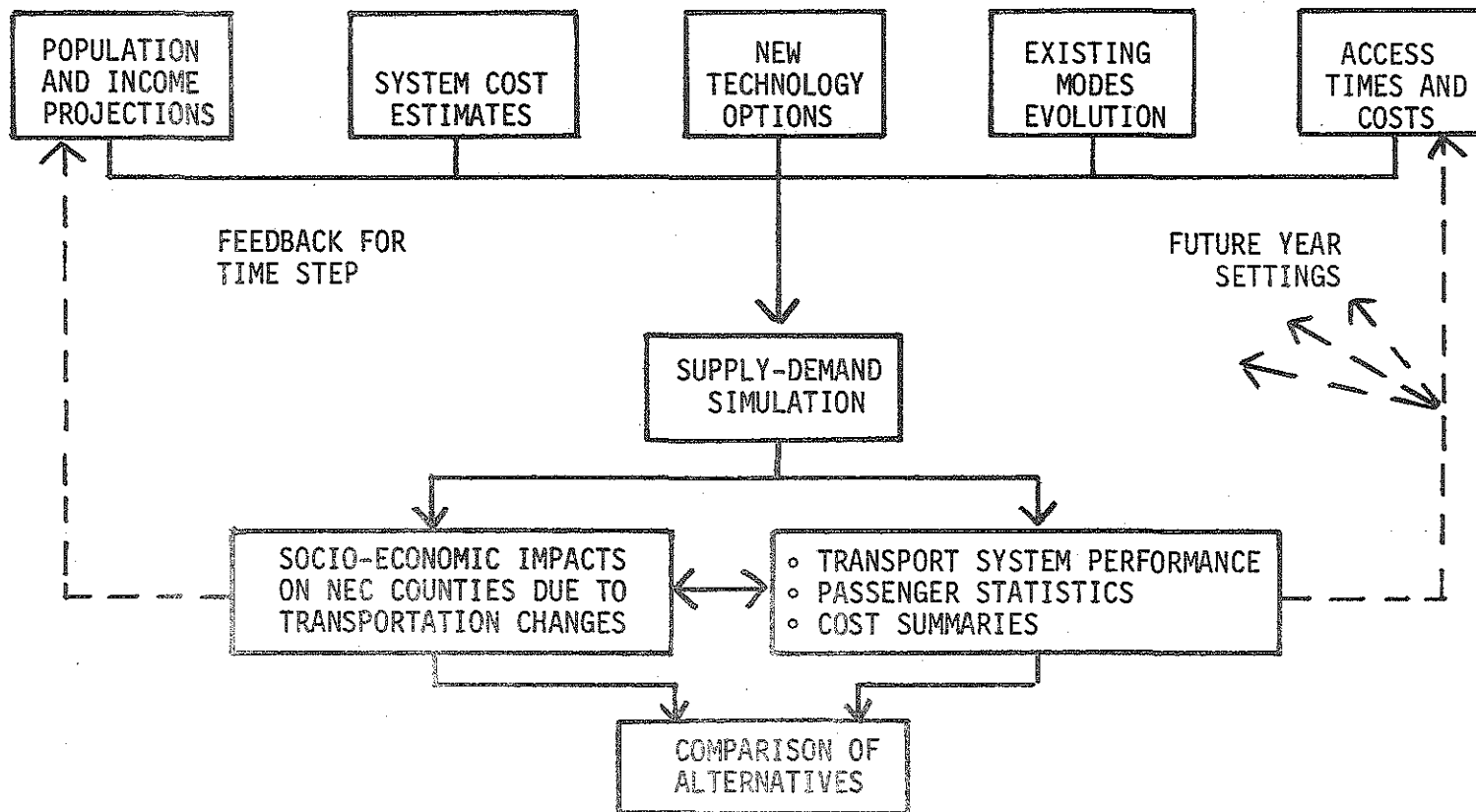


To the extent meaningful social and economic impact indicators can be defined, they have been in the course of this study although they really reflect surrogates for true impacts. The mutual interactions are clearly only accessible through closed loop modelling of a transportation system. A large multi-million dollar study effort which resulted in such a closed loop model system was developed as a part of the U. S. Department of Transportation's Northeast Corridor Transportation Project. The basic framework for such an evaluation is shown in Figure 3-2.

The basic process modelled considers the demand for transportation to be based upon trip origin destination attractions stratified by trip purpose. A number of mode-free attributes such as trip time, trip cost and frequency of service is used to define modal split of these trips based upon measured demand elasticities. A mathematical demand model projects this demand, in terms of number of passenger trips or freight tonnage based upon a given transportation system configuration physical and operation characteristics. Resulting economic and social impacts resulting from the spatial distribution of trip origin-destination/trip purpose stratifications are hypothesized and changes in these socio-economic indicators projected. These resulting changes create different levels of demand on the transportation system. An equilibrium, in terms of mathematical and economic convergence of the iterative process is eventually reached, which would represent the state of the social and economic conditions indirectly as of a given point in time. Clearly such a comprehensive analysis tool will not be developed for the Michigan transportation structure overnight. Thus a high degree of emphasis is placed in this report on the acquisition and display of relevant information with which the bilateral interaction can be approximated for the transportation program.

FIGURE 3-2

EXAMPLE CLOSED LOOP INTERACTIVE MODEL SYSTEM SIMULATION FRAMEWORK



This bilateral interaction is not the case with respect to environmental and safety impacts, however. Here, State personnel found it fairly easy to identify impact indicators, although there was no general agreement on specific subcategory impact indicators for different reasons - the inability to agree on appropriate units of measure. This aspect is discussed in Section 1.8.3.

The third important implication of this observation is that evaluation of the transportation program effectiveness and impacts cannot be neatly separated from the analysis and evaluation of the transportation planning process. The "ends" involved are considered in a planning process which explicitly or implicitly articulates social and economic goals and objectives and considers the bilateral interrelationships between the transportation system and regional social and economic characteristics. A transportation system is placed in this scenario in order to provide a mechanism for the achievement of these goals. Thus, miles of highway to be constructed, or number of buses to be acquired might represent legitimate surrogates for transportation program objectives if these objectives have been defined as an outgrowth of a truly comprehensive planning process. To the extent that the NTS can consolidate the results of such planning processes, as constrained by program funding realities, transportation program objectives could be tied to measures of progress toward completion of Michigan's 1980 Program. It would seem clear that this would be a long-term goal and probably not practical or meaningful during the 1974 NTS.

It is impossible to view structural alternatives without reference to their resource allocation implications, and their implication on the quantity and quality of information which they make available to the executive and

legislative decision making and review process. As discussed, in the short run, it is in this area that perhaps the greatest gains are to be realized, with comprehensive explicable allocation procedures based on impact trade-offs to come perhaps years later as information base and analytical procedures are developed.

1.4 TRANSPORTATION PROGRAM STRUCTURE CONSTRAINTS

The first three tasks of this study constituted 1) a review of Michigan's resource allocation decision making process in terms of: participants in the process and their roles; funding sources and constraints; legislative and institutional factors; state, local, regional and federal government roles and linkages; and the identification of potential changes in these factors; 2) an assessment of the applicability of available resource allocation techniques and methodologies to the analyzation of cost/impact interrelationships at the aggregate level of state planning and programming; 3) an assessment of transportation program structures in other states; and 4) a review of the current PBES structure in terms of the definition of conceptually and operationally valid outputs and impact indicators which reflect a funding/impact relationship controllable by the concerned agency, as well as modal trade-off implications of resulting generic classes of element outputs and impact indicators.

The results of performing these tasks provided much valuable information which provided basic considerations for the transportation program structure alternatives and constraints on the refinement of the structure.

Perhaps the most significant conclusion of these tasks is the observation that the revised program structure should be modal at some level in the hierarchy. A wide variety of considerations has led to this conclusion. The primary consideration which leads one to this conclusion is derived from the fact that transportation is a means to achieving broader social and economic objectives and not an end in itself. Thus with transportation the most important stratification is probably based on considerations related to trip purpose and interzonal trip origin/destination.

Alternatives cannot be defined and evaluated without reference to modal characteristics. Given a transportation mode with these travel demands specified, modal choice is a function of parameters such as travel time, frequency of service, trip cost, and the amenities of the system. These factors are pre-defined by the physical attributes of the vehicle and guideway for each mode. Thus, each mode competes with each other mode from the standpoint of its economic and service attributes.

A second consideration which supports this conclusion is the fact that transportation systems have traditionally developed along modally oriented lines. State government transportation functions are, at some level in the structure, modally oriented. Perhaps a major contributing factor here is the fact that Federal government funding plays a large role in transportation system development in the United States. Federal Funding programs have always been modally oriented in terms of restrictions on their use and probably will continue to be so, at least for the next few years. Federal-Aid-Highway Acts have distributed funds, primarily on a formula basis, from the highway trust fund to states for use on highway projects. The 1972-1973 Act may allow the use of a portion of these funds for certain mass transit uses, but nevertheless the mass transit portion will not be available for use in a port facility improvement project. Similarly the Airport and Airway Development Act, the Urban Mass Transit Act, etc. restrict the use of funds to modal uses. Current State transportation legislation and funding is also modally oriented. Act 51, as modified, places very clear highway use restrictions on the use of the 8 1/2¢ gas tax, and an urban mass transit orientation on the use of the remaining 1/2¢.

Another consideration is the fact that the state government's role is different for different modes. With highways, the state has a legislated role oriented to providing highways and highway related services. With Mass Transit, the state government's role is limited to providing funding and planning assistance to regional agencies. The role in Aeronautics encompasses elements of both of these. With ports, railroads, and pipelines, the role of the state government is oriented toward promotion of investments for system improvement by the private sector to enhance state objectives, as well as regulation to protect the public interest. This would lead one to the conclusion that transportation should be oriented to State Function at some level in the stratification in order to accomodate these variations in state government roles.

A final consideration indicating a modal orientation of the program structure is the modal orientation of transportation planning processes. Because of the different physical characteristics of the modes and because of the limited number of choices for modal trade-offs for given origin-destination/trip purpose desires (i.e., urban highways vs urban mass transit) as economically viable alternatives (i.e., rail for cross country passenger trips does not, in most cases, present an economically viable alternative to air travel), existing transportation planning has an overwhelmingly modal orientation. Changes are occurring in this area, as evidenced by the DOT unified work program, the FHWA action plan process and potential reorganization of the State Department of Highways and Transportation. But in all cases, alternatives to be examined in the planning process must have definitive modal characteristics.

Another attribute of the refined transportation program which would appear desirable based upon the initial task results is that a geographic distinction be included, i.e., urban vs rural vs interurban transportation. Consideration in reaching this conclusion would include the fact, again, that this represents a major stratification by trip purpose and trip origin destination. Consequently, these geographic distinctions allow comparison of modal and network alternatives most directly.

Federal Government funding programs and research and development activities are oriented to an urban/rural/interurban distinction in recognition of the different travel needs by geographic area and trip purpose. Examples of this orientation include UMTA activities, the separation of highway funds by urban system, interstate and other categories, and FAA airport funding distinctions between general aviation and air carrier airports serving urban areas. The 1972 NTS results clearly pointed out great differences in transportation needs between urban, rural and interurban travel.

Another distinction which should be clearly reflected in the stratification of the transportation program structure is the explicit disaggregation of transportation system maintenance vs improvement vs new construction. A review of the 1972 NTS results clearly reveals that the State has a huge capital investment in its in-place transportation facilities and structures. The maintenance of this capital stock is clearly a first order priority in the allocation of transportation resources. The only remaining resource allocation question is the mechanism whereby, at the project level, maintenance standards are set with respect to safety and other considerations. These would seem to be very minimal social and economic impacts associated

with system maintenance, although safety and environmental considerations are relevant.

Transportation system improvements must necessarily result in economic and social impacts if there was any rationale to the improvements in the first place. These improvements, for all modes, must somehow be related to considerations of improved service (i.e., capacity improvements), safety or to correct structural deficiencies. PBES could here best be oriented toward the analysis of the relationship between resources expended and resulting incremental safety or service improvements.

Finally, the major impacts which are controllable result from new construction activity. Promotion of the understanding of new construction impacts via the collection, display and analysis of relevant data is probably the greatest contribution PBES can make with respect to improvement of the transportation resource allocation decision making process.

Consideration of the impacts of new construction impacts, however, must start with the evaluation of the planning process which led up to the construction activity. It is at this point, and only at this point, in the decision making process, where a significant degree of control over social, economic, environmental and safety impacts is a viable option. Figure 4-1 shows diagrammatically this sequence of activities. The flow depicted here is clearly unilateral. You cannot budget funds for a project unless you have a plan which has been costed out. Once having implemented the project, you cannot go back and replan it. You are constrained at this point by the consequences of the plans in terms of its entire ensemble of impacts.

PLANNING/IMPLEMENTATION SEQUENCE



FIGURE 4-1

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This observation has still further consequences to the PBES structure. Figure 4-2 depicts the transportation planning process for public transportation facilities diagrammatically. Most transportation planning processes are characterized by a long lead time, perhaps eight or more years, between the planning of a transportation system and its implementation, and thus a PBES planning horizon must be considerably extended from a "next fiscal year" look at the budget.

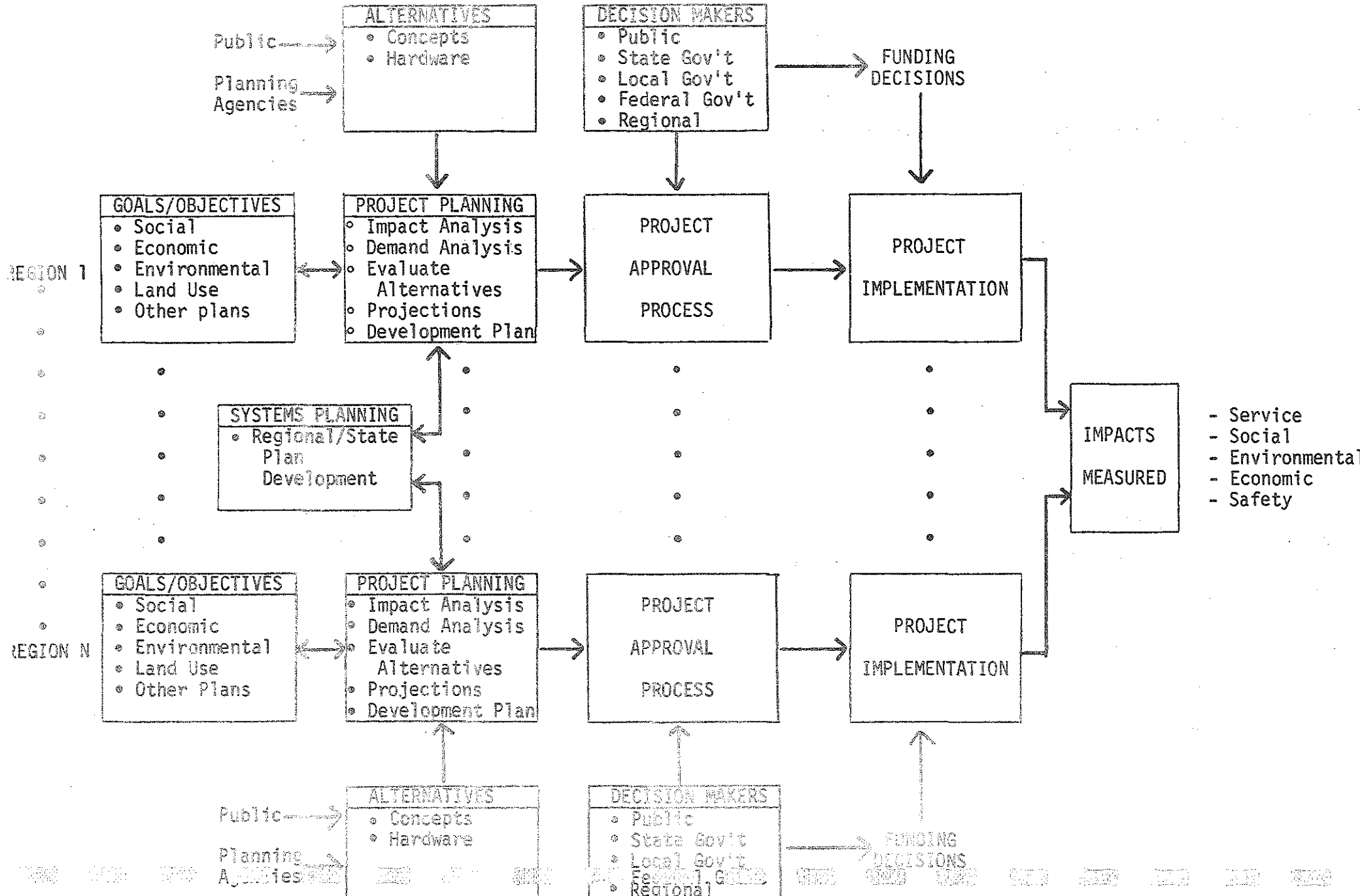
The process by which the decisions are reached also bears upon the characteristics and constraints of a desirable transportation structure. First of all, the program structure should clearly be based on a separation of responsibility and accountability. This requires a careful analysis of current state government functions coupled with an analysis of decision makers, and their roles, in the transportation system planning process.

As Figure 4-2 shows, the transportation planning process begins with a consideration of the goals and objectives of the region or state. This figure is reflective of the planning of transportation systems for public needs.

These objectives are explicitly or implicitly articulated with respect to the broad spectrum of regional and state socio-economic goals and objectives. These goals and objectives may be considerably different from region to region depending on the socio-economic characteristics of the region. Thus, decisions which are best for one region are not necessarily best for another. Another feature depicted by this diagram is the interaction between the transportation system planning and project planning functions. For highway and airport system planning, the role of this interaction is two-fold. First of all, it provides a mechanism for the consideration of Michigan economic development and social well-

FIGURE 4-2

TRANSPORTATION SYSTEM DEVELOPMENT OVERVIEW



being goals and objectives. Secondly, it insures that an orderly state-wide development process can be maintained which provides interregional linkages.

Another characteristic of this planning process is that there is no unified, cohesive set of decision makers. Technical advice on social, environmental, economic and safety aspects of proposed alternatives is often supplied by state agencies, but the evaluation and trade-offs between proposed alternatives, which specified and defined ultimate impacts, is performed by a wide variety of decision makers, including the public, elected officials, planning agency personnel, state agency personnel, legislative bodies, etc. Thus, since better planning results in better decisions, the PBES structure should focus considerable attention on the transportation planning function.

Rail, port and other cargo facilities improvements and construction decisions are made by corporations or individuals based upon their assessment of the economic viability of the proposed project. Other than approval role, the State has virtually no role in these decisions at all, and they must react. This is especially true with respect to rail abandonment plans, etc.

Still another important stratification which should be made in the program structure is the distinction between cargo movement and people movement. In many cases, transportation facilities are jointly used by both, which presents many problems from an analytical standpoint. Nevertheless, cargo movement is vital to the state industry and inter-industry economic relationships, whereas people movement is related to objectives more closely aligned with social well-being. The service levels available for cargo movement in terms of capacity, shipping time, shipping cost, frequency of service, etc. are important considerations here.

As a final, and very important observation with respect to the refinement of the program structure, the structure should provide a clear means of identifying how things should be, not how they are. Thus, the focus of attention should be upon transportation related functions which are necessary to the achievement of the overall objective without regard to whether these functions are currently being performed or studied by any state agency. For example, program measures with respect to the economic impact of railroad abandonment would seem to be useful in the decision making process even though Michigan's current role with respect to railroads is a predominantly regulatory one. The presentation and dissemination of this information will tend to focus attention on the magnitude of the problem and possible policy options.

A final consideration in the definition and analysis of alternatives is the inherent disparity and misalignment between programs and organizations. The state government is organized partially by function and partially by program in a quasi "matrix" type organization. At the current time, the organizational structure of the State Department of Highways and Transportation is not totally definitized. However, it is recognized that an organizational alignment at some level in the transportation program structure is an important consideration, and perhaps constraint which could transcend "analytical" justification of the structure.

It was recognized in this study, as a conclusion of the review of other states transportation program structures, that compatibility with current accounting structures and systems, including the basic chart of accounts, is an important consideration. The Bureau of Programs and Budget have indicated a desire to prefer organizational alignments at some point in the structure in order to relieve the necessity for a budget "crosswalk."

In addition, other considerations included in the guidelines issued by the Bureau of Programs and Budget were considered as constraints on the structure. These program plan refinement guidelines, issued in May, 1973, are included here for the sake of completeness:

1. Each element should have organizational integrity. That is, it should equate to a sub-departmental organization unit having a single effective management head and be subject to direct cost assignment.
2. Each element should permit direct cost assignment to an appropriation unit on a one to one basis or on the basis of an aggregation of whole appropriation units or a dissaggregation of one appropriation unit.
3. Elements must have clearly defined cost sensitive primary output or workload measures which uniquely express leading work products or workload contributions.
4. Where elements, because of their functional complexity, give evidence of cost sensitive secondary output or workload measures which in turn generate primary output or workload measures. Sub-elements should be established in accordance with guideline 1.
5. Where elements functionally cross institutional boundaries, sub-elements representing individual institutions should be established together with cost sensitive output and workload measures.
6. Sub-category impact indicators should be of two types - one, indicators which are highly sensitive to all sub-category element output or workload measures, and two, indicators which are sensitive to relevant external variables.

7. Categories should be assigned objectives and impact indicators which logically address the ultimate purpose and measure of the combined effect of sub-category programs.
8. While there is no ceiling on the number of program measures which can be identified, the fewer the better from the standpoint of program analysis.

1.5 PROGRAM MEASURES

Quantifiable program measures which have been defined include generic classes of impact indicators, output measures, and need/demand estimators. These measures have been defined without regard to data availability. These program measures are defined in subsequent sections of this report at their level in the proposed structure. It is clearly recognized that the alternatives presented do not include a totally exhaustive list of all possibilities, but hopefully major program considerations have been included in the measures to be considered. These measures should not be considered as final, or the ultimate achievable. Some refinement of these measures should be possible through the 1974 NTS, and refinement should be considered an on-going process. Questions relating to desirable units of measure are also addressed.

Throughout this study definitions of program measures have been referenced to impact indicator, output measure, need/demand estimator, definitions contained in PBES memorandum 71-13. These definitions are:

Impact Indicator - A quantitative expression of the objective statement; a measure which describes the effect programs have upon individuals, the environment, or other institutions.

Output Measure - Quantifiable units produced as a result of activities carried out at the element level.

Need/Demand Estimator - A quantitative measure of the magnitude of a problem which is related to the required size of an element's output production in response to that problem.

1.6 DATA CONSIDERATIONS

Data availability must form an important consideration in the selection of final program measures. Some compromise between the Bureau of Programs and Budget and the State Department of Highway and Transportation will be necessary to achieve a workable cost assignment procedure and program measures.

As has been previously discussed, a comprehensive assessment of data availability was clearly beyond the scope of this study. Many of the program measures selected will be available as an output of the 1974 NTS. Others will require varying degrees of effort required to collect, aggregate and analyze data.

Careful study may be necessary, in some cases, to weigh the cost of collection of requisite data against its utility for inclusion in PBES. Again, the 1974 NTS Coordinating Committee should provide a mechanism for consideration of these issues.

Another consideration with respect to program measure data will include the degree of sensitivity associated with the data, as well as the credibility. Highly credible data items would include number of miles of state trunkline, number of airports, etc.

