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EVALUATION OF CITY AND REGION ¹²⁹
PLANNING TECHNIQUES

BY

CHARLES CLAY MILLER, 1940-

A

THESIS

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ABSTRACT

The transportation and community planning effort in the United States has resulted in the expenditure of a great deal of time and money. However, the result of this effort has largely been unusable because of a lack of an effective formalized planning method.

This thesis presents summarizations of the planning methods employed in ten plans which are typical of the U.S. Planning Effort. Each of these methods are critiqued in the light of a proposed planning method.

The Federal Government has recently required the adoption of a Planning, Programming and Budgeting System (PPBS) in an effort to formalize a scientific approach to planning. As an approach to the implementation of PPBS this thesis presents the use of value analysis and objective setting as practiced by the fields of product and methods engineering.

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I. INTRODUCTION

Transportation is one of the most dynamic forces in any civilization. Civilizations stagnate where they do not have the ability to physically transport people and goods or the ability to use substitutes for physical transport. The movement of energy by power transmission or telecommunication between persons at remote points was done so that people would not have to transport themselves face to face in order to communicate information to each other. Transportation and communication networks are the driving force which develops primitive tribes into giant nations.

A. BACKGROUND OF THE PROBLEM

Wood and Ames¹ (p. 382) state that the "national transportation system has a basic goal--the provision of fast, safe, and economical transportation services needed in a growing and changing economy. It must meet private and public needs to move people and goods. This must be accomplished at the lowest cost consistent with health, convenience, national security and other public objectives."

The transportation system, being at the heart of national and metropolitan development, interwoven into every facet of life, is of primary importance. From the very inception of this nation, transportation and the necessary coordinated planning which goes with it have had overpowering influence upon the social climate.

McGrath states² (p. 491) that the city of today is an agglomeration of multitudinous decisions made by people of the city over long periods of time. Sometimes people act separately or in small groups directly