Data which involves professional judgement and aggregation of more granular data is considerably more subjective in nature. An example of this would be peak time travel speeds for urban highways. At still another level is data which has been estimated solely on the basis of professional judgement and opinion. An example of this would be rail abandonment plans for Michigan. At the far extreme of the spectrum would be data which would

require a massive study effort, and still be based in part on subjective factors.

No consideration has been given in this study to the definition of a more dynamic presentation of data in terms of the use of time-based data from which significant trends could be observed. This would seem to be a very worthwhile consideration for further refinement of the transportation program. It would, however, require a reconsideration of the entire PBES framework to be compatible with data presentation for other programs.

An example of the use of time-based graphical data is contained in the State of Oregon's 1973-1974 Executive Budget. Oregon has used graphical displays of significant trends based on data developed for the 1974 National Transportation Study.

Another worthwhile concept to consider would be the display of statistical data. For example, the statistical frequency distribution of highway capacity deficiencies, etc. would seem to be more illuminating than the use of a point measure. Other examples as related to impact indicators are presented in Section 1.8.3.

1.7 PROGRAM LEVEL

1.7.1 DEFINITION

Figure 7-1 shows that there are two logical possibilities at the program level. The program currently encompasses both Transportation and Communication.

Transportation is a means of transferring people or goods from one geographical location to another. Communication is a means of transferring words, ideas and messages from one point to another. The basic purpose of the program structure is to provide a logical framework to organize goals and objectives so that activities of different organizational units designed to accomplish similar results can be reviewed within the program context. Transportation and Communication are conceptually similar but operationally totally dissimilar. There would seem to be no information to possibly be gained by their consolidation. Therefore, the communications functions related to regulatory aspects should probably be transferred to Program I, those functions related to operational aspects should be transferred to Program VIII, and those related to Transportation should remain in the Transportation Program. This will allow the use of the additional level of stratification for the transportation program.

1.7.2 PROGRAM GOALS

The Program VI goals, as currently defined, are for both transportation and communication and are thus not appropriate. The current sub-goal statement, however, does seem to adequately describe the "desired state of the society, economy or environment" with respect to the transportation program. This goal statement is:

PROGRAM, CATEGORY, SUB-CATEGORY, ELEMENT ALTERNATIVES

PROGRAM	CATEGORY	SUB-CATEGORY	ELEMENT
TRANSPORTATION	URBAN/RURAL	MODAL	MODAL
	IMPROVEMENTS/ MAINTENANCE/ NEW CONSTRUCTION	URBAN/RURAL	URBAN/RURAL
TRANSPORTATION AND COMMUNICATION	PASSENGER/CARGO	MAINTENANCE/ IMPROVEMENTS/ NEW CONSTRUCTION	MAINTENANCE/ IMPROVEMENTS/ NEW CONSTRUCTION
	MODAL	PASSENGER/CARGO	PASSENGER/CARGO
	LAND/WATER/AIR	LAND/WATER/AIR	LAND/WATER/AIR
FUNCTIONS	ADMINISTRATION	PLANNING	
	REGULATION		
	PLANNING		

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FIGURE 7-1

"To provide an integrated transportation system insuring access to residence, employment, recreation, public service and commerce with minimum social and environmental disruption."

This would seem to be the logical candidate for use as the Transportation Program goal statement.

1.8 CATEGORY LEVEL DEFINITION/ANALYSIS

1.8.1 DEFINITION

As shown in Figure 7-1, there are five major generic classes of program categories which could be considered. Much of the background for discussion in this section is discussed in Sections 1.3 and 1.4 of this paper.

The current definition of a program category is "The state government program for the achievement of a subgoal." This definition does not, by itself, allow one to draw any conclusions on the criteria to be used in the selection of transportation program categories. It does, however, imply a hierarchial ordering of goals in terms of their level of importance. The key to the development of a criteria in which alternative structures can be analyzed from a program evaluation viewpoint is the hierarchial stratification of goals and objectives into increasing levels of specificity with respect to logical and potentially quantifiable interrelationships. These interrelationships should be logically sequential insofar as they represent a rollup of lower level measures.

In order to proceed with an analysis of the generic classes of program categories it is necessary to somewhat refine the concept of an hierarchy of goals. There would seem to be at least six major considerations here with respect to transportation goals. These are:

- a. Transportation Demand Determinants
- b. Policy implications/issues
- c. Funding implications/issues
- d. "Needs"

e. Significance of possible trade-offs

f. Flexibility of program options

Perhaps the most significant consideration in developing vertically the stratification of the transportation program should be on the primary determinants of transportation demand. Trip purpose and trip origin/destination are these determinants. Trip purposes represent a measure of the "end" objective of transportation. Thus, the levels in the structure should reflect some basic homogeneity with respect to trip purpose. Urban, rural and interurban trip purposes display the homogeneity. The possibility of merging this with the trip purpose distinction between people and cargo movements, as has been done by Pennsylvania, was considered. However, because of the joint use of transportation facilities, this stratification did not lead to a useful stratification at lower levels in the structure.

Another major consideration would be levels and importance of major policy issues. From this standpoint, the urban/rural interurban distinction would be the evident choice. The major policy issues associated with urban transportation problems include urban highway congestion, declining CBD economic viability, use of Highway funds for mass transit, recent Michigan transportation agency reorganization, industrial and economic development policies, etc.

Funding implications and issues are another major consideration. Here again, major funding categories, as well as being modally oriented are also geographically allocated based on urban, rural and interurban uses. This includes federal funding programs such as highway funding and mass transit funding, state funding through the gasoline tax receipts, as well as locally generated funding sources.

As has been mentioned previously, transportation "needs", at least insofar as measured by the 1972 NTNS, exhibit different characteristics both on a dollar per capita basis and on a modal basis.

The most significant available transportation system trade-offs with respect to social, economic, environmental and safety considerations, in terms of influencing trip generation and in terms of modal choice, exist in the urban areas. Significant trade-offs also exist for interurban freight movement.

Another important consideration is the flexibility of program options. Here again, the choice clearly dictates a distinction between urban, rural and interurban transportation. One of the primary roles of the state government with respect to transportation is in insuring the availability of adequate interurban highway, aviation, rail and port systems. With respect to this function, there is considerable flexibility. The development of transportation systems in urban areas, as previously discussed, is primarily an urban area responsibility with financial, technical, and planning support from state agencies.

Consideration was also given to the Maintenance/Improvement/New Construction option, as has been used by the State of Florida. This stratification would seem to completely obscure the basic purpose of the construction or maintenance function when viewed outside a modal context and leads to a seemingly inverted program structure from an analytical standpoint.

Transportation program administration could be a category associated with any of the above. This function could either stay with the transportation program or go to Program VIII. It would seem more logical to include this

function in Program VIII although its presence there is not crucial to the overall objectives of the structure.

Regulation has not been considered as a separate category for reasons discussed in Section 1.9.

1.8.2 CATEGORY SUB-GOALS

Since the category recommended is that which has previously been used as a program sub-category, the current sub-category objectives would be a logical candidate for use as sub-goals. Contrary to the definition of an objective, the current objectives are timeless and value oriented, and thus would be suitable for use as sub-goals. These sub-goals would be:

URBAN CATEGORY

To provide for goods and people movement needs in urban areas in order to maximize economic development and access by citizens to social and recreational opportunities while minimizing injury to life and the environment.

RURAL/INTERURBAN CATEGORY

To provide for goods and people movement needs in rural and interurban areas in order to maximize economic development and access by citizens to social and recreational opportunities while minimizing injury to life and the environment.

These sub-goals do not represent a significant refinement of the overall program goal. Alternative definitions would necessarily involve policy decisions but could possibly address the promotion of comprehensive transportation planning processes as a means of achieving substantive objectives, as well as consideration of a "balanced" transportation system.

1.8.3 CATEGORY IMPACT INDICATORS

The purpose of this section is to present alternative category impact indicators and to discuss attributes and possible selection criteria for each generic class identified. Much of the discussion and analysis in this section also applies to the sub-category impact indicators. There are a variety of conceptual and operational issues associated with the definition of impact indicators at the category level. Several of these issues have been noted previously in this report. Foremost among these issues is the fact that there is a bilateral, not unilateral, interaction between the transportation system and the social and economic environment in which the system is located. The second major problem area is associated with the fact that different units of measure serve different purposes in different situations, and can quite dramatically shift the emphasis of the data itself.

The proposed category objective statements address four categories of impacts: economic, social, safety and environmental.

Economic Impacts

Table 8-1 presents a list of generic classes of economic impact indicators which could be applicable to either the urban or rural/interurban category. These generic classes reflect the various sections of the economy which are impacted by transportation systems.

There are several ways that transportation systems impact government agencies. First of all, the implementation of a transportation system has an indirect impact on the regional tax base. These tax base changes, however, are usually local in nature, and aggregation at the state level may very well show little or no net change. Furthermore, definitive

TABLE 8-1

ECONOMIC IMPACTS

GOVERNMENT

- TAX BASE
- CONSTRUCTION / MAINTENANCE / OPERATING COST
- OPERATING SUBSIDY
- OPERATING REVENUE

COMMERCE

- ECONOMIC GROWTH
- RETAIL SALES
- EMPLOYMENT
- WHOLESALE SALES
- LAND VALUES

INDUSTRIAL

- LABOR SUPPLY
- CLOSENESS TO MARKETS
- ACCESS TO AIRPORT
- CLOSENESS TO ARTERIES
- SHIPPING TIME / COST

PERSONAL - BY SOCIO/ECONOMIC STRATA

- TRAVEL COST
- VALUE OF TRAVEL TIME

measurement of tax base changes due to transportation systems on an after-the-fact basis is not possible. It is possible to hypothesize, or estimate, changes in the tax base which would result from a proposed transportation system change, but this is not in any sense a measure. Thus, there would seem to be no worthwhile measure of tax base changes to include as an impact indicator.

There is an obvious economic impact associated with the construction, improvement and maintenance of transportation facilities. These impacts are both direct and indirect. The direct impacts are simply the result of the expenditure of funds, and hence a partial reason for inclusion of transportation function in many states in a "Department of Public Works." These expenditures, however, create jobs, business profits, etc. and thus create indirect economic effects which propagate throughout the state economy. The display of the transportation program budget is a measure of the direct impact. Indirect impacts could be defined with the use of an econometric model of the state economic function. The development of such a model could be considered as a future refinement of PBES.

With subsidies and revenues derived from transportation facilities, measures of the direct impacts are possible through the 1974 NTS. Again, indirect benefits could only be addressed via the use of an econometric model.

Direct and indirect economic impacts associated with the industrial and commercial sectors of the economy are even more difficult to measure. Each sector of the economy is highly interrelated and changes in input or distribution costs in one sector propagate rapidly through the economy to other sectors in a state aggregate basis. This propagation would have to be addressed in order to have any measure of economic growth. On an

isolated geographic area basis these are distinctions which can be addressed by econometric modelling techniques, but are not easily and definitively measured after-the-fact. For example, changes in retail sales, employment, wholesale sales, land values, etc. due to a proposed transportation system can be estimated for the CBD of an urban area vis-a-vis suburban areas. These economic shifts cannot be measured directly after-the-fact, since changes in these parameters will also occur due to other factors, such as changes in overall economic conditions, industrial output changes, etc. These shifts can be approximated after-the-fact via the use of surveys addressing questions such as "how much did your business gross increase last year due to new bus system." Results of analysis such as these must necessarily be viewed with extreme caution. In any event, geographic or very localized shifts would represent the only possibility of quantifying these types of economic impacts. This would necessitate stratification by geographic area. The separation of transportation related economic effects from other economic effects could be ignored, resulting in measures such as "increase in retail sales in urban area" as an impact indicator alternative. This, however, would not be recommended.

Many surrogates for these high level impact indicators can be defined. These surrogates are, at least hypothetically, related to the determinants of economic viability and activity. For example, the dollar volume of cargo handled at ports and the percentage of all statewide cargo movement handled by ports, rail, truck and air gives a qualitative evaluation of the relative economic importance of each of these modes, and thus provides some measure of their impact.

Another direct economic impact to be considered would be shipping times and shipping costs. Industrial and commercial viability are often

significantly influenced by their distribution costs. The important consideration here is with respect to the "total distribution cost" concept, which requires an evaluation of direct line haul shipping costs, loading and unloading costs and shipping costs resulting from the opportunity cost of capital associated with having the goods in the transit "pipeline". These factors are only relevant from the standpoint of an individual firm. There are no overall aggregate measures of shipping costs or time which would be traceable to input transportation costs. Statewide transportation cost as a percentage of industrial output may be available, but this would include transportation costs incurred in other states as well as Michigan. Here again, a surrogate must be found for this measure.

At the individual level, travel costs and, in particular travel time, are also an important consideration. As discussed previously, these factors are a significant determinant of modal choice. The evaluation of the Michigan state airport system plan, for example, was performed on the basis of examining a weighted function of airport access time and opportunity cost of travel time. Once again, there are no particularly relevant aggregate measures of these costs which reflect the entire transportation system of the state. On a modal basis, average taxi fares, automobile operating costs, per-mile air costs, etc. could be a surrogate for more global measures.

One useful concept to consider here would be the establishment of a travel cost index, which would define a composite of travel costs and travel times for a pre-defined set of trips for people or cargo. These pre-defined trips would have to be shredded by trip purpose and geographic area and by commodity type for cargo shipment. For example, one could have an index which is reflective of urban travel costs in Southeastern Michigan.

This index may be a weighted measure based upon picking selected origin-destination pairs in selected urban areas and computing resulting trip costs.

In a similar manner, shipping cost indices could be developed which could be shredded by industry, geographic location and commodity.

As an aggregate measure the total transportation expenditure made by government, business and individuals could be included as a gross revenue measure of the direct economic impact of transportation related activities.

Safety Impacts

The measures of safety impacts for transportation would include transportation related fatalities, injuries and property damage.

Several states have developed a "safety index" which combines all three of these measures in a single number. This index is developed with dollars, or some surrogate for dollars. For example

$$\text{Safety Index} = \# \text{ of fatalities} * \text{cost/fatality} + \text{injuries} * \text{cost/injury} \\ + \text{property damage}$$

This approach requires some estimate of the value (cost or relative weighting) of a human life, and some estimate of the "pain and suffering" associated with an injury. This concept does not seem at all worthwhile to consider for these reasons.

Previous efforts in Michigan have resulted in the tentative selection of fatalities and injuries on a passenger mile basis as the appropriate impact indicator. It would seem that this is probably not the best measure from three standpoints:

- a. It has a definite modal choice implication. As discussed previously, modal choice from the passenger standpoint is made on the basis of travel cost, travel time and frequency of service, with perhaps

some subjective weighting of safety implications as in the case of driving a motorcycle to work. A stratification by trip purpose and trip origin/destination will lead to the conclusion that for many purposes air travel and highway travel are not viable alternatives from the traveller's standpoint, and thus consideration of which is the "safest" mode is not particularly relevant.

- b. This measure removes the emphasis from the overall magnitude of the highway safety, rail safety, etc. problems in the context of focusing attention on activities oriented to achieving specific reductions in accidents.
- c. It eliminates the possibility of setting an impact target over which control is readily apparent.

For these reasons it would appear that the best safety impact indicators at the category level would be:

- a. Number of transportation related fatalities
- b. Number of transportation related injuries
- c. Transportation property damage

These measures would tend to place emphasis on how to improve existing problems, not on how to get people to substitute airplane trips for highway trips.

In an hierarchial rollup of impact indicators, incremental contribution to impacts should be considered at succeeding levels in the structure, eventually leading to increments which are directly influenced by State government activities. Thus, these same impact indicators would be relevant at the sub-category level.

Environmental Impacts

Table 8-2 lists eight generic classes of environmental impacts.

Air pollution impacts measures must include consideration of the adverse effects of various types of atmospheric pollutants. The primary pollutants generated as a result of transportation system operation are Carbon Monoxide, Hydrocarbons, Oxides of Nitrogen, and Lead.

The highest level impacts associated with these pollutants would be measured in terms of the following effects:

- a. Property damage due to pollution effects
- b. Degradation in life expectancy due to effects
- c. Increased incidence of diseases, particularly respiratory and heart disease
- d. Hospital costs, work loss costs, etc. associated with increased incidence of diseases resulting from atmospheric pollutants
- e. Crop damage costs due to pollutants
- f. Other adverse social effects

There have been literally thousands of studies made which have attempted to link these adverse effects to exposure to various pollutant/concentration levels. Some limited data is available on this cause-effect relationship, particularly with respect to crop damage. Effects of pollution on people are much less well understood, and hence the inability to agree on particular standards. There is, however, general agreement that increased exposure to any of these pollutants tends to lead to these adverse effects. Thus, desirable impact measures such as "number of respiratory disease cases due to transportation pollution" cannot be measured, or even estimated.

TABLE 8-2

ENVIRONMENTAL IMPACTS

AIR POLLUTION

- CARBON MONOXIDE
- HYDROCARBONS
- OXIDES OF NITROGEN
- LEAD, PARTICULATE, ETC.
- LEVEL AND DURATION - GLC VS GROSS TONS

NOISE POLLUTION

- ABSOLUTE LEVELS
- DURATION
- FREQUENCY

WATER POLLUTION

- SALT CONTAMINATION
- OIL SPILLAGE
- THERMAL, BIOCHEMICAL OXYGEN DEMAND

SOIL EROSION

LANDSCAPE

WILDLIFE

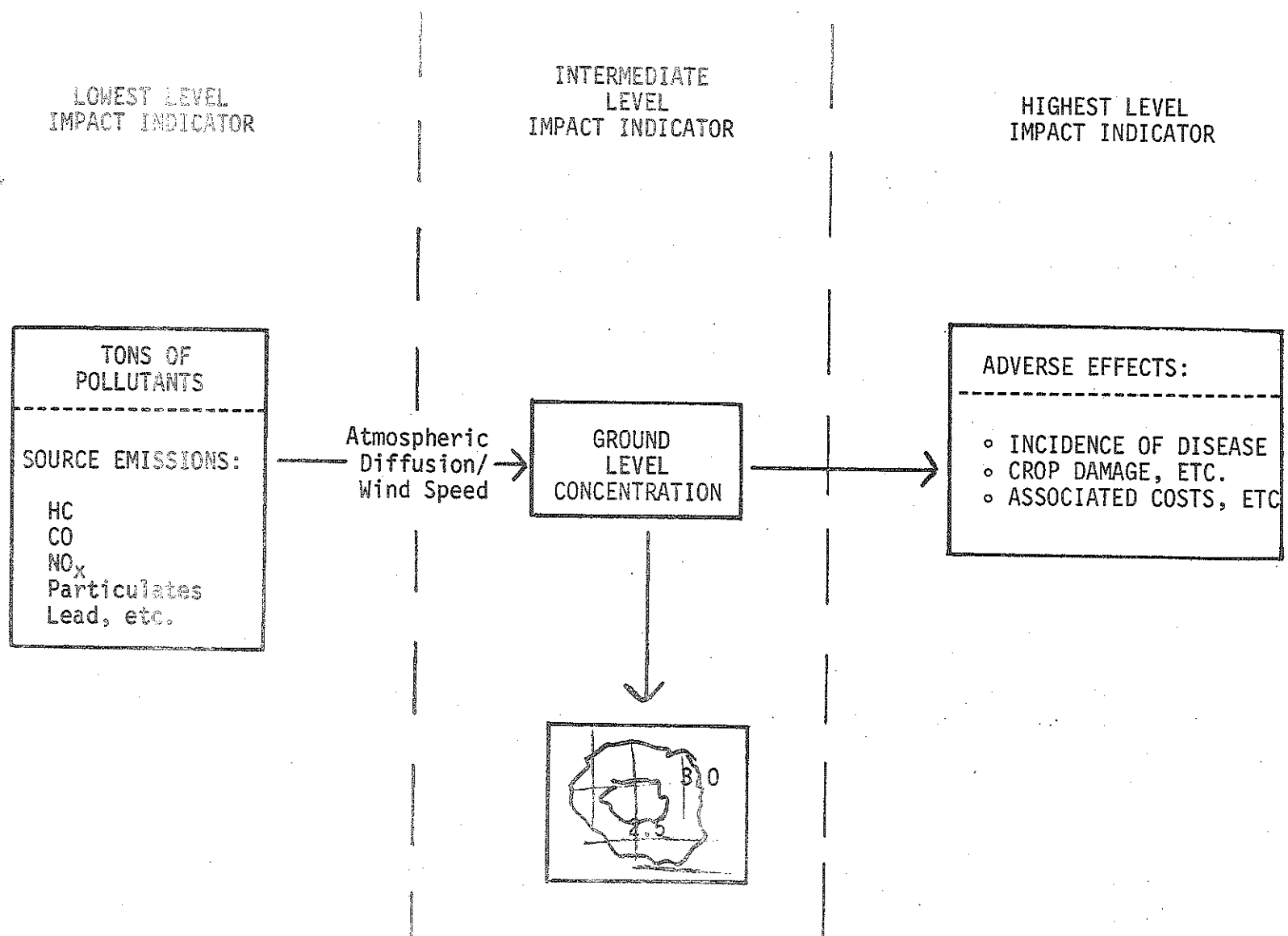
NATURAL RESOURCES

ENERGY CONSUMPTION

The next level of impact indicators would be one which is measured in terms of the same units of measure that would be correlated with observed adverse effects. There is no general agreement on what this unit of measure would be, however, since both short term exposure effects (pollution episodes) and long-term exposure effects on people are noticeable. The appropriate units of measure must thus consider exposure and duration of exposure.

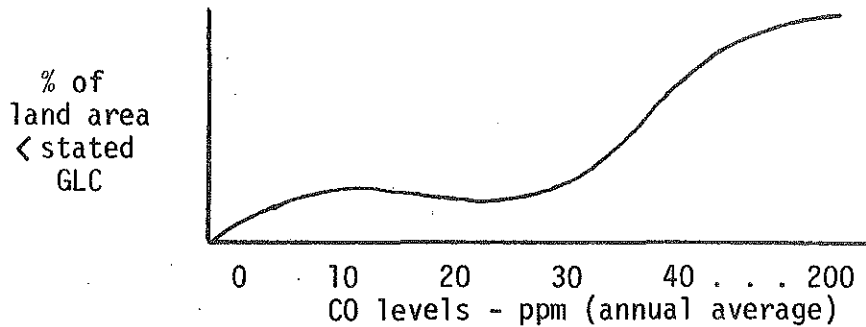
The relevant exposure measured is in terms of ground level concentration (GLC) of pollutants, for example, parts of carbon monoxide per million parts air (PPM). Separation of GLC measurements into transportation related contributors and contributors from other sources is not possible except for localized effects.

In order to measure GLC contribution of transportation related pollutants it is necessary to consider where these ground level concentration levels are located geographically and to have a means of determining the relationship between source emissions and ground level concentration. This transform can be estimated by the use of an atmospheric diffusion model which considers the level of source emissions, wind speed and direction, and chemical diffusion process to calculate resulting ground level concentration. These concentrations can be displayed as iso-concentration contours in a graph as shown in Figure 8-1. There is clearly no means of "rolling" up the thousands of individual measurements which would result in one number for the State. What can be done however, is to generate a statistical frequency distribution of measure such as:



HIERARCHY OF IMPACT INDICATORS

FIGURE 8-1



This measure, however, does not consider the number of people exposed. The addition of this factor suggests statistical measures such as that shown above, except with measurement in terms of percentage of population exposed to pollutant concentration less than stated GLC. These measures could be considered for future refinements of impact measures at such time that a state level pollution model was available which allowed segregation of transportation related effects.

Thus, with pollution measures, it is not a question of picking the "best" measures, but of selecting the only measure available which is tons/year of the three major pollutants. This is available for the 1974 NTS activity. Here again, previous definitions developed by NTS Committees of impact indicators have defined emissions on a passenger mile basis. As is the case with safety measures, this would not seem to be particularly relevant, since only automobile, aircraft and other vehicle manufacturers have any control over emissions and even they are constrained by available technology. Major emphasis should thus be on the total measures and thus the measures proposed would be:

- a. Tons hydrocarbons per year
- b. Tons carbon monoxide per year
- c. Tons oxides of nitrogen per year

Again, these should be rolled up from the sub-category level.

Noise Pollution

Noise pollution measures are subject to similar problems as with air pollution measures. Ultimate effects on people cannot be analytically related to measured noise levels. Second-level impact measures would be measured noise levels, perhaps stratified by noise frequency. Measurement problems here are less severe than with pollution measures. Noise levels in areas adjacent to airports, highways, buses, etc. can be measured, although there is no general agreement on the exact units of measurement. As with air pollution, a single number, perceived noise decibels (PNdB), can be used, or this can be combined with a time factor to reflect exposure time and/or frequency of exposure.

Probably the most useful practical measure for use as an impact indicator is the percent of population or number of people exposed to one or more noise levels, or thresholds, from transportation sources. These thresholds could be, for example, at the 60 PNdB and 100 PNdB level, as agreed upon by the NTS Coordinating Committee.

Energy Consumption

The recent "energy crisis" has focused attention on transportation related energy consumption, which represents approximately 25% of the total

energy requirements for the United States. It would seem worthwhile to consider inclusion of an energy consumption measure such as "Transportation BTU per person/year."

WATER POLLUTION, SOIL EROSION, LANDSCAPE, WILDLIFE, ETC.

The contribution of transportation system components to these environmental impacts is difficult to measure on an aggregate basis. These are factors which must be considered at the individual project level, and thus should be measured with respect to whether or not a given project meets all planning and technical standards for these types of environmental impacts.

SOCIAL IMPACTS

Table 8-3 presents four generic classes of social impacts created by transportation systems. No consideration of social impacts can be made without consideration of who is impacted. Transportation systems benefit particular socio-economic groups, often at the expense of other groups. Thus, socio-economic stratifications of social impacts must be considered as an integral part of the measurement of social impacts.

The primary measurable social impacts of transportation systems would be in the area of their mobility impacts, as related to the accessibility and service.

Measurement of mobility would involve consideration of 1) availability of transportation services, 2) socio-economic groups to whom these facilities are available, 3) interzonal travel times, 4) trip purpose, 5) frequency of service, and 6) diurnal variation (peak hours, off-peak).

Alternative measures of availability of transportation services would include, by relevant socio-economic strata:

- a. % of population owning automobiles
- b. % of population within access to mass transit (\pm 1/2 mile)
- c. % of industries within 2 miles of Interstate highway
- d. % of population within 1/2 hour travel time of airport
- e. % of industry with direct rail access

Alternative socio-economic strata would include:

- a. Personal income level strata
- b. Labor force strata - white collar, blue collar, industrial, office, commercial, housewife, etc.
- c. Age group - youth, middle-age, elderly, etc.
- d. Physical condition - handicapped, etc.

There are clear state level policy implications to the selection of relevant socio-economic strata, and thus, this should be discussed by the NTS Coordinating Committee and appropriate strata/measures selected.

Measures of interzonal travel times can be developed for both urban and rural/interurban transportation. There are at least two different measures which could be considered. The first of these would be the development of an "index" as previously discussed. This index could be developed based upon the selection of a set of relevant trip origin-destination combinations for selected urban trips and rural/interurban trips. If stratified by other relevant factors, it could be considered as a mobility index. In addition, percent reduction in the trip time index (or mobility) could also be considered for use as an impact indicator. Interzonal travel times would be determined, and a composite developed

which aggregates these trip times into an average value. The predictability of this trip time, or its variability, over a daily or weekly cycle, may also be considered as a measure of reliability. The second measure of interzonal trip time would be the use of average operating speeds, by mode. This measure is stratified by time of day, i.e., peak hour, average, etc., but not by origin-destination or trip purpose for inclusion in the 1974 NTS inputs. Major alternative trip purpose stratification would include:

- a. Recreational
- b. Social
- c. Home - work
- d. Home - shopping
- e. Farm - market
- f. Home - school
- g. Others

The profound effect transportation systems have on regional demographic characteristics such as population and population density is evident. Less evident, however, is how these effects can be measured as discussed in Section 1.3. Less evident still is a universal determination of "good" or "bad" with respect to these measures. Clearly, the availability of fast, inexpensive transportation systems to access a geographical area will tend to increase population density and consequently, total population. The exact nature of interaction is at best imperfectly understood at the present time, and could only be addressed again by detailed analysis and assumptions at the project level. As an impact indicator, population density could be displayed, but the relationship between this measure and the transportation system is far too complex to warrant the inclusion of measures of this type.

One demographic social indicator which could be included, however, is population relocated due to transportation construction or improvement projects.

Impacts on residential communities, recreational facilities, etc. are not addressed here, and should not be addressed as PBES impact indicators. These aspects are very much value oriented, not subject to measurement, and must be addressed via State, Regional and Local planning processes in order for significant changes in impacts to be effected.

TABLE 8-3

SOCIAL IMPACTS

DEMOGRAPHIC

- POPULATION GROWTH
- POPULATION DENSITY
- POPULATION REDISTRIBUTION

RESIDENTIAL COMMUNITY

- EDUCATION
- HEALTH CARE
- FIRE AND POLICE
- RELOCATION
- COHESION

RECREATION

- DEMAND
- ACCESS TO SCENIC AREAS
- VACATION TRAVEL

SERVICE - BY SOCIO-ECONOMIC STRATA

- MOBILITY
- RELIABILITY
- AMMENITIES
- CONVENIENCE
- ACCESS TO JOBS, MARKET, ETC.
- COMPATIBILITY WITH EXISTING FACILITIES/PLANS

1.9 PROGRAM SUB-CATEGORY LEVEL DEFINITION/ANALYSIS

1.9.1 DEFINITION

Program sub-category options considered are shown in Figure 7-1.

The current definition of a program sub-category is "the state government program for the achievement of an objective." Here again, an hierarchial ordering of goals and objectives is the major consideration. Thus, the analysis of the options considered for the sub-category level must be done in the framework used for analysis of the program level.

Proceeding with the assumption that the preferred option for the category level is an urban category and a rural/interurban category, this option was not considered as a sub-category possibility.

Having a category which is basically stratified on the basis of major categories of trip purpose and trip origin/destination, the next level of consideration would logically consider the options available to satisfy these trip demands. These options are clearly defined by available transportation technology. Transportation systems consist of vehicle, guideways and physical structures. From the physical characteristics of the system are derived the consequences of satisfying travel demands in terms of trip cost, travel time, accessibility, pollutant emissions, noise and safety impacts. These available options are clearly modally oriented, and thus a modal orientation at the sub-category level would focus attention on alternative means of accomplishing stated goals. A modal orientation at this level would also appear desirable from the standpoint of exposing modal trade-off implications in terms of their impacts; from the standpoint

of reflecting existing and future funding sources and restrictions; and other criteria as discussed in Sections 1.3 and 1.4.

The definition of the modes to be considered also seems evident from the standpoint of policy options available. All available major transportation modes in the State should be considered before being shredded by the State's role with respect to the mode. Thus, rail regulation should be a subset of railroad related activity and not vice versa.

Only in this manner will relevant program measures be exposed to executive review as a basis for consideration of the necessity or desirability of possibly assuming other roles. For example, the abandonment of low density rail lines in the state could possibly have severe economic consequences. Based upon a knowledge of possible consequences, it may be possible to consider activities oriented toward the mitigation of these adverse economic effects.

Urban modes to be considered would include:

- a. Highways
- b. Mass transit
- c. Possibly bicycles (if deemed relevant by NTS Coordinating Committee)

Rural/interurban modes to be considered would include:

- a. Highways
- b. Aviation
- c. Ports
- d. Rail
- e. Trucks
- f. Pipelines

Aviation is not a viable intraurban transportation mode, and thus was not included with the urban category.

1.9.2 SUB-CATEGORY LEVEL OBJECTIVE DEFINITION

The definition of sub-category objectives for each of the modal sub-categories identified and their subsequent approval/adoption require the consideration of issues which must be addressed by the NTS Coordinating Committee and by the concerned modal agency/department. To aid in the definition of these objectives, alternative issues to be considered and objective statements for consideration are presented in this section.

Sub-category objectives should represent a refinement of the category sub-goals and should relate to:

"A specified desired condition to be achieved in a specified or implied time frame which will contribute to the attainment of an expressed goal or sub-goal." (A Guide to Michigan's Program Budget Evaluation System, February, 1973)

As defined in PBES Memorandum 71-13 this should be "a desired quantifiable change in a condition within a specified time frame . . ."

In the definition of representative goals and objectives, available documented goals and objectives were used to the extent possible, whether produced as a result of previous PBES activity or from modal agencies. In cases where such documentation was not available, these have been hypothesized subject to approval of concerned parties, since in many cases these contain policy implications. In addition, as discussed in the NTS Coordinating Committee Meeting and with BPB personnel, relating to difficulties of measuring impacts, the definition of an objective as "attainable in a stated time frame and not value oriented" was not rigidly adhered to.

URBAN CATEGORY

URBAN HIGHWAY SUB-CATEGORY

The following considerations would seem to be important for inclusion in the Urban Highway objective statement:

- Plan system with full consideration of effects on people, environment and institutions
- Provide safe system
- Provide efficient system
- Provide accessibility
- Provide convenient intermodal transfer
- Cargo / people
- Moving people between residences and places of work, shopping, conduction of business, recreational areas
- Coordinated network
- Consideration of improvements to minimize travel time
- Minimize adverse environmental impacts
- Capable of handling peak hour traffic demands
- Insure maximum public participation in planning process

The following objective statement has been defined for discussion purposes:

To provide an adequate urban highway network for the safe, efficient and economical movement of people and goods, connecting residential neighborhoods and employment centers, capable of handling peak hour traffic demand, with consideration of the effect upon the environmental, aesthetic and social values of citizens.

URBAN MASS TRANSIT SUB-CATEGORY

The following considerations would seem to be important for inclusion in the Urban Mass Transit objective statement:

- Provide frequent service
- Provide low travel time
- Provide low cost travel
- Between residential neighborhoods and employment and shopping centers
- Alleviate pressures of highway system caused by congestion
- Promote coordinated intermodal planning
- Minimum social disruption
- Provide transportation service to immobile social groups, elderly, handicapped, etc.

The following objective statement has been defined for discussion purposes:

To provide financial and technical assistance in maintaining frequent, efficient, and inexpensive mass transit services between residential neighborhoods and employment and other urban activity centers and provide assistance in the development of coordinated intermodal plans through support of planning and research studies at the state and local levels.

RURAL/INTERURBAN CATEGORY

RURAL/INTERURBAN HIGHWAY SUB-CATEGORY

The following considerations would seem to be important for inclusion in the Rural/Interurban Highway objective statement:

- Plan system with full consideration of effects on people, environment and institutions
- Provide safe system
- Provide efficient system
- Provide accessibility
- Provide convenient intermodal transfer
- Cargo / people
- Moving people between residences and places of work, shopping, conduction of business, use recreational areas
- Coordinated network
- Consideration of improvement to minimize travel time
- Minimize adverse environmental impacts
- Capable of handling peak hour traffic demands
- Insure maximum public participation in planning process

The following objective statement has been defined for discussion purposes:

To provide an adequate highway system for the safe, efficient and economical movement of goods and people, connecting urban activity centers, rural, mining and forest centers, and recreational areas, providing convenient accessibility to intermodal transfer facilities, with consideration of the effects upon the environmental, aesthetic and social values of the citizens.

AVIATION SUB-CATEGORY

The following considerations would seem to be important for inclusion in the Aviation objective statement:

- Provide safe system
- Minimize noise, air pollution
- Maximum accessibility to airport
- Promote economic development/increase regional economic viability
- Cargo / people
- Capable of meeting demands
- Interface effectively with other modes
- Minimize congestion
- Provide reasonable frequency of service
- Planning coordinated with other modes

The following objective statement has been defined for discussion purposes:

Promote and increase the availability of efficient, safe and accessible movement of goods and people by air; assist in the planning and development of a comprehensive system of state airports and air carrier services capable of interfacing effectively with other modes of transportation; increase regional economic development/viability; minimize the effects of congestion, noise and air pollution.

PORT SUB-CATEGORY

The following considerations would seem to be important for inclusion in the Port objective statement:

- Maintain port system to meet existing freight demands
- Promote economic development via port improvement/construction
- Maintain economic efficiency of port system
- Promote efficient land/water interface

The following objective statement has been defined for discussion purposes:

To promote the development and coordinated planning of a modally integrated system of navigable waterways, ports and harbors which is adequate for handling shipping, travel and recreational demands with maximum economic efficiency, and which is coordinated with Michigan economic development plans.

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RAIL SUB-CATEGORY

The following considerations would seem to be important for inclusion in the Rail objective statement:

- Safe rail system
- Economically efficient cargo movement
- Minimize impacts on employment and commerce due to abandonment
- Regulation
- Study statewide economic effects of abandonment
- Rail industry problems and impact on Michigan

The following objective statement has been defined for discussion purposes:

To promote the availability of an efficient, safe and economically viable rail transportation facility for the movement of goods.

TRUCKS SUB-CATEGORY

The following considerations would seem to be important for inclusion in the Trucks objective statement:

- Promote safe system
- Regulation
- Economically efficient cargo movement
- Efficient intermodal transfer
- Capable of meeting demands

The following objective statement has been defined for discussion purposes:

To promote the availability of an efficient, safe and economically viable truck transportation system for the movement of goods.

PIPELINES SUB-CATEGORY

The following considerations would seem to be important for inclusion in the Pipelines objective statement:

- Safety
- Regulation
- Capable of meeting demands

The following objective statement has been defined for discussion purposes:

To enhance the efficiency and effectiveness of pipeline services and protect safety and welfare of citizens.

1.9.3 SUB-CATEGORY IMPACT INDICATORS

The following set of generic sub-category impact indicators have been identified to date, and are presented here for discussion purposes only. These sub-category impact indicators will be subject to further review and refinement during the course of the 1974 NTS, particularly with respect to data availability considerations. Consideration of these impact indicators should be made with reference to Section 1.8.3 which discusses category impact indicators.

URBAN HIGHWAYS

SAFETY

- Number of annual fatalities
- Number of annual injuries
- Annual property damage

ENVIRONMENTAL

- Total annual tons hydrocarbons
- Total annual tons oxides of nitrogen
- Total annual tons carbon monoxide
- Population exposed to noise levels greater than PNdB 60
- Automobile energy consumption, BTU's

ECONOMIC

- Total State/local/regional/federal highway expenditures for previous fiscal year
- Total personal automobile expenditures for previous fiscal year
- Number of jobs directly connected with transportation functions at State/local/regional level
- Percentage of peak hour passenger trips carried on urban highways
- Dollar passenger losses attributable to sub-standard urban highways
- Travel Cost Index (see discussion Section 1.8.3)
- Others to be discussed (see discussion Section 1.8.3)

SOCIAL

- Travel Time Index (see discussion Section 1.8.3)
- Mobility (see discussion Section 1.8.3)
- Annual passenger miles
- Population relocated due to construction activities
- Businesses relocated due to construction activities

URBAN MASS TRANSIT

SAFETY

- Number of annual fatalities
- Number of annual injuries
- Annual property damage

ENVIRONMENTAL

- Total annual tons hydrocarbons
- Total annual tons oxides of nitrogen
- Total annual tons carbon monoxide
- Population exposed to noise levels greater than PNdB 60 due to mass transit system
- Mass transit consumption of energy, BTU's

ECONOMIC

- Cost per passenger mile relative to other modes
- Travel Cost Index (see discussion Section 1.8.3)
- Others to be discussed (see discussion Section 1.8.3)
- Fare subsidies

SOCIAL

- Percentage of population \pm 1/2 mile from mass transit facility
- Average operating speed
- Travel Time Index (see discussion Section 1.8.3)
- Mobility (see discussion Section 1.8.3)
- Number of urban areas with mass transit facilities
- Population relocated due to construction activity
- Businesses relocated due to construction activity
- Annual passenger miles

RURAL/INTERURBAN HIGHWAYS

SAFETY

- Number of annual fatalities
- Number of annual injuries
- Annual property damage

ENVIRONMENTAL

- Total annual tons hydrocarbons
- Total annual tons oxides of nitrogen
- Total annual tons carbon monoxide
- Population exposed to noise levels greater than PNdB 60
- Automobile energy consumption, BTU's

ECONOMIC

- Total State/local/regional/federal highway expenditures for previous fiscal year
- Total personal automobile expenditures for previous fiscal year
- Number of jobs directly connected with transportation functions at State/local/regional level
- Percentage passenger losses attributable to sub-standard rural/interurban highways
- Travel Cost Index (see discussion Section 1.8.3)
- Others to be discussed (see discussion Section 1.8.3)
- Number of new industries locating near or along trunkline

SOCIAL

- Travel Time Index (see discussion Section 1.8.3)
- Mobility (see discussion Section 1.8.3)
- Annual passenger miles
- Population relocated due to construction activities
- Businesses relocated due to construction activities

AVIATION

SAFETY

- Annual fatalities in general aviation accidents not due to pilot error or equipment defects
- Annual fatalities in air carrier accidents not due to pilot error or equipment defects
- Annual injuries in general aviation accidents not due to pilot error or equipment defects
- Annual injuries in air carrier accidents not due to pilot error or equipment defects

ENVIRONMENTAL

- Population exposed to PNdB 60 or greater
- Annual tons carbon monoxide
- Annual tons oxides of nitrogen
- Annual tons hydrocarbons

SOCIAL

- % of population within 15 minutes of general aviation airport
- % of population within 30 minutes of air carrier airport
- # of cities accessible with direct service
- % on-time service
- Population relocated due to airport construction, etc.
- Airport Access Time Index (see discussion Section 1.8.3)

ECONOMIC

- Number of jobs due to airport construction/improvements
- Airport Access Cost Index (see discussion Section 1.8.3)
- Value of cargo shipped
- Total State/local/regional/corporate/federal aviation expenditures in Michigan during previous fiscal year
- Others to be discussed (see discussion Section 1.8.3)
- % of freight tonnage moved by air
- Value of freight lost/damaged

RAIL

SAFETY

- Annual rail related fatalities due to faulty track and equipment
- Annual rail related injuries due to faulty track and equipment
- Annual rail related fatalities due to grade crossings
- Annual rail related injuries due to grade crossings

ENVIRONMENTAL

- Annual tons carbon monoxide
- Annual tons hydrocarbons
- Annual tons oxides of nitrogen
- Population exposed to noise level greater than PNdB 60

SERVICE/ECONOMIC

- Railroad capital replacement rates in Michigan
- Jobs lost due to abandonment
- Number of businesses closed due to abandonment
- Decrease (increase) in track miles
- Rail Cost Index (see discussion Section 1.8.3)
- State/local/regional/corporate/federal expenditures during previous fiscal year
- Percent of freight tonnage moved by rail
- Value of freight lost/damaged

PORTS

SAFETY

- Number of fatalities at port facilities
- Number of injuries at port facilities

ENVIRONMENTAL

- Number of ports not meeting state/local/federal water pollution standards

ECONOMIC

- Water Shipping Cost Index (see discussion Section 1.8.3)
- Dollar value of cargo handled by type
- Direct employment at port facilities (# of jobs, gross income)
- Ratio of Michigan water cargo charges to national and north central region
- Employment in industries dependent on port facilities
- Ratio of Michigan cargo tonnage handled to U. S.
- Dollar output of Michigan cargo tonnage handled to U.S.
- Value of state exports (international, other states) via water
- Percent of freight tonnage (state total) by water
- Cargo tonnage lost due to rail abandonment
- Output of new industries locating in Michigan because of port facility availability
- Property damage/loss at port facility
- Federal ship operating subsidies

SERVICE

- Shipping delays - average turn around time at port, by type of ship

TRUCKS

SAFETY

Annual highway fatalities due to trucks
Annual highway injuries due to trucks

ENVIRONMENTAL

Annual tons carbon monoxide
Annual tons hydrocarbons
Annual tons oxides of nitrogen

SERVICE/ECONOMIC

Percentage freight tonnage moved by type
Trucking industry expenditures during previous fiscal year
Property damage due to trucks
Value freight lost/damaged
Number of direct trucking industry employees
Dollar cost of highway degradation due to truck use
Truck Shipping Cost Index (see discussion Section 1.8.3)
Others to be discussed (see discussion Section 1.8.3)

PIPELINES

SAFETY

Number of pipelines related accidents

SERVICE/ECONOMIC

Total pipeline expenditures during previous fiscal year
Value of material shipped by pipeline
Number of employees of pipeline companies
Property damage due to pipeline accidents

ENVIRONMENTAL

Gas leakage - tons per year

1.10 ELEMENT/SUB-ELEMENT LEVEL DEFINITION/ANALYSIS

1.10.1 DEFINITION

The definition of a program element is currently "Activities and resources concerned with the production of a discrete output or group of related outputs."

As was the case with program, category and sub-category definitions, this definition does not provide a definitive guideline to the definition of the next level in the program structure. Thus, once again the basic criteria discussed in Section 1.8 is applicable to the refinement of the element definition to a workable operational concept with respect to the transportation structure.

Based upon the choice of the category and sub-category definitions, the next most important distinction would be consideration of maintenance/improvement/new construction activities or passenger/cargo transportation at the element level. To a great extent passenger/cargo distinction is implicit in the revised modal orientation, since truck, rail, pipelines and ship are predominantly freight movement oriented. As has been previously discussed, maintenance, improvement and new construction represent major distinctions to be considered because of their possible trade-offs and impact implications. However, these activities represent only three of the possible set of program activities which could or are being performed by state agencies. In order to focus attention on as many available options as possible, it would seem desirable to have the element level focus on the entire ensemble of transportation program functions which

could be performed by state agencies regardless of whether or not the particular function is currently being performed.

The major transportation program functions are:

- a. Research and Development
- b. Regulation
- c. Planning
- d. New Construction
- e. Improvements
- f. Operations/Maintenance

The sub-element level, then, would align with organization and consider only state department/agency contributions to these functions and thus be compatible with the current definition of an element. This would clearly separate state level responsibility and accountability, and thus at least implicitly address the question of controllability of transportation impacts. This identical set of functions would define the element level for each sub-category, and would be reduced at the sub-element level for alignment with organizational entities and functions.

Safety considerations should be considered under their appropriate state government function. For example, state police functions and motor vehicles licensing activities related to highway safety should be included at the sub-element level as regulatory activities.

The necessity of including Research and Development is a matter of judgement to be resolved. Clearly the State Department of Highways and Transportation has little, if any, activity directed to original research and development. However, probably one of the most significant roles of

these agencies is maintaining an awareness of new and fast changing transportation technology developments with respect to mass transit; with respect to new shipping concepts and as ice breakers, roll-on, roll-off, etc.; with respect to highway construction techniques, etc. Hence, its inclusion for consideration here.

1.10.2 ELEMENT OUTPUTS

The following set of generic element outputs have been identified to date and are presented here for discussion purposes only. These element outputs will be subject to further review and refinement during the course of the 1974 NTS, particularly with respect to data availability considerations. It will be necessary for concerned agencies to provide precise operational definitions for measures to be included.

OUTPUT INDICATORS

URBAN HIGHWAYS

R & D

Number of technical conferences and seminars attended
Number of technical reports and papers prepared

REGULATION

Number of registered automobiles
Number of drivers completing drivers education courses
Number of drivers licenses issued
Drunk/reckless driving arrests
Number of other moving violations
Number of audits performed

PLANNING

Number of route location studies
Number of design studies
Number of environmental impact studies
New highway miles planned in next ten years
Planning/construction cost ratio
Number of traffic flow studies
Number of man-years of advanced planning
Number of man-years of operational planning
Number of miles plans approved
Number of man-years support to regional planning groups
Number of public hearings held

NEW CONSTRUCTION

Number of State trunkline lane-miles constructed
Number of county road lane-miles constructed
Number of municipal street lane-miles constructed
Number of roadside tourist areas constructed
Number of acres acquired for right-of-way
Number of bridges and structures constructed
Percent increase in capacity due to new construction

IMPROVEMENTS

Number of state trunkline lane-miles added
Number of county road lane-miles added
Number of municipal street lane-miles added
Number of roadside tourist areas improved
Number of intersections improved
Number of bridges and structures improved
Number of directional signs erected
Number of signal lights installed

URBAN HIGHWAYS (Cont'd)

IMPROVEMENTS (Cont'd)

Percent capacity increase due to improvements
Number of lane-miles improved with critical safety deficiency
Number of lane-miles improved with critical capacity deficiency

OPERATIONS/MAINTENANCE

Number of State trunkline lane-miles reconstructed, resurfaced
Number of county road lane-miles reconstructed, resurfaced
Number of municipal street lane-miles reconstructed, resurfaced
Number of State trunkline lane-miles maintained at standard
Number of county road lane-miles maintained at standard
Number of municipal street lane-miles maintained at standard
Number of roadside tourist areas maintained
Total annual passenger miles
Number of man-years expended on general maintenance - mowing,
litter removal, line painting, winter maintenance, etc.

OUTPUT INDICATORS

MASS TRANSIT

R & D

- Number of technical conferences and seminars attended
- Number of technical reports and papers presented
- Number of UMTA technical grants administered

REGULATION

- Number of audits performed

PLANNING

- Number of route location studies
- Number of design studies
- Number of environmental impact studies
- Number of miles of rapid rail/subway planned for next ten years
- Number of man-years support to regional planning groups
- Number of regional/local mass transit plans approved
- Number of UMTA demonstration grants
- Number of mass transit public hearings

NEW CONSTRUCTION

- Number of miles exclusive bus lane added
- Number of miles of rail/subway system added
- Number of acres of mass transit right-of-way acquired
- Number of urban areas establishing new mass transit system
- Increase in population served by new construction facility

IMPROVEMENTS

- Number of buses added
- Number of bus route miles added
- Percent capacity increase due to improvements
- Number of maintenance and support facilities constructed
- Number of projects to improve existing service
- Increase in population served by mass transit system

OPERATIONS/MAINTENANCE

- Total number of buses operated
- Total number of buses maintained
- Number of bus route miles
- Total annual passenger miles
- Number of route miles of mass transit other than buses
- Percent of trips serviced by mass transit
- Number of cities offering mass transit system

OUTPUT INDICATORS

RURAL/INTERURBAN HIGHWAYS

R & D

Number of technical conferences and seminars attended
Number of technical reports and papers prepared

REGULATION

Number of registered automobiles
Number of drivers completing drivers education courses
Number of drivers licenses issued
Drunk/reckless driving arrests
Number of other moving violations
Number of audits performed

PLANNING

Number of man-years spent on State Highway System Plan
Number of route location studies
Number of design studies
Number of environmental impact studies
New highway miles planned in next ten years
Planning/construction cost ratio
Number of traffic flow studies
Number of man-years of advanced planning
Number of man-years of operational planning
Number of miles plans approved
Number of man-years support to regional planning groups
Number of public hearings held

NEW CONSTRUCTION

Number of State trunkline lane-miles constructed
Number of county road lane-miles constructed
Number of municipal street lane-miles constructed
Number of roadside tourist areas constructed
Number of acres acquired for right-of-way
Number of bridges and structures constructed
% increase in capacity due to new construction

IMPROVEMENTS

Number of state trunkline lane-mile added
Number of county road lane-miles added
Number of municipal street lane-miles added
Number of roadside tourist areas improved
Number of intersections improved

RURAL/INTERURBAN HIGHWAYS (Cont'd)

IMPROVEMENTS (Cont'd)

Number of bridges and structures improved
Number of directional signs erected
Number of signal lights installed
% capacity increase due to improvements
Number of lane-miles improved with critical safety deficiency
Number of lane-miles improved with critical capacity deficiency

OPERATIONS/MAINTENANCE

Number of state trunkline lane-miles reconstructed, resurfaced
Number of county road lane-miles reconstructed, resurfaced
Number of municipal street lane-miles reconstructed, resurfaced
Number of state trunkline lane-miles maintained at standard
Number of county road lane-miles maintained at standard
Number of municipal street lane-miles maintained at standard
Number of roadside tourist areas maintained
Total annual passenger miles
Number of man years expended on general maintenance - mowing,
litter removal, line painting, winter maintenance, etc.

OUTPUT INDICATORS

AIRPORTS

R & D

Number of technical conferences and seminars attended
Number of technical reports and papers prepared

REGULATION

Number of airport inspections
Number of complaints investigated
Number of pilot registrations
Number of airports licensed
Number of violations cited
Number of safety regulations issued
Number of accidents reviewed

PLANNING

Number of man-years spent on state aviation system planning
Number of man-years spent supporting regional planning groups
Number of public hearings held
Number of design studies
Number of environmental impact studies
Number of zoning projects completed
Number of zoning codes revised

NEW CONSTRUCTION

Number of new air carrier airports constructed
Number of new general aviation airports constructed
Increase in population served by new air carrier airports

IMPROVEMENTS

Number of air carrier airport facilities improved
Number of general aviation airport facilities improved
Number of safety equipment installed
Number of air markers painted
Number of displaced thresholds marked
Number of auto parking areas improved
Change in capacity/service level due to improvement
Number of airport access improvements completed
Additional passenger handling capacity added - air carrier airports
Number of runways added - air carrier airports
Number of runways added - general aviation airports
Increase in population within 30 minutes travel time due to
access improvements

AIRPORTS (Cont'd)

OPERATIONS/MAINTENANCE

Tons cargo handled

Passenger volume handled - air carrier airports

Man years spent on general maintenance

OUTPUT INDICATORS

RAIL

R & D

Number of technical conferences and seminars attended
Number of technical reports and papers prepared

REGULATION

Number of rate regulation cases handled
Number of rail crossing inspections
Number of accident investigations
Miles of track inspected
Number of bridges and buildings inspected
Number of man-hours spent in service change/rail abandonment cases

PLANNING

Number of rail abandonment studies conducted
Number of modal interface studies conducted
Number of grade crossing studies conducted
Number of economic impact studies conducted
Number of service change studies conducted

NEW CONSTRUCTION

Railroad new construction investment in Michigan
Number of miles of track added

IMPROVEMENTS

Number of grade crossings improved
Number of track miles with safety deficiencies corrected
Railroad industry improvement expenditures in Michigan
Bridges/structures improved

OPERATIONS/MAINTENANCE

Miles of railroad track maintained at standard
Number of miles rail line abandoned
Tons of cargo handled

OUTPUT INDICATORS

PORTS

R & D

Number of technical studies and research reports reviewed
Number of technical seminars and conferences attended

REGULATION

Number of rate/service cases handled
Number of complaints investigated and resolved

PLANNING

Number of man-hours spent in planning function
Number of man-hours spent in state economic development coordination

NEW CONSTRUCTION

Value of new port facilities investment - private funds
Additional capacity (tonnage) added
Number of new facilities constructed

IMPROVEMENTS

Value of port facility improvements - private funds
Additional capacity made available (tons)
Number of facilities improved

OPERATIONS/MAINTENANCE

Miles of channels dredged and improved
Cargo received, by SIC (tons)
Cargo shipped, by SIC (tons)
Number of port facilities maintained (greater than 3M tons)
Number of port facilities maintained (less than 3M tons)

OUTPUT INDICATORS

TRUCKS

R & D

Number of technical conferences and seminars attended
Number technical reports and papers prepared

REGULATION

Number of trucks weighed/inspected
Number of man-days spent on rate cases

PLANNING

Number of trucking related planning studies prepared
Number of trucking related planning studies reviewed
Number of man-years spent on trucking/intermodal transfer studies

NEW CONSTRUCTION

Number of intercity truck terminals constructed
Truck capacity per hour of new terminals
Cargo volume per hour added
New investment in intercity truck terminals - dollars

IMPROVEMENTS

Number of intercity truck terminals improved
Available intercity truck tonnage added
Dollar value of improvements to intercity truck terminals
Additional trucks handled by terminal improvements
Cargo volume per hour added

OPERATIONS/MAINTENANCE

Total trucks handled annually at intercity trucking terminals
Number of tons of consumer goods handled annually at intercity truck terminals
Number of tons of industrial goods handled annually at intercity terminals
Structural degradation of highways due to truck usage - dollars
% of freight cargo handled by trucks
Cargo ton miles
Annual cargo ton miles
Dollar value of cargo handled

OUTPUT INDICATORS

PIPELINES

R & D

Number of technical studies/research reports prepared
Number of technical conferences/seminars attended

REGULATION

Number of miles of new pipeline approved - natural gas/petroleum products/other
Number of hearings attended

PLANNING

Number of rate analysis studies
Number of pipeline related planning studies prepared

NEW CONSTRUCTION

Number of miles of new pipeline laid - natural gas/petroleum products/other
Number of modal interchange facilities constructed - natural gas/petroleum products/other

IMPROVEMENTS

Number of miles of pipeline added - natural gas/petroleum products/other
Capacity of pipelines improved - natural gas/petroleum products/other
Dollar investment in improvements - natural gas/petroleum products/other
Dollar investment in modal interchange facilities - natural gas/petroleum products/other

OPERATIONS/MAINTENANCE

Dollar value of materials handled via pipeline - natural gas/petroleum products/other
Tons of material handled via pipeline - natural gas/petroleum products/other
Ton miles of material movement - natural gas/petroleum products/other

1.10.3 ELEMENT NEED/DEMAND ESTIMATORS

The following set of generic element need/demand estimators have been identified to date and are presented here for discussion purposes only. These element need/demand estimators will be subject to further review and refinement during the course of the 1974 NTS, particularly with respect to data availability considerations. It will be necessary for concerned agencies to provide precise operational definitions for measures to be included.

NEED/DEMAND ESTIMATORS

URBAN HIGHWAYS

R & D

Federal government highway research and development expenditures

REGULATION

Total number of licensed drivers
Number of vehicles to be regulated
Number of state trunkline road miles to be regulated
Number of county road miles to be regulated
Number of municipal street miles to be regulated

PLANNING

Lane miles to be added by 1980 - State trunkline (from 1974 NTS)
Number of lane miles county roads to be added by 1980 (from 1974 NTS)
Number of lane miles municipal streets to be added by 1980 (from 1974 NTS)
Number of lane miles planned to commence construction within two years
Number of regional planning groups to be supported
Guideline planning/construction cost ratio

NEW CONSTRUCTION

Percent increase in vehicle miles in previous year
Number of lane miles State trunkline plans approved & awaiting construction
Number of lane miles of county roads plans approved & awaiting construction
Number of lane miles municipal streets plans approved & awaiting construction

IMPROVEMENTS

% increase in vehicle miles
Number of State trunkline lane miles critically deficient in capacity
Number of county road lane miles critically deficient in traffic carrying capacity
Number of municipal street lane miles critically deficient in traffic carrying capacity
Number of State trunkline lane miles critically deficient in safety
Number of county road lane miles critically deficient in safety
Number of municipal street lane miles critically deficient in safety

OPERATIONS/MAINTENANCE

Total annual vehicle miles
Number of State trunkline lane miles
Number of county road lane miles
Number of municipal street lane miles
Number of State trunkline lane miles critically deficient structural condition
Number of county road lane miles critically deficient structural condition
Number of municipal lane miles critically deficient structural condition
State highway investment at replacement cost (by functional class)-dollars

NEED/DEMAND ESTIMATORS

MASS TRANSIT

R & D

Federal government mass transit research and development expenditures
Number of UMTA technical grants approved

REGULATION

Number of private and public bus companies

PLANNING

Bus route miles to be added by 1980 (from 1974 NTS)
Other mass transit route miles to be added by 1980 (from 1974 NTS)
Number of regional planning groups to be supported

NEW CONSTRUCTION

New mass transit plans approved and awaiting construction

IMPROVEMENTS

Percent increase in urban area trips
Percent capacity increase necessary to meet demand increase
Percent increase in number of passenger miles for previous year

OPERATIONS/MAINTENANCE

Total number of buses
Total number of route miles other than mass transit systems
Total number of bus route miles
Total annual vehicle miles
Mass transit fixed investment, dollars

NEED/DEMAND ESTIMATORS

RURAL/INTERURBAN HIGHWAYS

R & D

Federal government highway research and development expenditures

REGULATION

Total number of licensed drivers
Number of vehicles to be regulated
Number of state trunkline road miles to be regulated
Number of county road miles to be regulated
Number of municipal street miles to be regulated

PLANNING

Lane miles to be added by 1980 - State trunkline (from 1974 NTS)
Number of lane miles county roads to be added by 1980 (from 1974 NTS)
Number of lane miles municipal streets to be added by 1980 (from 1974 NTS)
Number of lane miles planned to commence construction within two years
Number of regional planning groups to be supported
Guideline planning/construction cost ratio

NEW CONSTRUCTION

Percent increase in vehicle miles in previous year
Number of lane miles State trunkline plans approved & awaiting construction
Number of lane miles county roads plans approved & awaiting construction
Number of lane miles municipal streets plans approved & awaiting construction

IMPROVEMENTS

Percent increase in vehicle miles
Number of State trunkline lane miles critically deficient in capacity
Number of county road lane miles critically deficient in traffic carrying capacity
Number of municipal street lane miles critically deficient in traffic carrying capacity
Number of State trunkline lane miles critically deficient in safety
Number of county road lane miles critically deficient in safety
Number of municipal street lane miles critically deficient in safety

OPERATIONS/MAINTENANCE

Total annual vehicle miles
Number of State trunkline lane miles
Number of county road lane miles
Number of municipal street lane miles
Number of State trunkline lane miles critically deficient structural condition
Number of county road lane miles critically deficient structural condition
Number of municipal lane miles critically deficient structural condition
State highway investment at replacement cost (by functional class) - dollars

NEED/DEMAND ESTIMATORS

AVIATION

R & D

Federal government airport research and development expenditures

REGULATION

Number of complaints received
Number of pilots
Number air carrier airports regulated
Number general aviation airports regulated
Number aviation accidents

PLANNING

Number of requests for planning assistance
Number of runways to be added by 1980 - air carrier (from 1974 NTS)
Number of runways to be added by 1980 - general aviation (from 1974 NTS)
Number of new airports to be added by 1980 - air carrier (from 1974 NTS)
Number of new airports to be added by 1980 - general aviation (from 1974 NTS)

NEW CONSTRUCTION

Number new air carrier airport plans approved and awaiting construction
Number new general aviation airport plans approved and awaiting construction

IMPROVEMENTS

Number of air carrier airports with existing safety deficiencies
Number of general aviation airports with existing safety deficiencies
Number of air carrier airports with existing capacity deficiencies
Number of general aviation airports with existing capacity deficiencies
Percent increase in passenger demand - air carrier airports
Percent increase in LTO operations

OPERATIONS/MAINTENANCE

Number of runways - air carrier airports
Number of runways - general aviation airports
Number of general aviation airports
Number of air carrier airports
Number of LTO cycles
Percent increase in passengers handled
Percent increase in tons of cargo handled

NEED/DEMAND ESTIMATORS

PORTS

R & D

Number of rate/service cases filed
Number of rate/service complaints filed

IMPROVEMENT

Number of port facilities with capacity/modal interface deficiencies

OPERATIONS/MAINTENANCE

Number of port facilities maintained
Port capacity (tons)
Number of berths
Number of ships loaded
Number of ships unloaded
Percent utilization of port facilities

NEED/DEMAND ESTIMATORS

RAIL

R & D

Federal government rail research and development expenditures

REGULATION

Number of rail crossings
Number of rail safety related complaints received
Number of businesses affected by abandonment
Number of miles of rail abandonment petitions filed

PLANNING

Number of planned miles of rail service abandonment
Number of potential miles of rail service abandonment

IMPROVEMENTS

Number of miles of track with critical safety deficiencies
Number of rail crossings with critical safety defects
Number of bridges/structures with critical safety deficiencies

OPERATIONS/MAINTENANCE

Total miles of railroad track in Michigan
Ton miles of freight handled

NEED/DEMAND ESTIMATORS

TRUCKS

REGULATION

Number of weighing stations operated
Number of rate cases filed

PLANNING

Number of truck terminals planned by 1980 (from 1974 NTS)
Number of truck terminals planned by 1990 (from 1974 NTS)

NEW CONSTRUCTION

Increase in cargo tonnage handled expected (thru 1980)

IMPROVEMENTS

Historic increase in freight tonnage handled

OPERATIONS/MAINTENANCE

Number of intercity truck terminals
Total annual truck miles
Miles of highway truck routes
Number of trucks

NEED/DEMAND ESTIMATORS

PIPELINES

REGULATION

Miles of new pipeline applications pending - natural gas/petroleum products/other

PLANNING

Number of miles of pipeline planned by 1980 - natural gas/petroleum products/other

Number of miles of pipeline planned by 1990 - natural gas/petroleum products/other

NEW CONSTRUCTION

Increase in pipeline tonnage handled expected thru 1980 -- natural gas/petroleum products/other

IMPROVEMENTS

Number of miles of pipelines not meeting state requirements - natural gas/petroleum products/other

Historic increase in tonnage/material handled - natural gas/petroleum products/other

OPERATIONS/MAINTENANCE

Total number of miles of pipeline - natural gas/petroleum products/other

Number of modal interchange facilities - natural gas/petroleum products/other

WORKING PAPER #2

REVIEW OF TRANSPORTATION PROGRAM
STRUCTURE IN OTHER STATES

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June 4, 1973

Resource Planning Associates, Inc.
1379 Woodside Drive
McLean, Virginia 22101

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INTRODUCTION

The purpose of this paper is to review the status of transportation program structure development in other states using a program budgeting system.

This review was done by, first of all, reviewing the fiscal year 1974 budget documents for forty-four states to see what was currently being used, as well as to provide indication of past efforts or future direction. The status of the states participating in the State and Local Finances Project at George Washington University (the so-called 5-5-5 project) was also reviewed. A literature search was performed which revealed several interesting activities with respect to program budgeting. Of particular note here is the book "Status of PPB in the States" by Allen Schick (published by The Brookings Institute, 1972) which reviews the status of program budgeting in many states. From the survey of the budget documents states which seemed to have devoted a considerable attention to the transportation program, or for which unusual features were noted, were contacted. These contacts were with either Transportation Program budget offices, or those who had been responsible for developing the transportation program structure. Pertinent details are included in the detail discussion.

As a result of this survey, several interesting observations can be made. First of all, there are very few states which have anything more elaborate for a program structure than modal agencies' budgets consolidated in a "Transportation" program, and a few superficial program measures such as "miles of highway," etc.

Of those states which have progressed beyond this stage, there was no state which "stood out" with respect to having done an obviously thorough job. There was also a great disparity noted in many states between the granularity of the transportation program structure and the structure for other major programs. This difficulty in dealing with transportation was further confirmed in discussion with responsible budget analysts. Those states which seemed to have the greatest degree of modal consolidation were those which had a state Department of Transportation. Nineteen states now have such an agency. Another significant difference which emerged was with respect to the role of planning the program budgeting system. Some states, such as Michigan, have a fairly weak tie-in with planning and others, such as Florida, have a strong tie-in.

None of the states reviewed had explicitly identified "impact indicators." The trend seemed to be to identify "program measures" which represent something of a mixture of impact indicators, output measures, need/demand estimators and workload measures. Thus, none of the states reviewed or contacted seem to have made any significant progress with respect to the analytical coupling of program outputs and impact indicators.

All of the persons contacted directly made explicit reference to the trade-offs involved between alignment of the program structure with the current accounting system and the analytical linkage of outputs to impacts. This conflict seemed to have been predominantly resolved in favor of accounting alignment rather than analytical possibilities.

It was also noted during the course of this review that many states have retreated considerably from program budgeting. This has been due to variety of factors, most of which are discussed in Allen Schick's book.

The lack of ability to firmly establish analytical linkages has prompted some states to orient more strongly toward narrative description of program results, particularly Pennsylvania and Wisconsin.

In the course of this review many curious compromises in the program structure were observed. No state seemed to have a particularly noteworthy structure from an analytical standpoint.

This review proved to be useful from several standpoints. First of all, some of the transportation program structures provided a good frame of reference for Tasks 4 and 5, which were oriented to defining and analyzing alternative transportation program structures. Secondly, the discussion and written material provided some interesting ideas worthy of consideration with respect to program measures and data display techniques, such as graphical displays. These have been incorporated in Working Paper #1. As discussed, no particularly significant analytical features were uncovered, but this was not expected.

WISCONSIN

Wisconsin was the first state in the union to develop a program budget, however, the initial attempts involved only the classification of expenditures according to the activities and services provided by governmental agencies (the program budget as conceived under the performance system of budgeting). However, a program budget in the accepted PPB format had been prepared and submitted to the legislature as early as 1965.

Any further development of the State's PPB system has proceeded much more slowly; the entire process was expected, in 1971, to extend into the mid-1970's.

Discussion with Mr. Mike Lovejoy, who has responsibility for Wisconsin's transportation budget, revealed that the 1971-1973 budget concentrated heavily on performance indicators, however, the 1973-1975 budget tends to de-emphasize performance indicators and dwells more on the development of policy papers for the State Department of Transportation. This would appear to be a retreat from a PPB system in this state.

Another significant change in the Department of Transportation in the period 1971-1973 to 1973-1975 has been an almost total restructuring of the program format. The structure for the 1971-1973 fiscal year budget was more modally oriented at the program level with the programs in the Department of Transportation as follows:

1. Airports & Aeronautical Activities
2. Highway Facilities
3. Vehicle and Driver Regulation
4. Transportation Administration and Planning

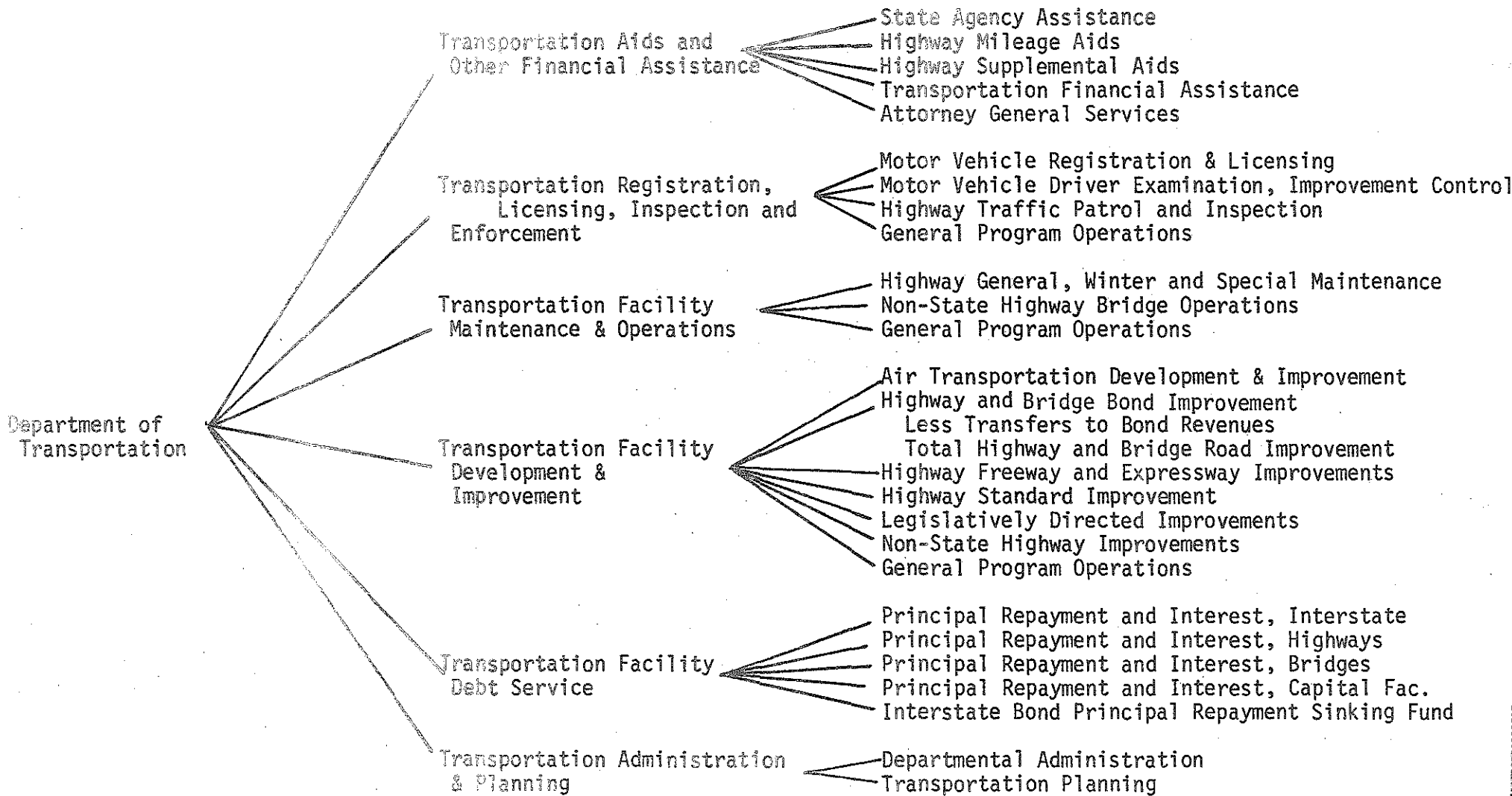
The new program structure is diagrammed on the following page. This structure is broken down by major activities (i.e., maintenance, improvements, regulation) at the program level and modally oriented at the sub-program level. Objective statements are given for each the program and sub-program categories. As indicated above, performance measures received little attention in the 1973-1975 fiscal year budget.

The executive budget "policy papers" mentioned above appear to be a sizeable undertaking by the Bureau of Planning and Budget. A 250 page document was prepared for the 1973-1975 fiscal year, encompassing the entire state government apparatus. In these papers, major policy issues are addressed, recommendations for change are given, along with a problem definition and alternative solutions to the problem. In some instances, the impacts of these alternative solutions are also addressed.

As stated previously, Wisconsin's budget is in a programmatic format, however, further progress toward implementation of a PPB system of budgeting has been extremely limited.

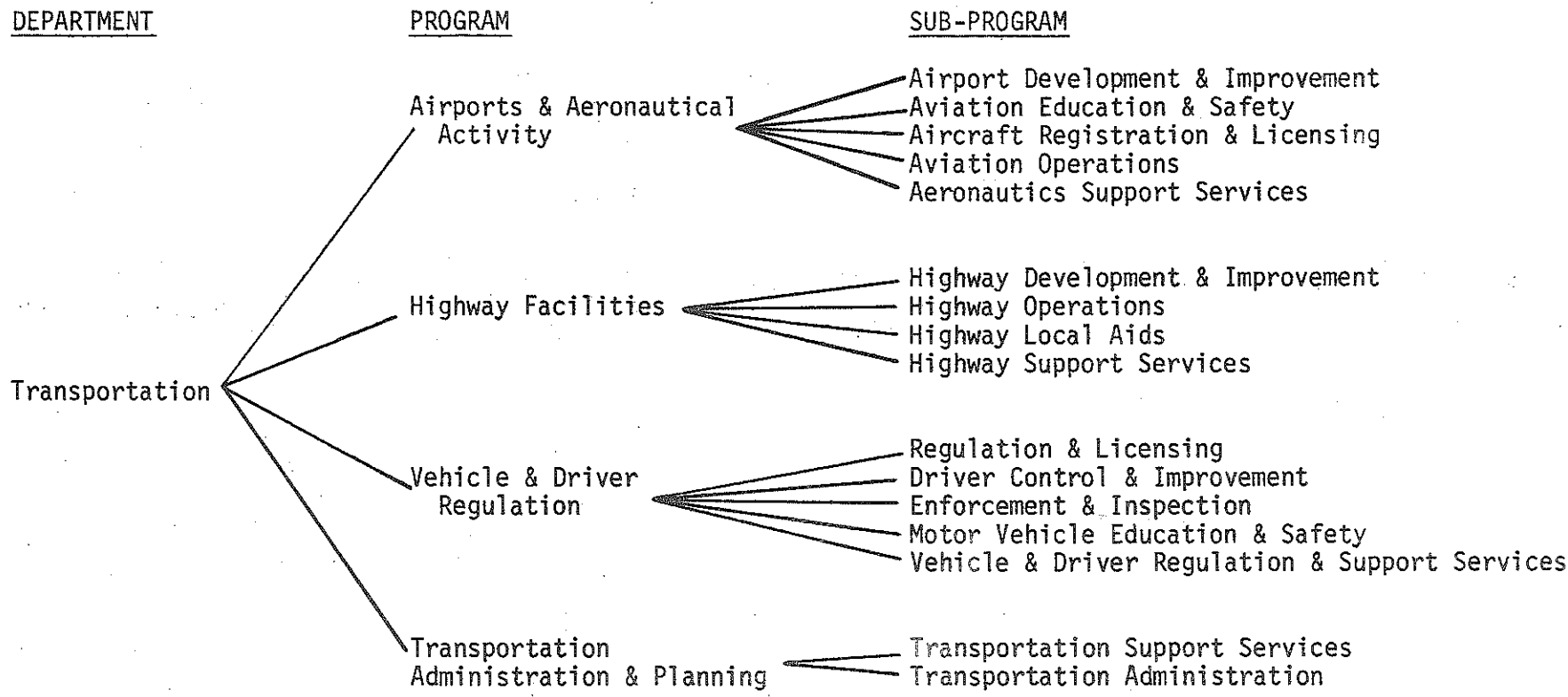
PROGRAM

SUB-PROGRAM



WISCONSIN PROGRAM STRUCTURE

1973-1975



WISCONSIN PROGRAM STRUCTURE

1971-1973

FLORIDA

Florida has developed a comprehensive long-range planning system and a very complete program structure for the Executive Branch of the State Government. The Department of Administration is required by the Florida Statutes to develop the Florida State Plan as a part of its long-range planning system for the State of Florida. The Florida State Plan must consist in part of the following:

- The overall long-range goals and objectives of the state government.
- The shorter term specific objectives and plans geared to and consistent with the long-term goals and objectives.
- Annual six-year development programs including recommended financial schedules for each of the planning areas.
- Alternate methods of accomplishing long- and short-range development plans including recommended financial schedules for each alternate method.
- A six-year schedule of proposed capital improvements.

Formal adoption of any substantial phase or part of the plan under current law depends upon the joint action of officers of the executive and legislative branches.

As one of the stages in preparation of the Florida State plan, Chapter 23 provides for the submission of six-year plans by each state agency in the following language:

"Upon request of the department of administration, each state agency shall annually file with the department its plan for each program under its jurisdiction to be undertaken or executed for the next six years. The plan shall include: (1) a full explanation of the need and justification for each program, (2) its relationship to other similar programs being carried out by state, local, federal or private agencies, and (3) the annual anticipated accomplishment of each program over the (next) six years as is feasible.

The Florida planning legislation further provides that "the planning and budget director shall submit to the Secretary recommendations for the annual development programs based on the information submitted by each state agency and his analysis of developmental needs and requirements." The plans and proposals of the various departments, though fitted to the tentative goals and objectives of the State program structure, have not been given the intensive review and recommendation required of the central executive and thus bear no recommendation for adoption beyond the budget year 1972-73.

The six-year plan represents one component of Florida's evolving and developing planning, programming, budgeting system. A capsule review of that system and progress in its development to date is presented below:

Florida's Planning and Budgeting System

There is a significant movement in the management and direction of governmental operations at both the state and local levels in the nation today which is often characterized as the installation of a PPBS (Planning, Programming, Budgeting System). Rather than being a precise methodology or procedure that can be automatically placed into operation within a governmental enterprise, it is rather a collection of several principles or emphases that, when combined, might be called a system.

These principles or emphases are:

(1) An emphasis on the fundamental purposes or objectives that the government exists to perform. This is an emphasis on the output rather than the input--an emphasis on what is to be accomplished rather than on the means of accomplishment. Using this approach, the end product of an expenditure must be assessed fully, prior to any consideration of the means (men, money, and materials).

(2) An emphasis, stemming from and consistent with (1) above, on program rather than organization; thus an emphasis upon what is to be accomplished, how and at what cost, rather than upon the continuation of established organizational staffing numbers and levels of expenditure. A budget which reflects this emphasis is called a "program budget".

(3) An emphasis upon the consideration of alternative ways of accomplishing the objectives of government rather than simply a continuation of the same means or processes year after year. In the consideration of alternatives a systematic comparison of relative costs and benefits under each alternative is required in a fully developed PPB system.

(4) An emphasis on the measurement of effectiveness of a governmental program in accomplishing the objectives it is designed to achieve. Further, the emphasis is on quantification, that is, on the explicit enumeration of targets to be achieved and the counting of results actually attained against those targets.

(5) An emphasis on multi-year planning and program budgeting, over at least a five year period.

Florida's commitment to an integrated Planning, Programming, Budgeting System is undeniable. The Florida Legislature, in three separate pieces of legislation, has clearly given its intent through:

(1) the state planning law, which provided for the formal annual development of the Florida State Six-Year Plan, for the articulation of the goals and objectives of the state government, for the projected, quantified annual accomplishments and financial schedules for each of the six years in each program area, and for the formal adoption of each of these;

(2) legislation requiring the Auditor General of the state to begin performance audits of all state operations. This obviously requires each department of the state to establish criteria for evaluation of its programs' effectiveness in order for the Auditor General to certify actual accomplishment compared with planned, budgeted, or anticipated accomplishment;

(3) the reorganization act of 1969, which lists as the responsibility of the head of every department a requirement that he "compile annually a comprehensive program budget covering such period as may be required, reflecting all program and fiscal matters relating to the operation of his department and each program, subprogram, and activity therein and such other matters as may be required by law;

(4) the revision of the budget law, also included in the reorganization act of 1969 and revised again in 1971, which provides that "the department (of administration) in consultation with the legislative auditor shall prescribe a budget system and related reporting and evaluation procedures to establish a plan for continuous planning and programming by all state agencies to provide for effective management practices and internal controls and for efficient operation."

Florida's State Program Structure

A major step toward the statewide implementation of PPBS was the development of a program structure encompassing all of the undertakings of each and every area and responsibility of the executive branch of state government. This program structure provides an orderly arrangement of state undertakings regardless of their organization placement and provides the framework for preparation of the Florida State Plan as well as of the executive program budget for annual presentation to the Florida legislature.

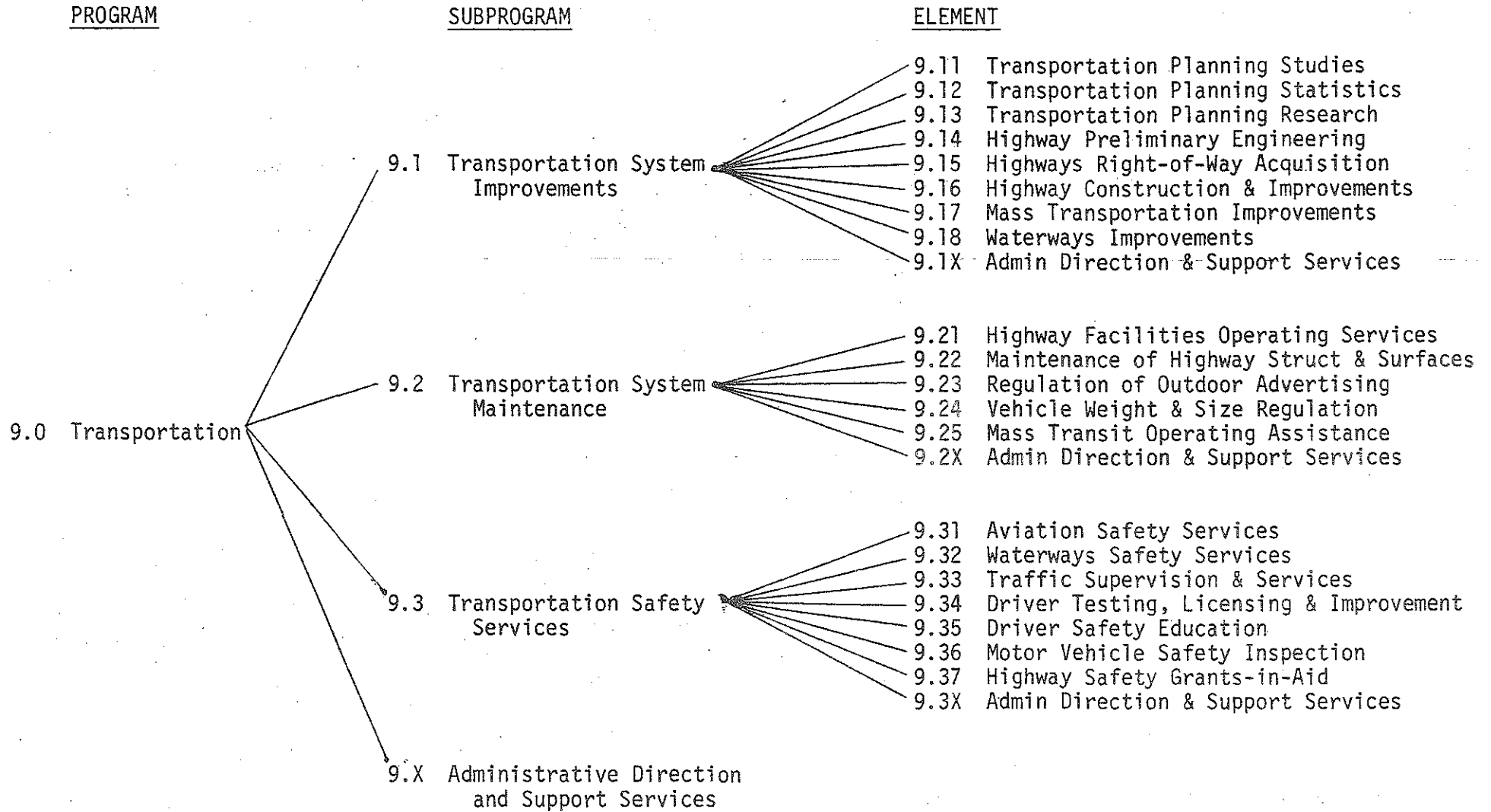
Completed first and published in August, 1970, the structure was re-examined, revised and re-published in July, 1971. Each and every current and proposed undertaking of each and every department of the executive branch of state government has been placed within the revised state program structure.

Florida's Planning, Programming, Budgeting System

Considerable effort was devoted towards identifying and mandating the use of specific program component measures - need, effectiveness, efficiency and workload - for each substantive program component. Significant progress was achieved in this endeavor. However, additional effort is felt to be required before program measures may be used with confidence as primary considerations in our budget analysis and recommendation process.

Florida believes it is necessary, before appropriations can be made on a program basis, to (a) develop, install and refine accounting systems and procedures dedicated to program accounting, and (b) determine the program level and the organizational level at which appropriations will be made and develop and implement the procedural mechanism required for the control of appropriations through the appropriation, encumbrance and disbursement processes. Because these essential ingredients to Florida's PPB system have not been fully provided for and because all of the problems cannot be foreseen at this time, appropriations were made in the traditional appropriation category method for fiscal year 1973-1974.

FLORIDA TRANSPORTATION PROGRAM STRUCTURE



PROGRAM: 9.0 TRANSPORTATION

GOAL: To facilitate social, economic, cultural and recreational interaction.

OBJECTIVES:

- To provide an integrated mix of transportation modes (aviation, highways, mass transit) which offer viable alternatives for the movement of people and goods;
- To reduce the losses in human lives, injuries, and property damage due to accidents in transportation;
- To protect the State's investment in transportation facilities;
- To have a positive effect on the physical, social and cultural environment of the State.

DEFINITION:

This program encompasses those undertakings of state government which are devoted to the planning, promotion, and/or development of the State's transportation system, as well as those regulatory and maintenance functions necessary for its efficient operation. The program includes the acquisition of land or right-of-way for transportation purposes; planning and design of facilities; construction of, or supervision over the construction of facilities; policing and certain other types of regulatory activities pertaining to the operation of the subsystems; licensing of operators and inspection of vehicles; coordinative efforts between the several levels of government and the private sectors; and those administrative and supportive services necessary for the achievement of program objectives.

Excluded are: motor vehicle licensing which is primarily for the purpose or objective of revenue collection; classroom driver/safety education; and pipeline regulation. Also excluded are regulation and taxing of common carriers which have as their objective the regulation of business and collection of revenue.

SUBPROGRAM: 9.1 TRANSPORTATION SYSTEM IMPROVEMENTS

Transportation System Improvements: Planning and construction of improvements to transportation systems.

DEFINITION:

The transportation system in Florida is composed of a number of modal subsystems including, but not limited to, highway transport; aviation; waterborne transport; rail; pipelines; and various forms of mass transit such as bus systems. This subprogram includes those state efforts which are directed toward the promotion and development of an integrated system which will enable the user to select the optimal mode for his transportation needs. It includes cooperation with and support of other levels of government and the private sector in providing a variety of facilities and services; inter-modal planning; and the design and construction of a statewide highway system.

OBJECTIVE:

To expand the social, cultural, economic, educational and recreational opportunities of all the people of the State, as well as those wishing to visit from other areas, by providing an integrated mix of transportation alternatives which offers a viable choice among modes for optimal service, comfort and economy.

ELEMENTS:

9.11 Transportation Planning Studies

Objective: To gather, analyze and evaluate on a continuing basis alternate transportation system concepts and configurations in order to facilitate orderly, progressive development of an integrated transportation system.

9.12 Transportation Planning Statistics

Objective: To efficiently process transportation planning data with the highest standards of economy, and to fulfill the specialized requirements of transportation engineers, planners, and public and private groups dependent upon the data.

9.13 Transportation Planning Research

Objective: To provide new planning techniques and methods which provide more accurate and efficient means for determining the near-term and long-range needs for new and/or modified transportation systems.

SUBPROGRAM: 9.1 TRANSPORTATION SYSTEM IMPROVEMENTS (Cont'd)

9.14 Highway Preliminary Engineering

Objective: To provide engineering services necessary to maintain an orderly flow of highway improvement projects which effectively implement the State highway construction program.

9.15 Highway Right-of-Way Acquisition

Objective: To efficiently and economically acquire such real estate as is required to provide rights-of-way for highway facility improvements.

9.16 Highway Construction and Improvements

Objective: To supervise the construction of highway improvements as programmed in the Five Year Construction Plan and Work Program to insure that they are constructed efficiently and economically in accordance with specifications.

9.17 Mass Transportation Improvements

Objective: To extend the coverage and improve the levels of service provided by surface transit systems, air carriers, and general aviation, and promote the development and implementation of technologically advanced mass transportation systems.

9.18 Waterways Improvements

Objective: To develop an integrated system of navigable waterways, ports, and harbors which is adequate for the shipping, travel, and recreational needs of waterborne transportation in the state.

Summary of Agencies' Plans

Short range plans for transportation appear to be based upon several assumptions involving the federal aid programs. Accordingly, agency efforts are to be directed toward achieving a posture designed to maximize the capture of discretionary federal aid as it becomes available.

SUBPROGRAM: 9.2 TRANSPORTATION SYSTEM MAINTENANCE

Transportation System Maintenance: Protecting the state's investments in transportation systems.

DEFINITIONS:

The state responsibility for maintenance and operation of transportation systems is presently limited to the highway system; however, this subprogram will include all state supported efforts relating to the maintenance and operation of highways of various classifications, bridges, tunnels, ferries, toll facilities, and all other components of the highway system including related appurtenances; and state support for the operation or maintenance of other modes of transportation.

OBJECTIVE:

To optimize the combined costs and benefits of the transportation systems, considering the effect upon the environmental, aesthetic, and social values of the people of the state, and the economic and and social benefits which can be accrued.

ELEMENTS:

9.21 Highway Facilities Operating Services

Objective: To manage and operate all facilities to the end that each functions on a profit making basis and provide for the timely liquidation of its indebtedness while providing a high level of service and convenience to its patrons.

9.22 Maintenance of Highway Structures and Surfaces

Objective: To provide for safe and efficient movement of persons and goods by maintaining highways and public service facilities to a safety and quality level that preserves the state's investment.

9.23 Regulation of Outdoor Advertising

Objective: To provide for the movement of persons and goods safely and enjoyably through regulations which preclude the erection of distracting and/or unsightly signs, and/or other advertising material adjacent to highways.

SUBPROGRAM: 9.2 TRANSPORTATION SYSTEM MAINTENANCE (Cont'd)

9.24 Vehicle Weight and Size Regulation

Objective: To preclude damage to the State highway system and excessive maintenance costs through regulation of the weight and size of vehicles using the State highway system.

9.25 Mass Transportation Systems Operating Assistance

Objective: To provide interim service to patrons of mass transportation systems through short-term financial assistance.

Summary of Agencies' Plans

The six-year agency plans project a 52% increase in maintenance and operating costs between 1971 and 1978; these costs are borne entirely by state (and local) fuel tax revenues and toll collections.

Agency efforts are directed toward increasing efficiency and productivity through organizational and technological improvements. Recent legislation provides the opportunity for counties to assume the management and operation of their own maintenance programs on certain components of the highway system, an option several counties have exercised. It may be several years before the advantages or disadvantages of this system can be accurately assessed, however.

SUBPROGRAM: 9.3 TRANSPORTATION SAFETY SERVICES

Transportation Safety Services: Regulatory and educational efforts aimed at reducing losses due to transportation-related accidents.

DEFINITION:

This subprogram includes those undertakings of state government which are concerned with transportation safety, protection of lives and property through the enforcement of laws and regulations and educational efforts directed at the users of the transportation system. Included will be such activities as: inspection of vehicles and facilities for operational safety; examination and licensing of operators; police traffic supervision and services; accident data collection and analysis; safety education; and the planning and administration of highway safety grants-in-aid to units of local government.

OBJECTIVE:

To reduce the losses in human lives, injuries, and property damage due to accidents in transportation.

ELEMENTS:

9.31 Aviation Safety Services

OBJECTIVE: To promote the safe and efficient movement of people and goods by air through the reduction of the probability of accidents involving aircraft in the state.

9.32 Waterways Safety Services

OBJECTIVE: To promote the full utilization of the State's waterways for commercial and recreational purposes through enforcement and educational efforts tending to minimize the likelihood of boating accidents.

9.33 Traffic Supervision and Services

OBJECTIVE: To reduce the accident rate, death rate and property damage rate due to highway accidents.

SUBPROGRAM: 9.3 TRANSPORTATION SAFETY SERVICES (Cont'd)

9.34 Driver Testing, Licensing, and Improvement

OBJECTIVE: To reduce the accident rate, fatality rate, and property damage rate through efforts aimed at insuring the proficiency of licensed drivers.

9.35 Driver Safety Education

OBJECTIVE: Reduce the accident rate, death rate, and property damage rate through safety education of motorists and pedestrians.

9.36 Motor Vehicle Safety Inspection

OBJECTIVE: To reduce the accident rate, death rate, and property damage rate caused by unsafe vehicles.

9.37 Highway Safety Grants-in-Aid

OBJECTIVE: To reduce the accident rate, death rate, and property damage rate due to highway accidents through the implementation of the State's responsibilities under the National Highway Safety Act of 1966.

Summary of Agencies' Plans

Narrative summary of agency plans for improved safety through increased levels of enforcement of traffic rules and regulations, vehicular inspections, etc.

DISCUSSION WITH FLORIDA STATE BUDGET DIVISION

Talked to Mr. Jim Ward, who is responsible for development of the Transportation Structure for Florida, which is located in the State Budget Division, in the Florida Department of Administration.

History

The structure was first done in a study in 1968 of the State Road Commission which addressed the PPB structure and the organization. The structure was based on Federal categories such as urban-urban, urban-rural, inter-urban, etc. This proved to be unworkable from the standpoint of obtaining requisite data, and felt to be unnecessary by the legislature.

The current structure relates to current organizations and accounting systems and was first used in FY 72. It was discussed on an element basis by the legislature this year, and decisions were made on basis of program budget. The structure will be used again next year and is 98% complete. The entire structure was coordinated with legislative committees and then presented to the DOT. Florida now has a DOT. The focus is on starting with maintenance and maintenance standards and then proceeding to allocate remainder to new projects.

Relationship to Organizational and Accounting Structure

The lowest level is the sub-element level which corresponds to organizational units. The 400 cost centers used by the Florida DOT all fit into elements and sub-elements. The structure was developed by starting at the bottom using the manuals for the DOT accounting system. The structure encompasses the entire DOT plus some of the safety programs of the State Police.

Impacts

Objectives are stated in terms of statements relating to environmental, social and safety concerns. There are no quantified impact indicators per-se. These objectives seem rather to be addressed through the planning process. Specifically, the State develops a Department Work Program, which is a five-year plan based upon public hearings, and meetings with county and local officials and planning agencies. This process determines priority of construction projects. It is further constrained by available funding. These plans are then directly tied to the program structure. For example, the number of lane miles to be constructed, by category, must follow the plan.

Quantifiable Measures

Quantifiable measures are presented at three levels:

- Needs estimates
- Effectiveness measures
- Efficiency measures
- Workload measures

Needs Estimates

These include:

- lane miles to be constructed (lane miles have been selected as more meaningful measure than road miles)
- lane miles maintained at level of quality specified by state standards

Effectiveness Measures

Examples:

- percent of standards met for maintenance
- percent of roads meeting specifications (currently 1/2 or 1% not eligible for Federal funding because below specifications)

Efficiency Measures

Examples:

- Cost per lane mile for maintenance at actual level and cost per lane mile meeting 100% of standards (currently 77% of standards met)
- With safety specific studies on roads with high accident rates to define needed roadway improvements
- For construction - cost per lane mile, cost of supervision and inspection as % of contract price, etc.

Workload Measures

Examples are:

Maintenance

- Acres mowed large machines
- Acres mowed small machines
- Acres mowed hand machines
- Acres treated with chemicals
- Number signs maintained

Florida State Plan

This year the Florida legislature separated a Budget Division and Planning Division. An out year document was prepared, just one year but this has been dropped. It is part of the basis for planning process, such as Department Work Plans.

Data Requirements

All data currently available. Much of statistics come from traffic flow data, deficiency rating system, etc., especially for the planning aspect.

Data computerized includes number of signs in state system, lane miles, etc. by urban/rural and Federal Aid and State Classification.

Future

Analysis to tie in time back to system. For example, when will 98% level be met for maintenance with respect to standards?

GEORGIA

Georgia produced a budget document in two parts for the fiscal years 1974-1979, Volume II being a "programmatic display" supplement to the executive budget. This is required under Georgia Act 1066 which includes the following requirements:

- (1) Office of Planning & Budget directed to prepare and annually update the Biennial Development Plan;
- (2) Provides that each program shall have objectives, alternative solutions and expenditure plans;
- (3) There shall be a continuous review of programs to determine their consistency with long-range policies and goals; and
- (4) Governor shall submit the State Development Program to the General Assembly along with the executive budget.

The State government has been organized into seven Program Categories.

The first part of Volume II contains a summary of the State Development Program. The recommended expenditures for each major program category are summarized, and a graphic comparison is shown. A brief narrative outlines demographic, socio-economic and physical conditions and trends in Georgia. Five-year projections are given for all programs.

The second part of Volume II is divided into seven sections, one for each Major Program Category. At the beginning of each section, the major program Goal is stated; the programs of the category are listed; a major program financial summary is provided, and the major program is assessed. Following this information is a summary of each program; the objective is stated; activities which make up the program are listed; program financial summary is presented. Narrative is included that identifies resources and functions, and where possible, planned achievements or workload data.

GEORGIA

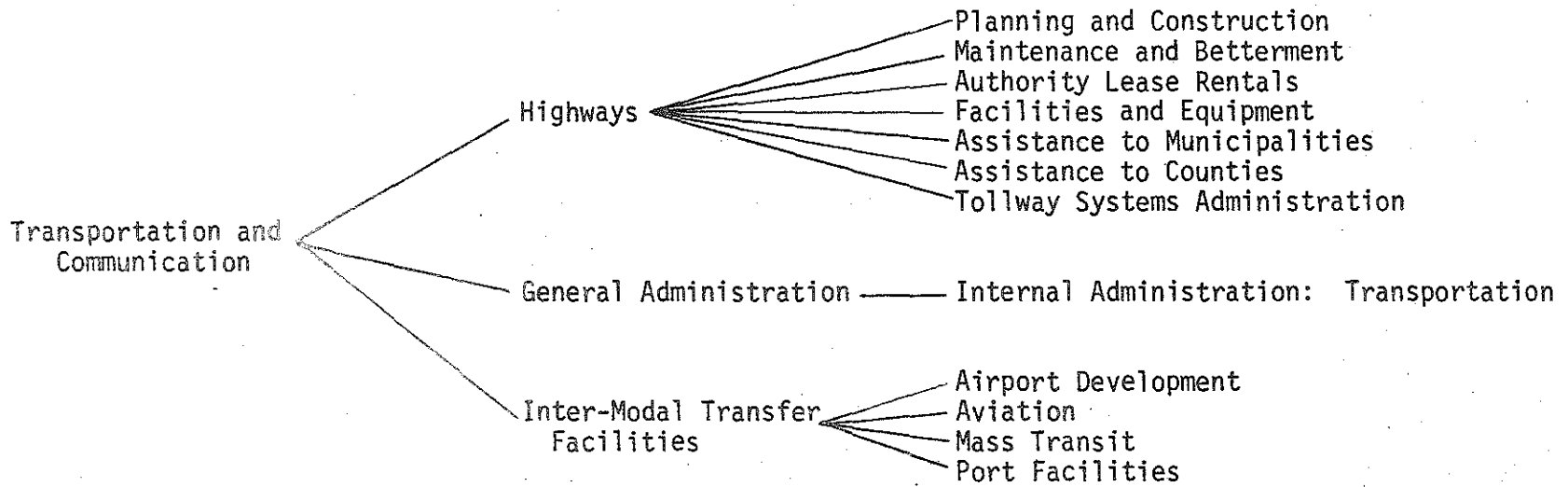
TRANSPORTATION AND COMMUNICATION

PROGRAM STRUCTURE

MAJOR PROGRAM CATEGORY

PROGRAM

ACTIVITIES



MAJOR PROGRAM CATEGORY
TRANSPORTATION AND COMMUNICATION

GOAL: To develop and maintain a comprehensive transportation and communications network that will enable all Georgians to have safe, efficient and economical access to the activities, services and facilities within the state and in adjoining states.

PROGRAMS

Highways
General Administration
Inter-Modal Transfer Facilities

MAJOR PROGRAM OVERVIEW:

This is a narrative summary of the activities and plans for the transportation system of the State of Georgia.

PROGRAM: HIGHWAYS

OBJECTIVE:

To provide an adequate highway system for the safe, efficient, and economical movement of people and goods.

ACTIVITIES

Planning and Construction
Maintenance and Betterment
Authority Lease Rentals
Facilities and Equipment
Assistance to Municipalities
Assistance to Counties
Tollway Systems Administration

AGENCIES

Transportation
Transportation
Transportation
Transportation
Transportation
Transportation

ASSESSMENT:

A narrative summary of highway construction statistics, funding levels and sources, etc.

ACTIVITIES

Planning and Construction

PURPOSE: To provide an adequate system of roads and bridges for the movement of people and goods.

RESOURCES:

FUNCTIONS:

WORKLOAD DATA:

- No. of projects programmed
- Miles of location studies
- Miles of photogrammetric data
- No. of property appraisals
- No. of relocations
- Miles of State Highway System constructed

PROGRAM: HIGHWAYS (Cont'd)

Authority Lease Rentals:

PURPOSE: To provide lease rental financing for highway construction and maintenance.

RESOURCES:

FUNCTIONS:

PLANNED ACHIEVEMENTS:

Not applicable

Maintenance and Betterments

PURPOSE: To maintain and improve roads and bridges.

RESOURCES:

FUNCTIONS:

WORKLOAD DATA:

The State's current inventory of 17,887 miles of road includes: 37,800 lane miles of paved highways; 300 lane miles of unpaved highways, 5,845 bridges, related shoulders, ditches, fences, rest areas, guardrails and signs.

- Miles of road contracted for patching, leveling and resurfacing
- Lane miles painted
- Linear feet bridge cleaned and painted
- Number of markers installed
- Signs processed
- Square feet of metal reclaimed

Facilities and Equipment

PURPOSE: To provide land, buildings and equipment to support construction and maintenance and State roads and bridges.

RESOURCES:

FUNCTIONS:

PLANNED ACHIEVEMENTS:

Not applicable

PROGRAM: HIGHWAYS (Cont'd)

Tollway Systems Administration

PURPOSE: To administer the development, financing, construction and operation of existing and proposed toll highway facilities.

RESOURCES:

FUNCTIONS:

WORKLOAD DATA:

- Projects anticipated
- Public hearings
- Public meetings
- Public exhibitions
- Studies completed
- Prospective consultants reviewed

Assistance to Municipalities

PURPOSE: To provide financial assistance to municipalities to construct, maintain and improve roads and bridges.

RESOURCES:

FUNCTIONS:

PLANNED ACHIEVEMENTS:

- Construction, maintenance and improvement of roads and bridges within Georgia's municipalities.

Assistance to Counties

PURPOSE: To provide financial assistance to counties to construct, maintain and improve roads and bridges.

RESOURCES:

FUNCTIONS:

PLANNED ACHIEVEMENTS:

- Construction, maintenance and improvement of roads and bridges within Georgia's counties.

PROGRAM: GENERAL ADMINISTRATION:

OBJECTIVE:

To provide administrative support for the Department of Transportation.

ACTIVITIES:

Internal Administration: Transportation

PURPOSE: To manage, administer and support the construction and maintenance of transportation facilities.

RESOURCES:

FUNCTIONS:

PLANNED ACHIEVEMENTS:

Not applicable.

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PROGRAM: INTER-MODAL TRANSFER FACILITIES

OBJECTIVE:

To provide for the fast, efficient, and safe transport of people and goods and their transfer from one transportation mode to another.

ACTIVITIES

Airport Development
Aviation
Mass Transit
Port Facilities

AGENCIES

Transportation
Transportation
Transportation
Community Development

ASSESSMENT:

This is a narrative summary of the current status of air, rail and water transportation systems in the state of Georgia. An excellent example of an assessment is quoted from this section:

"Railroad passenger service in the State is poor."

ACTIVITIES:

Airport Development

PURPOSE: To aid in construction of an adequate system of airports in the State.

RESOURCES:

FUNCTIONS:

WORKLOAD DATA:

- Number of projects assisted
- Number of seminars and courses held

PROGRAM: INTER-MODAL TRANSFER FACILITIES (Cont'd)

Aviation

PURPOSE: To assist in planning and development of a comprehensive system of airports in the State.

RESOURCES:

FUNCTIONS:

WORKLOAD DATA:

- Number of airport master plans assisted

Mass Transit

PURPOSE: To assist in planning and development of adequate mass transportation facilities in the State.

RESOURCES:

FUNCTIONS:

WORKLOAD DATA:

- Number of technical studies annotated

PORT FACILITIES

PURPOSE: To provide for pass-through funds to Georgia Ports Authority for debt services.

RESOURCES:

FUNCTIONS:

PLANNED ACHIEVEMENTS:

Not applicable

OREGON

The Oregon budget combines features of the line-item, performance and program budgets. The program structure is modally oriented. It includes output indicators, defined as quantitative measures of results which indicate the degree of accomplishment toward a specific objective. These output indicators are not specifically identified for every program, as it has not been possible to identify the measurable results in each case.

Workload indices have been emphasized in the 1973-75 recommended budget; in general, these have become more meaningful as the agencies have become more experienced in analyzing their activities and projecting their workload trends.

The 1973-75 recommended budget continues the practice of segregating all expenditure items on the basis of whether the expenditure is proposed from the General Fund, Federal Funds or Other Funds. This breakdown has become traditional since federal grants have become a major source of funding for many state programs. Through this method of identification, funding relationships are more easily understood and the Executive Department and the Legislature can better anticipate problems that might arise within particular programs if federal financing were reduced or withdrawn.

The budget review process is facilitated by some method of classifying estimated costs. In the 1973-75 budget, separate expenditure classifications separate the cost of continuing present services from the cost of expanded or improved services. These classifications, briefly defined, are:

Base Budget - the costs necessary to continue in 1973-75 the expenditure levels approved by the 1971 Legislative Assembly. Interim modifications by the Emergency Board are also included in this classification.

Increased Workload - additional costs related to increases in the workload

Program Improvements - increased costs resulting from expansion of existing programs beyond the level included in base budget or increased workload. Operation of new facilities and new programs are program improvements.

Since the services which a government could provide are infinite and the resources available to pay for these services are limited, the construction of a budget requires the reexamination of objectives and rearrangement of priorities so that the public's most urgent needs can be met with the resources available. The state-wide objectives were accumulated in 1970 in the document "Goals for a Liveable Oregon" and produced one extremely controversial objective for the State. This objective was in essence, "Oregon should discourage any tourists from coming into the state, and further discourage those who did come from staying in Oregon." This was accomplished in the 1973-75 budget with the following statement: "The Tourist Information Program is reduced to reflect de-emphasis in attracting tourists to Oregon." A discussion with Jon Yunker, who is responsible for Transportation Programs on the Budget Division Staff, revealed, however, that these state goals were for the most part not used in the 1973-75 budget process.

Oregon's budget also included several pages of graphical representation of objectives, improvement needs, and expenditure levels. These graphs included the following:

- (1) The State Highway's Division's objectives are to construct and maintain an efficient and safe highway system; ensure the orderly growth of tourism in the state; and achieve optimum recreational use of the state's public and private lands. The following chart shows the increasing demand placed on the state highway system.

Annual Billion Ton-Miles Over Highway System

Vs

Annual Billion Vehicle-Miles Traveled on Highway System

- (2) The highway construction budget provides for shifting concentration from the interstate highway system which is nearing completion to the ABC system which consists of crucial primary and secondary roads. The following chart depicts the level of increase in ABC needs as compared to available resources to meet these needs.
- (3) The objective of the Aeronautics Division is to promote and increase the availability of efficient and safe air transportation services. The following chart depicts the "Estimated Total Oregon Airport Construction and Improvement Needs."
- (4) The following charts show the projected increase in Motor Vehicles Division Workload.
 - (a) Vehicle Registration and Titling
 - (b) Driver's License Originals and Renewals
 - (c) Suspensions Except "Driving While Suspended" and "Failure to Furnish Security Deposit"
- (5) This chart depicts Oregon's Ports' anticipated expenditure for waterway and harbor improvement needs, as identified in the 1972 National Transportation Needs Study.

- (6) This graph illustrates the growth that mass transit has experienced since state assistance began in 1970. Growth is measured by the number of mass transit patrons in six Oregon urban areas.
- (7) The objective of the Traffic Safety Commission is to promote traffic safety in Oregon primarily through the use of federal grants to state agencies and local governments. This graph depicts the obligation of Section 402 federal funds to Oregon's Traffic Safety Program.

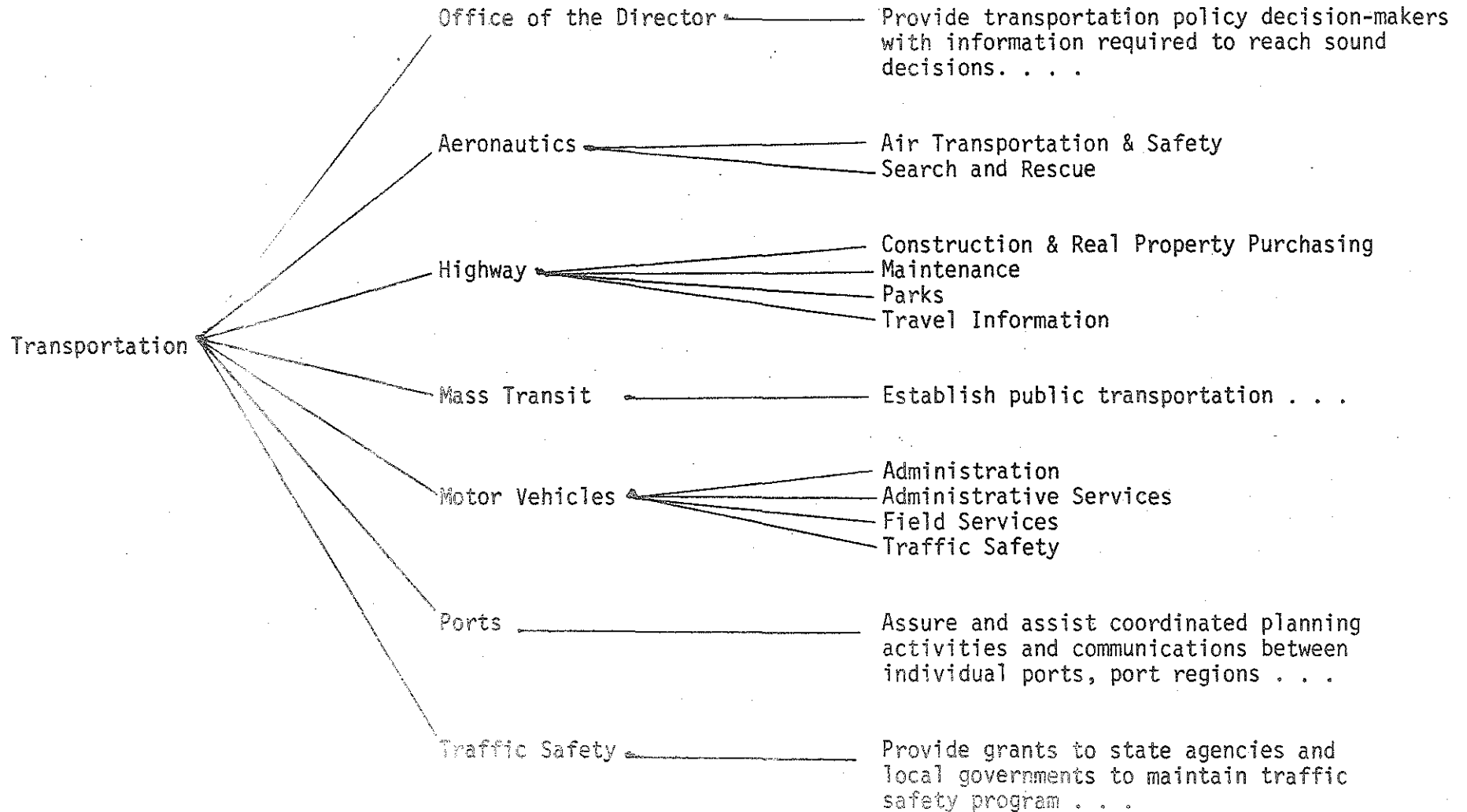
OREGON

DEPARTMENT OF TRANSPORTATION PROGRAM STRUCTURE

PROGRAM

DIVISION

PROGRAMS OR ACTIVITIES



DEPARTMENT OF TRANSPORTATION

OFFICE OF THE DIRECTOR

OBJECTIVES:

Develop long-range comprehensive transportation plans and coordinate transportation activities of the state.

PROGRAMS OR ACTIVITIES:

Provide transportation policy decision-makers with information required to reach sound decisions. Promote, assist and support a coordinated transportation policy-making mechanism and process. Improve coordination and communications among state and local agencies concerned with transportation planning and development. Develop Oregon's portion of the national transportation plan; assist in aviation planning and develop and support regional transportation committees. Participate in the State Transportation Coordinating Committee and provide assistance to the Governor's Transportation Council.

RECOMMENDED PROGRAM LEVEL:

The recommended budget provides for minimal increase in base budget activities. There is recommended a major program improvement to provide financial assistance to districts for development and continuation of district transportation committees.

OUTPUT INDICATORS:

None Identified

WORKLOAD INDICES:

None Identified

PROGRAM ANALYSIS:

AERONAUTICS DIVISION

OBJECTIVES:

Promote and increase the availability of efficient and safe air transportation services.

PROGRAMS OR ACTIVITIES:

Air Transportation and Safety - provide supportive services to local governments in planning and developing local airports and construct, improve and maintain State airports. Inspect local airport facilities to ensure adherence to safety standards and provide a variety of services to ensure aeronautical safety and refresher training for pilots. Promote public knowledge of air transportation and transportation facilities through public relations programs and participate in the development of planning studies to provide for the orderly growth of air transportation.

Search and Rescue - coordinate search and rescue efforts.

RECOMMENDED PROGRAM LEVEL:

Narrative discussing recommended budget appropriation levels.

OUTPUT INDICATORS:

- Number of new state and local airports constructed
- Number of existing airports improved
- Number of state-owned airports receiving maintenance work
- Number of airport construction improvement and zoning plans prepared jointly with municipalities
- Maintenance of accident rate in Oregon below national average -
 - Accidents per 1,000 air hours
 - Fatalities per million miles flown
- Number of domestic air service patterns improved

WORKLOAD INDICES:

- Number of state-owned airport construction projects supervised
- Number of state-owned airports requiring vegetation control
- Number of airports from which obstacles to aircraft operations removed
- Number of municipalities aided with engineering and other technical assistance in the development of airport plans
- Number of municipalities aided with technical assistance in constructing or improving airports
- Number of civil pilots registered
- Number of active aircraft registered
- Number of airports licensed annually
- Number of aircraft dealers licensed

WORKLOAD INDICES: (Cont'd)

- Number of airports inspected for safety standards
- Number of publicly-owned airports provided with runway and taxiway lighting
- Number of pilot hours expended in providing air transportation to state government officials
- Number of flight school inspection

HIGHWAY DIVISION

OBJECTIVES:

Construct and maintain an efficient and safe highway system; ensure the orderly growth of tourism in the state; and achieve optimum recreational growth of the state's public and private lands.

PROGRAMS OR ACTIVITIES:

Construction and Real Property Purchasing - develop and extend the interstate and noninterstate highway systems; upgrade substandard highways and aid local governments in the development of urban highway systems.

Maintenance - maintain state highways in a serviceable condition; sand highways; remove snow and slides and maintain highway surfaces, bridges and shoulders.

Parks - acquire land for park sites; construct, operate and maintain park sites and aid in implementing the development of the Willamette River Park System

Travel Information - advertise the attributes of the State of Oregon in neighboring states; distribute literature and provide information centers at state borders.

RECOMMENDED PROGRAM LEVEL:

The recommended budget provides for the continuation of highway construction at the present level. Also included in the construction budget is \$8 million for a new Highway Office Building and \$2,750,345 for planned construction of a new Materials Lab Building

Resources are provided to maintain current levels of operation and development of state parks.

The Tourist Information Program is reduced to reflect de-emphasis in attracting tourists to Oregon

The Maintenance Program has been increased to keep up with workload

OUTPUT INDICATORS: CONSTRUCTION AND REAL PROPERTY PURCHASING

- Stabilize highway deaths per hundred million miles
- Stabilize highway injuries per hundred million miles
- Stabilize highway accidents per hundred million miles

WORKLOAD INDICES: CONSTRUCTION AND REAL PROPERTY PURCHASING

- Complete or improve miles of interstate
- Complete or improve miles of noninterstate
- Initiate or continue local transportation planning studies
- Acquire scenic areas (acres)
- Acquire right-of-way - interstate (acres)
- Acquire right-of-way - noninterstate (acres)

OUTPUT INDICATORS: MAINTENANCE

- Number of lane miles maintained
- Number of vehicle miles maintained (in millions)
- Number of ton miles maintained (in millions)

WORKLOAD INDICES: MAINTENANCE

- Tons of asphaltic concrete used in surface maintenance
- Winter sanding (cubic yards)
- Pavement line painting (miles)
- Bridges maintained
- Ski area parking lots maintained

OUTPUT INDICATORS: PARKS

- Number of park visitations (in millions)

WORKLOAD INDICES: PARKS

- Acres acquired for park sites
- Campsites developed
- Beach access sites required
- Park units operated and maintained

OUTPUT INDICATORS: TRAVEL INFORMATION

- Average annual out-of-state visitors expenditures (in millions)

WORKLOAD INDICES:

- Number of visitors to the Capitol Guide Service at Salem
- Advertising - inquiries
- Printing and distribution of literature

MASS TRANSIT DIVISION

OBJECTIVES:

Develop an effective state-wide mass transit system.

PROGRAMS OR ACTIVITIES:

Establish public transportation as a viable part of Oregon's total transportation system and develop public transportation to meet the minimum requirements of those most in need of its service. Coordinate state-wide transportation activities. Provide and participate in planning programs for state-wide public transportation. Provide and participate in research on state-wide transportation issues.

RECOMMENDED PROGRAM LEVEL:

The recommended program level includes the addition of a professional planner and research analyst. There is also recommended support for a Willamette Valley Transportation Plan and funds to assist in local community planning studies.

OUTPUT INDICATORS:

- Number of patrons of publicly owned transit systems
- Number of cities offering public transportation services
- Number of systems with reduced fares for senior citizens
- Percentage of passenger increases -
 - Portland
 - Salem
 - Eugene

WORKLOAD INDICES:

- Conduct special public transportation studies and prepare reports
- Provide technical advice to small cities interested in offering public transportation services -
 - number of cities
- Participate in all hearings and meetings relative to public transportation

MOTOR VEHICLES DIVISION

OBJECTIVES:

Reduce loss of life and property due to unsafe driving and collect fuels tax and automobile licensing and registration revenues.

PROGRAMS OR ACTIVITIES:

Administration - develop agency goals and provide agency personnel with the tools they need to accomplish these goals.

Administrative Services - Provide agency support including accounting, supply, records, correspondence, data processing and fuels tax collection and audit.

Field Services - administer examination of vision, motor vehicle law and driving skills and collect drivers' license and registration fees within communities.

Traffic Safety -determine financial responsibility of drivers involved in accidents and conduct and develop driver improvement programs.

RECOMMENDED PROGRAM LEVEL:

Narrative of budget recommendations for level of effort.

ADMINISTRATION

OUTPUT INDICATORS: None identified

WORKLOAD INDICES: None identified

ADMINISTRATIVE SERVICES

OUTPUT INDICATORS: None identified

WORKLOAD INDICES: None identified

FIELD SERVICES

OUTPUT INDICATORS: None identified

WORKLOAD INDICES:

- Number of vehicle title applications processed
- Number of vehicle registration applications processed
- Number of driver license permit applications processed
- Number of driver examinations
- Number of dealer, transporter and wrecker licenses processed

TRAFFIC SAFETY PROGRAM

OUTPUT INDICATORS: None identified

WORKLOAD INDICES:

- Number of driver improvement interviews
- Number of driver improvement letters
- Number of driver improvement education courses completed
- Number of insurance certificates filed and cancellations processed
- Number of licenses suspended
- Number of vehicles inspected for safety

PORTS DIVISION

OBJECTIVES:

Assure coordinated planning for the development of the state's port regions and assure the highest quality in local port district development.

PROGRAMS OR ACTIVITIES:

Assure and assist coordinated planning activities and communications between individual ports, port regions and other governmental agencies; assist other agencies in studies relating to Oregon's port districts; assist local port authorities by developing needed information; and administer procedure for formation of port authorities.

RECOMMENDED PROGRAM LEVEL:

Narrative of budget recommendations for level of effort.

OUTPUT INDICATORS: None identified

WORKLOAD INDICES: None identified

TRAFFIC SAFETY COMMISSION

OBJECTIVES:

Promote traffic safety in the state.

PROGRAMS OR ACTIVITIES:

Provide grants to state agencies and local governments to maintain traffic safety program, provide funds for traffic safety research, coordinate traffic safety activities with state agencies and advise judiciary and law enforcement personnel on traffic safety.

RECOMMENDED PROGRAM LEVEL:

Narrative of budget recommendations for level of effort.

OUTPUT INDICATORS:

- Reduce number of fatalities per 100 million miles traveled

WORKLOAD INDICES:

- Number of federally financed local projects

TRAVEL INFORMATION COUNCIL

OBJECTIVES:

Provide a comprehensive motorist information program that will serve the traveling public and benefit public safety on Oregon's highways. Promulgate regulations to preserve the natural beauty of Oregon's highways and adjacent areas.

PROGRAMS OR ACTIVITIES:

Develop a Motorist Information program and a Sign Plaza program and promulgate regulations to control on-premise signs and signing in unzoned commercial and industrial areas.

RECOMMENDED PROGRAM LEVEL:

Narrative of budget recommendations for level of effort.

OUTPUT INDICATORS: None Identified

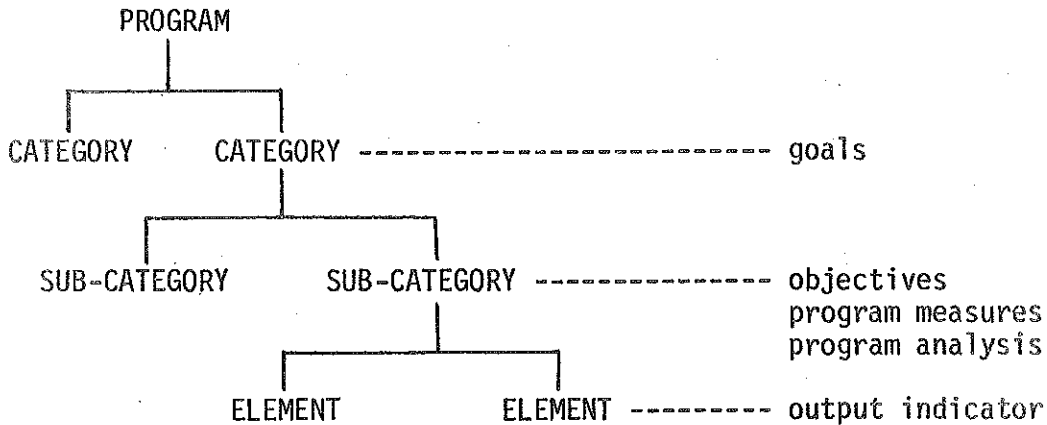
WORKLOAD INDICES:

- Number of on-premise sign variance requests reviewed
- Number of unzoned commercial-industrial area sign applications processed
- Number of gas station and food and lodging motorist information sign waiver requests reviewed
- Number of motorist information signs erected
- Number of directional signs erected
- Number of sign plazas designed

PENNSYLVANIA

The core of Pennsylvania's program planning and budgeting system is a multi-year program planning process, which is integrated directly into the annual budgeting process. The main components of the system are statewide and agency program structures, statewide and agency program plans, gubernatorial policy guidelines, and a procedure for revising authorized programs. It is, of course, very similar to Michigan's structure.

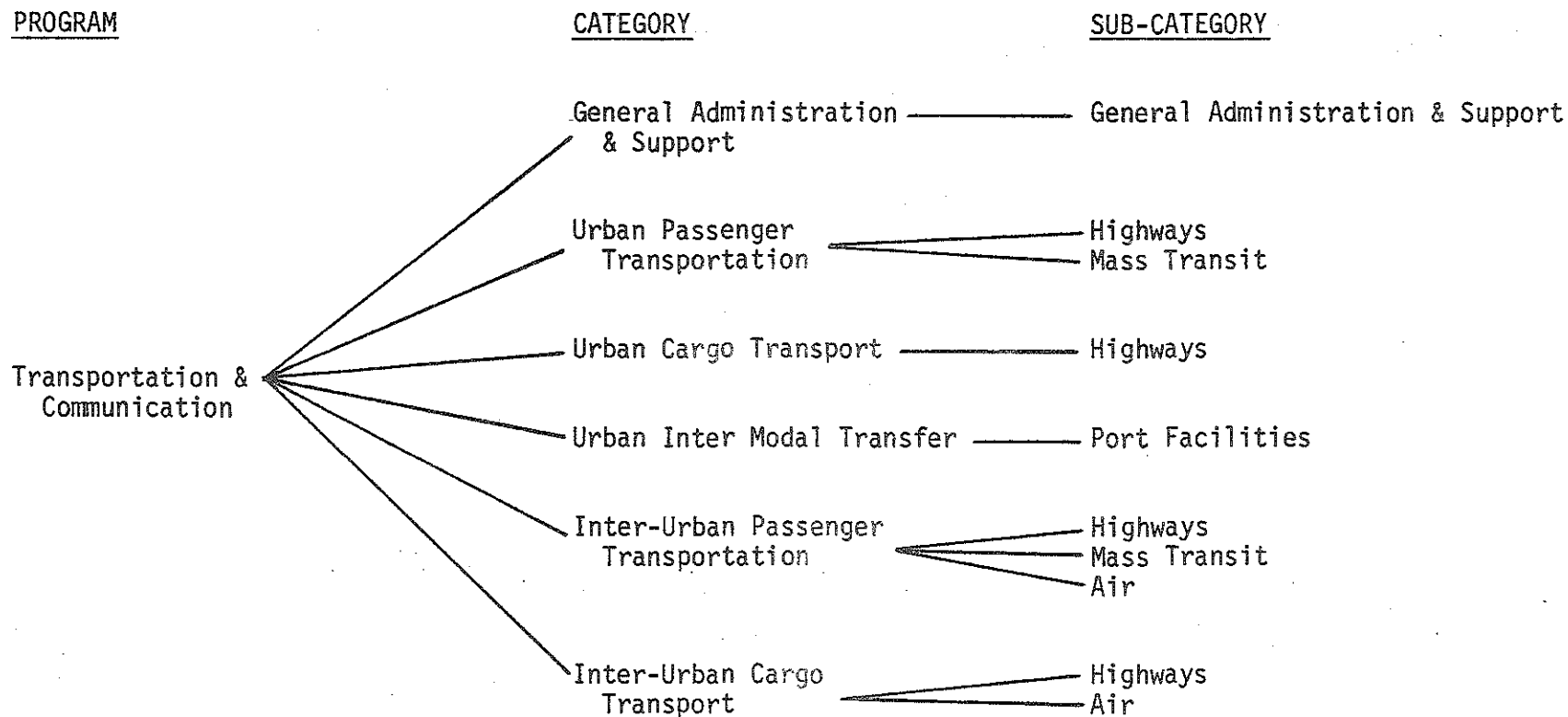
The program structure is based on general government-wide goals and, in some instances, transcend organizational lines. Following is an outline of the basic structure:



The 1972-1973 fiscal year budget for the Transportation and Communication Program adheres closely to the above format, although it does not include the breakdown to the element level, nor does it include the output indicators associated with the element level. The basic program plan for the State also specifies that a final statement projecting "needs" and "demands" over the next five years be prepared and included with the executive budget, however, this was not available for the 1973-74 budget.

PENNSYLVANIA

TRANSPORTATION AND COMMUNICATION PROGRAM STRUCTURE



CATEGORY: GENERAL ADMINISTRATION AND SUPPORT

GOAL: To provide an effective administrative system through which the substantive goals and objectives of the Commonwealth can be achieved.

This category contains those necessary services which cannot reasonably be charged directly to special substantive programs due to their generalized nature. Such services include overall executive direction, manpower management, management information processing, procurement and distribution services, as well as other technical office support functions.

SUBCATEGORY: General Administration and Support

OBJECTIVE:

To provide an effective administrative system through which the substantive programs of the Commonwealth can be achieved.

PROGRAM ANALYSIS:

Narrative summary of the activities of this subcategory.

CATEGORY: URBAN PASSENGER TRANSPORTATION

GOAL: To provide, within urban areas, reasonably accessible means of moving people between their residences and the places where they work, shop, conduct business, or use recreational areas. The facilities engaged in moving people are to be designed and implemented in a coordinated network, recognizing that the mix between highways and mass transit can be used to shape the pattern and intensity of future urban growth in Pennsylvania's metropolitan areas.

SUBCATEGORY: URBAN PASSENGER TRANSPORTATION - HIGHWAYS

OBJECTIVE:

To connect residential neighborhoods and employment centers with an urban highway network capable of handling peak-hour traffic demand.

PROGRAM MEASURES:

- Passenger losses attributable to substandard urban highways
 - Time
 - Operating costs
 - Accident costs
- Passenger travel on urban highways (billions of vehicle miles)
 - Total travel
 - Percent of all urban trips
 - Travel on substandard highways
- Miles of urban highways
 - Total maintained
 - Substandard
 - Brought up to standard

PROGRAM ANALYSIS:

The program analysis for this subcategory is included here in its entirety as it is considered especially relevant.

Today's urban highway network falls far short of the objective stated above of adequately handling peak-hour traffic demand. During

rush hours congestion reigns supreme on our city streets, with most urban traffic travelling on capacity-deficient roads, while commuting speeds fall drastically. The new highways ostensibly built to alleviate this congestion tend to fill up as fast as they are built and only exacerbate the situation.

Meanwhile, the automobile continues to bring significant and increasing, undesirable social byproducts into the urban environment. Motor vehicles are the greatest single source of air pollution, producing up to 90% of all air pollution in some locations, over 60% nationwide. Vehicle-related facilities - roads and streets, parking, service stations, etc. - have become the dominant land use in most center cities, contributing to a diminishing tax base. Traffic deaths and injuries, incessant noise pollution, and increasing vehicular usage of rapidly-diminishing oil reserves are additional external results of an over-developed urban highway system.

This dominance of the automobile markedly discriminates against the under-privileged. While nine-tenths of all urban trips are made by cars, approximately one-fourth of Pennsylvania's adult population doesn't drive a car. In a recent year less than half of all black households and less than half of all families having incomes of under \$4,000 owned automobiles, yet urban highways have typically been built through low income and minority neighborhoods simply because the land was cheaper to acquire. Despite auto ownership in center city Philadelphia of only 0.65 autos per family compared to 1.20 for the metropolitan area as a whole, center city residents must bear to a far greater degree than their suburban neighbors the external effects of the automobile.

Even the positive effects claimed for urban highways are debatable. The massive "demand" for urban highways supposedly reflected in the program measures above in terms of vehicle miles of travel and percent of urban trips by automobile are arguably more a function of lack of alternative than of need. Economic arguments--the new industries, jobs, payrolls, and sales supposedly attracted by new and improved highways--lose validity to the extent that the phenomenon involved is often simply industries, jobs, payrolls, and sales transferring from one location to another, particularly from a dying center city out to its suburbs.

Time savings associated with improved highways is a nebulous theory and are probably never actually achieved in the magnitude claimed, since savings are typically calculated only before, but not after, the new road is built. In reality the new and improved highways tend to create their own new demand, fill up as fast as they are opened, and the new congestion results in little provable savings for users. Similarly, this lack of meaningful after-the-fact benefit analysis weakens the argument for claimed operating cost and accident savings.

While it is generally assumed that highways have a beneficial effect on land values in their vicinity and that the resultant increased tax revenues compensate for the lost land, there are indications that residential property values are becoming increasingly sensitive to the noise and air pollution resulting from close proximity to highways.

The "miles of urban highways" data shown in the Program Measures have been revised since last year to reflect updated urban-rural definitions. PennDOT has not yet made the corresponding adjustments to the travel and loss data.

The pressures to reduce reliance upon the personal automobile are ever increasing. In Pennsylvania's largest city, at least, limiting traffic is no longer simply an alternative that requires exploration. Philadelphia, according to Federal Environmental Protection Administration (EPA) officials, must reduce its vehicle traffic in order to meet air pollution ceilings mandated by law to be achieved by 1975. Even if automobile manufacturers meet their 1975 exhaust emission standards, the city will be unable to lower the carbon monoxide content of the air in its streets to the designated level without adopting extraordinary, innovative, demand-reducing measures. The EPA has outlined some of the options available: placing a heavy tax on off-street parking; increasing bridge tolls; stiffening on-street parking regulations; mandatory car pools; or even outright prohibition of automobiles during peak traffic hours.

If highways are to become a tool for the development of our urban areas, rather than a cause of their destruction, all the technology and planning skills at our disposal must be utilized to their fullest. The emphasis must shift to moving people, not vehicles, to protecting and enhancing the environment, not ignoring or dismissing the unwanted side-effects of an overreliance on highways.

SUBCATEGORY: URBAN PASSENGER TRANSPORTATION - MASS TRANSIT

OBJECTIVE:

To provide frequent, fast, inexpensive transit services between residential neighborhoods and employment centers at a level sufficient to alleviate prevailing pressures on urban road systems caused by congestion and lack of parking facilities.

PROGRAM MEASURES:

- Mass transit person-trips
Millions annually
Percent of all urban trips
- Passengers carried by State-assisted carriers
Millions annually
Percent of all transit passengers
Percent of all urban trips

PROGRAM ANALYSIS:

Narrative analysis of the problems, primarily, which exist with mass transit systems today.

CATEGORY: URBAN CARGO TRANSPORT

GOAL: To provide reasonably accessible means for moving the cargo necessary to support commercial and industrial activities in urban areas.

SUBCATEGORY: URBAN CARGO TRANSPORT - HIGHWAYS

OBJECTIVE:

To connect urban cargo-activity centers with a network of roads capable of handling heavy truck traffic.

PROGRAM MEASURES:

- Cargo losses attributable to substandard urban highways
 - Time
 - Operating Costs
- Cargo travel on urban highways (billions of vehicle-miles)
 - Total travel
 - Travel on substandard highways
- Miles of urban highways
 - Total maintained
 - Substandard
 - Brought up to standard

PROGRAM ANALYSIS:

Narrative

CATEGORY: URBAN INTER-MODAL TRANSFER

GOAL: To provide passenger and cargo facilities which coordinate the various modes of transportation serving urban areas with the larger transportation systems feeding urban areas. The interacting effects of all of the various modes of transportation should be considered within this category: airports, port facilities, and truck, bus and rail terminals.

SUBCATEGORY: PORT FACILITIES

OBJECTIVE:

To promote utilization of the Ports of Philadelphia and Erie, and our navigable rivers, by shippers and freight forwarders, thereby stimulating Pennsylvania's economy while maintaining an effective inter-modal link in the Commonwealth's transportation system.

PROGRAM MEASURES:

- Value of cargo handled
Port of Philadelphia
Port of Erie
- Cargo received (thousands of short tons)
Port of Philadelphia
Port of Erie
- Cargo shipped (thousands of short tons)
Port of Philadelphia
Port of Erie

PROGRAM ANALYSIS:

Narrative

CATEGORY: INTER-URBAN PASSENGER TRANSPORTATION

GOAL: To provide a system of integrated transportation modes connecting rural areas and centers of population, sufficient to serve the needs of all citizens of the Commonwealth.

SUBCATEGORY: INTER-URBAN PASSENGER TRANSPORTATION - HIGHWAYS

OBJECTIVE:

To connect the major urban-activity centers with each other, with rural, farm, mining, and forest centers, and with recreational areas; to provide mobility to rural Pennsylvanians; and to provide a highway system capable of serving traffic entering or crossing the State from other parts of the nation.

PROGRAM MEASURES:

- Passenger losses attributable to substandard inter-urban highways
 - Time
 - Operating costs
 - Accident costs
- Passenger travel on inter-urban highways (billions of vehicle miles)
 - Total travel
 - Percent of all inter-urban trips
 - Travel on substandard highways
- Miles of inter-urban highways
 - Total maintained
 - Substandard
 - Brought up to standard

PROGRAM ANALYSIS:

Narrative

HIGHWAY LIBRARY
MICHIGAN DEPARTMENT OF STATE
HIGHWAYS
LANSING, MICH.
P. O. DRAWER "K" 48904

SUBCATEGORY: INTER-URBAN PASSENGER TRANSPORTATION - MASS TRANSIT

OBJECTIVE:

To facilitate the development of improved mass transit service between major urban areas of the Commonwealth, thus providing relief for the frequent utilization beyond capacity of intercity highway and air systems.

PROGRAM MEASURES:

- Present intercity passenger rail trips
- Potential new and diverted intercity passenger rail trips

PROGRAM ANALYSIS:

Narrative

SUBCATEGORY: INTER-URBAN PASSENGER TRANSPORTATION - AIR

OBJECTIVE:

To promote the development of a system of airport facilities adequate to meet the needs of the Commonwealth's citizens.

PROGRAM MEASURES:

- Airports in Pennsylvania
 - Total
 - Substandard
 - Brought up to standard
- Passengers on scheduled airlines
- Percent of total inter-city trips

PROGRAM ANALYSIS:

Narrative

CATEGORY: INTER-URBAN CARGO TRANSPORT

GOAL: To provide for mobility of cargo to and between populated areas and points in between at a rate sufficient to maintain or increase the commercial, industrial, and agricultural activity of those areas.

SUBCATEGORY: INTER-URBAN CARGO TRANSPORT - HIGHWAYS

OBJECTIVE:

To connect centers of population, farm, produce, and commercial areas, and recreation centers with a network of roads capable of handling the trucking and bus freight traffic necessary to sustain the Commonwealth's economy.

PROGRAM MEASURES:

- Cargo losses attributable to substandard inter-urban highways (millions of dollars)
 - Time
 - Operating costs
- Cargo travel on inter-urban highways (billions of vehicle-miles)
 - Total travel
 - Travel on substandard highways
- Miles of inter-urban highways
 - Total maintained
 - Substandard
 - Brought up to standard

PROGRAM ANALYSIS:

SUBCATEGORY: INTER-URBAN CARGO TRANSPORT - AIR

OBJECTIVE:

To provide an air-cargo system adequate in size and service level to satisfy present and expected future cargo traffic demands of the public, industry and commerce.

PROGRAM MEASURES:

- Airports in Pennsylvania
 - Total
 - Substandard
 - Brought up to standard
- State-owned airports
 - Operations handled
 - Tons of cargo handled
 - Percent increase in cargo handled

PROGRAM ANALYSIS:

Narrative

MINNESOTA

Minnesota's budget document was not available for review, however, data given here was obtained in a discussion with Mr. Steve Wolley, who has responsibility for the development of transportation programs in the Minnesota Department of Administration, Bureau of Budget and Management.

Mr. Wolley provided a document, entitled "The Functional Analysis of State Activities Performed by the Executive Branch." This document was prepared for the 1971-73 fiscal year and "refers to the inventory of activities of the executive branch" Activities with similar purposes and objectives have been grouped into major functional categories (i.e. Transportation, Education, Environmental Management, etc.), and further grouped into sub-functional categories. Several charts are provided for each functional category showing costs and funding sources. Also included are graphical presentations of total transportation costs, percentage cost growth and percentage of total cost increase, all by sub-function.

This functional structure is shown diagrammatically on the following page.

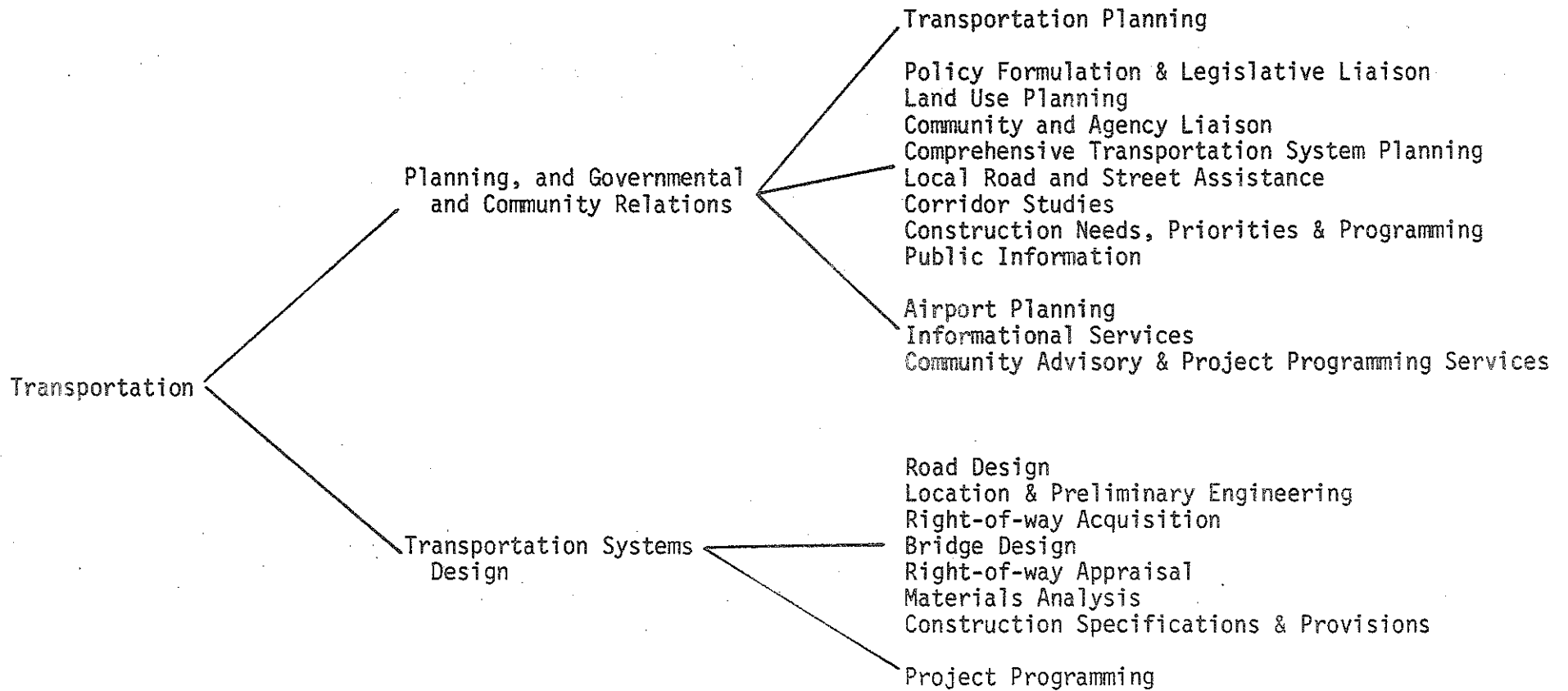
An objective or purpose statement has been provided for each category (function, sub-function, sub-subfunction), however, there are no performance or other program measures.

There is a bill presently before the State legislature to create a state Department of Transportation. As yet this year, the Highway Department has not developed a program budget structure, however, it is in the process of development. At present the Department is organized on a

functional basis and would remain so even if the bill to create a state DOT was passed. No performance measures have been identified in the Highway Department.

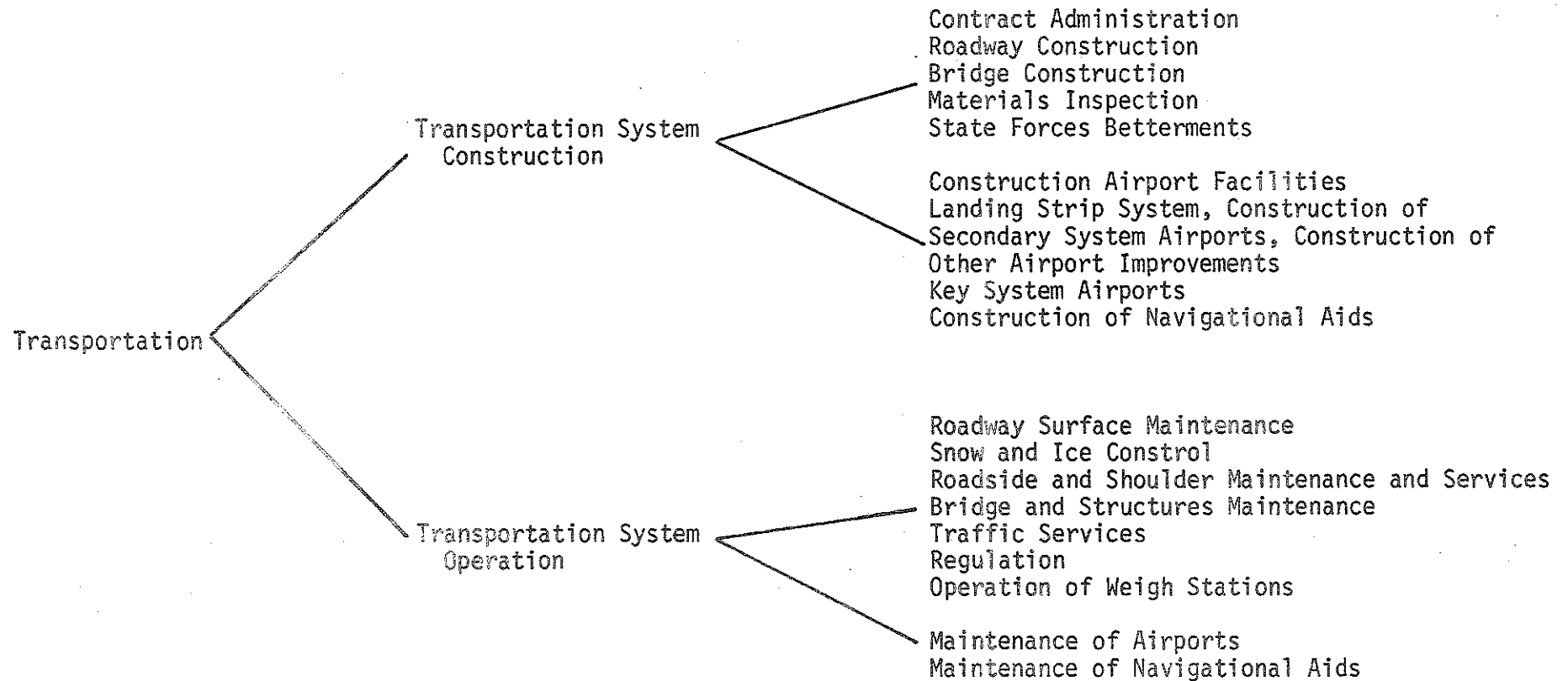
MINNESOTA

FUNCTIONAL CLASSIFICATION OF TRANSPORTATION RELATED ACTIVITIES



MINNESOTA

FUNCTIONAL CLASSIFICATION OF TRANSPORTATION RELATED ACTIVITIES



VERMONT

Vermont was one of the five participating states in the State and Local Finances (5-5-5) Project, however, it would appear that very little progress has been made in the state toward developing a comprehensive PPB system. Programs are modally oriented. The budget does include a narrative description for each program along with objectives and accomplishment indicators. Five-year cost projections are given for each line item.

VERMONT

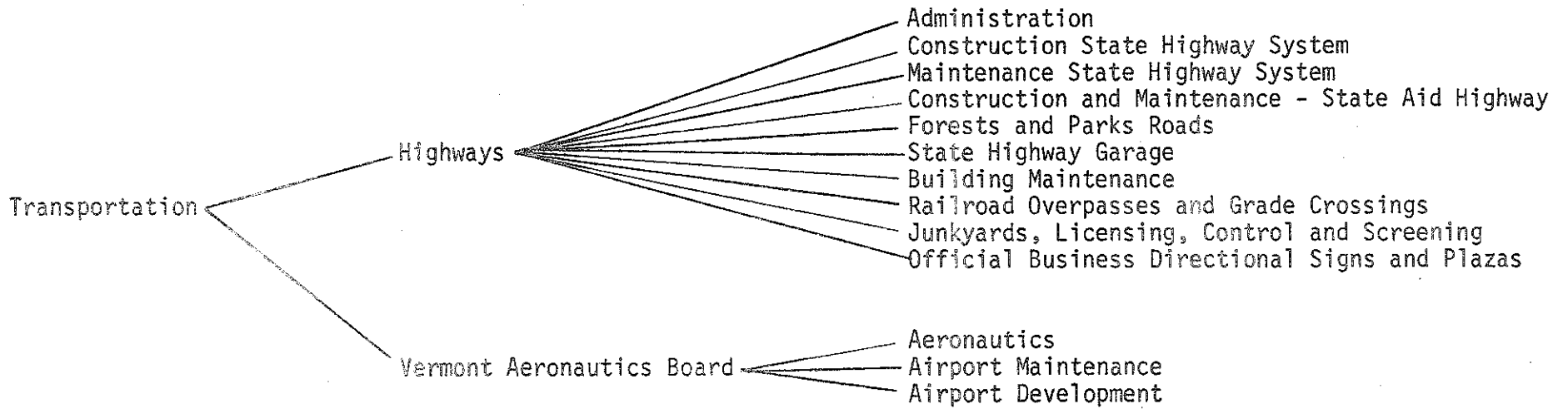
PROGRAM STRUCTURE

TRANSPORTATION

PROGRAM

DEPARTMENTS

MAJOR GROUPS



TRANSPORTATION

DEPARTMENT OF HIGHWAYS:

The Department of Highways is charged to provide for the people of Vermont, a system of State Highways which shall, by: (1) construction of new highways, and (2) maintenance of highways, contribute to the orderly economic development of the State and to the welfare of its citizens.

OBJECTIVES:

- To construct new highways and reconstruct existing facilities with due and careful consideration of: (1) economic potential, (2) sufficiency ratings, (3) fully adequate standards of engineering, (4) safety factors, (5) relationship to total system, (6) continuity of route improvement, (7) geographic location, (8) availability of fiscal resources, and (9) exercise of social responsibility.
- To maintain the State Highway System in a manner that will provide for the traveling public, safe, convenient, and adequate passage under all weather conditions.
- To assist local jurisdictions through provision of administrative and technical services required by their State-Aid and Town Highway programs.
- To design, construct, and maintain each project with a view to preservation and enhancement of the environmental and ecological characteristics of the area in which the project lies.
- To keep the Vermont public, the Legislature, and the Governor continuously informed of the Departmental programs and their progress.
- To accomplish the above objectives in an economical manner, within the resources provided by the Legislature for such purposes.

MAJOR GROUPS:

Administration: Represents administrative and supervisory activities not directly related to State Highway, State Aid or Town Highway construction or maintenance programs. Such activities include: (1) the Highway Board, (2) offices of the Commissioner, Chief Engineer, and Director of Administration, (3) major Division Heads and administrative or supervisory duties in Divisions and Highway Districts.

ACCOMPLISHMENT INDICATOR:

Percent of Expenditure of Total Highway Program

DEPARTMENT OF HIGHWAYS (Cont'd)

Construction State Highway System: Covers the building and rebuilding of the Primary, Secondary, Urban and Interstate Highway Systems. Activities include necessary planning, preliminary engineering, right-of-way acquisition and construction.

ACCOMPLISHMENT INDICATORS:

- Miles Under Construction
- Laboratory Test Reports
- Drilling Footage - Feet
- Properties Acquired

Maintenance State Highway System: Provides for the preservation and upkeep of existing State Highways and Interstate Highways. Functions include required repairs, preventive maintenance, traffic control, rest area activities and routine maintenance.

ACCOMPLISHMENT INDICATOR:

- State System and Interstate Miles to be Maintained

Construction and Maintenance - State Aid Highway: Supports the building, rebuilding, preservation and upkeep of State Aid Highways. Duties include planning, design, construction and continuing preventive and routine maintenance.

ACCOMPLISHMENT INDICATORS:

- State Aid Highway Mileages
- Town Highway Mileages

Forests and Parks Roads: Covers construction and maintenance of roads in State forest areas and in State park areas. Administration of this program is the responsibility of the Commissioner of Forests and Parks.

ACCOMPLISHMENT INDICATOR:

- Miles of Forest and Park Roads Maintained

State Highway Garage: Covers the procurement, maintenance and repair of vehicles and construction equipment utilized by the State Highway Department primarily in maintenance operations on the State Highway and Interstate Highway Systems.

ACCOMPLISHMENT INDICATORS:

None

DEPARTMENT OF HIGHWAYS (Cont'd)

Building Maintenance: Covers maintenance and erection of small storage facilities necessary to the operation of the Department.

ACCOMPLISHMENT INDICATOR:

- Maintenance of Highway Buildings- Square Feet

Railroad Overpasses and Grade Crossings: Covers maintenance, repair, replacement and installation of structures and grade crossings carrying highways over the Rutland Railroad as leased to Vermont Railway, Inc.

ACCOMPLISHMENT INDICATOR:

None

Junkyards, Licensing, Control and Screening: Covers disposal of all junk vehicles, etc., and licensing, control and screening of all junkyards as authorized by Title 24 which provides for Federal cost participation in these activities.

ACCOMPLISHMENT INDICATOR:

- Tons of Bulky Metallic Waste Material Disposed

Official Business Directional Signs and Plazas: Under the direction of the Travel Information Council, furnish, erect and maintain Official Business Directional Signs.

VERMONT AERONAUTICS BOARD:

The Vermont Aeronautics Board supervises and regulates aeronautics within the state and aids in the development and maintenance of airports.

PROGRAMS:

Aeronautics: The enforcement of aeronautics laws and regulations related to investigation of aircraft accidents, searches for lost aircraft, registration of aircraft and airmen, licensing of air schools, approval of dusting and spraying, approval of helicopter operations and special activities such as air shows and parachute jumps, maintain liaison with airlines on level of service.

ACCOMPLISHMENT INDICATORS:

- Enforcement of Aeronautics Statutes (Aeronautics Registrations)
- Air Commerce Scheduled Air Service (000's Passengers)

Airport Maintenance: Operation of all State owned airports in addition to providing grants to municipalities for maintenance of public airports; installation and maintenance of air navigational aids through radio beacons and stations located at Vermont airports.

ACCOMPLISHMENT INDICATORS:

- Maintenance of Paved Areas (100 sq. yds)
- Maintenance of Turf Areas (100 sq. yds)
- Operation and Maintenance of State Nav-Aids

Airport Development: Aid in the development of airports. This is done through participation with federal and local governments, with local governments only and through construction wholly with state funds.

ACCOMPLISHMENT INDICATORS:

None

NEW YORK

New York was the first state to adopt a PPB system, and the first to discard it. The 1973-1974 fiscal year state budget retains the aspect of appropriating funds by programs, which in this structure refer to the major subdivisions of the various departments of State Government, i.e., among the programs listed for the Department of Transportation are Administration, Traffic and Safety, Highway Operation and Maintenance. No performance measures, output indicators or need/demand estimators are included. The actual appropriations are on a line item basis. A narrative description of each activity in a program is included.

PPBS had a curious history in New York. Adopted in 1964, it was replaced in 1970 by the PAR System (Program Analysis and Review). As originally conceived in New York, PPB was to be a planning process, with budgeting only one of its many components. The focus was on the future and the language was drawn from planning rather than from budgeting or economic analysis. The shift to a budgeting emphasis did not come until 1968, however, by this time the entire system had fallen into such disrepute that even a major directional change could not save it. One of the primary reasons for its demise was due to the fact that although the system had top-level rhetorical support in the State, the Governor's right arm in planning remained in the Office of the Secretary to the Governor. PPB groups were isolated and their activities were never totally integrated into either the planning or budgeting process.

The PAR system which replaced PPB in 1970 attempts no reforms; rather it attempts merely to inject some analysis into program and financial systems in New York.

CALIFORNIA

California's Programming and Budgeting System (PABS) conforms in most essentials to the PPB approach introduced in the federal government. Many of the strategies and methods have been similar and differences have been terminological rather than procedural or conceptual.

PABS incorporated a program structure, program memoranda and multi-year financial plans. Agencies were to classify their activities into program categories and prepare "program statements" that explained the objectives of each program and the activities taken to accomplish them. "Program memoranda" were to be the analytic components of the PABS system, containing the agency's program recommendations, along with information on objectives and effectiveness and an analysis of program alternatives. Multi-year program statements represented the planning component of PABS. The several planning and analytic documents were to be the informational base for the annual budget. Line-item detail was to be eliminated from the budget once the program format was fully developed.

A standard format - based on the sample program budgets - was developed. This format contained program information as follows:

1. Need - why is the program, element or component needed?
2. Objective - what is to be accomplished? How do the program objectives relate to the need for the service?
3. Output - what product is delivered? How may the effectiveness of the program be measured?
4. Authority - by what or how is the program authorized?
5. General Description - how will the department organization be used to accomplish the objectives?

6. Work Plan - what performance standards and workload measures are used to indicate levels of performance?
7. Input - what will the program cost?

As in other states, however, the plans far exceeded the accomplishments. The documents produced under the system were never used in the budgeting process, and their quality was generally unsatisfactory. In spite of training efforts, the fact remained that few administrators in the state understood PABS itself, and had even less of an idea of what was expected of them in developing the key elements of the system - programs, objectives and goals. Too often this lack of understanding led many agency heads to the conclusion that the end-product of the system was the technique acquired in completing the necessary documents, rather than any innovation in budgeting. Another major fault was that, again as in other states, the PAB system was never fully integrated into the budget making process; rather the established budget practice was left intact, and changes were attempted through a planning and analytic system that was tied to the budget process.

Despite its limited applicability, PABS has managed to survive in California for the following reasons:

1. A considerable investment has been made in training.
2. The Governor has given consistent verbal backing to the system, and has used the multi-year agency projections to justify his pleas for austerity in the State government.
3. Separate PABS unit was abolished and its functions were assigned to four program staffs.

4. Calendar of budget cycle was adjusted to facilitate central policy review and program analysis prior to budget preparation.
5. Budget data system being established, which is envisioned to accomodate PABS information in future.

The FY 74 budget, however, was prepared under the traditional line item approach for the Transportation Program (as part of the Business and Transportation Agency).

MISSOURI

Missouri's executive budget for fiscal year 1973-1974 shows a modally oriented program structure. A program description and performance measures have been provided for each program. The "Program Planning and Budget Preparation Manual - 1972-73" gives detailed instructions for developing program objectives; however, these are not shown on the budget document. The system seemed to be oriented to a "management by objectives" framework. The system was focused on program objective statements and performance measures. The program objective statement was to be a statement of intended program accomplishment for the budget request year. The criteria for development of the objective statements was as follows:

1. An objective should be important. The primary criterion for an objective is that it relate to the accomplishment of activities that the agency manager considers most important. An objective is thus a statement of program results which the agency director commits himself to accomplish. The number of program objectives will generally be rather limited - number (10 or less).
2. Objectives should be "end" oriented. Objectives are concerned with what accomplishments are desired. They are not concerned with the means of accomplishment.
3. Objectives should relate to the fundamental purpose for the existence of a program. A program may accomplish many different things related to its primary purpose for existence. Objectives should be concerned as closely as possible with the overall purpose of the program.
4. Objectives should be realistic and attainable. If an objective is to be a standard of expected achievement and if it is to motivate an agency, then it should be a challenge but not be impossible to attain. An objective should be a realistic estimate of what can be attained but it should not be so "realistic" that the agency does not have to work to attain it.

5. Progress toward achievement of an objective should be measurable by identifiable performance indicators. The second section of Form 5 calls for the identification of measures of the performance of a program objective. Objectives and performance indicators are closely inter-related. The objective may suggest a performance measure and the performance measure may be a refinement of the objective.

The performance measures were to be output oriented, directly related to and serve as a measure of program objectives, and be quantifiable and readily available on a continuing basis.

HAWAII

The history of PPBS in Hawaii is interesting mainly from the standpoint that this is the only state in which the initial impetus for promotion of the system came from the legislative branch of the Government. It is also a curious history with the legislature advocating an immediate conversion of the budgeting system to a PPB framework and the executive advocating a more cautious, considered approach.

In 1970 the legislature passed the Executive Budget Act, which the Governor approved, requiring that budget format be based on the concepts and techniques of PPB, however, the Executive office has still not been able to develop the expertise to comply with the statute. This approach requires first of all that a program structure be developed which was still in the process of being formalized when the 1971-1973 biennial budget was submitted to the legislature. The 1973-1975 budget was not available for review, however, since a request for a copy of the transportation budget was denied by Senator Inouye's office.

ALASKA

Governor Egan states in his Budget Message to the Legislature that Alaska is now in its second year using a program budgeting procedure, however, this is not immediately evident in studying the State's Budget Document, Fiscal Year 1973-1974. The various departments of the government are shown as program categories and there is a narrative for each program which focuses mainly on the sources of funds for the department and lists the major Transportation projects either under construction now or planned for the near future. No objectives, output indicators or performance measures are included for the transportation category, although work is apparently in process.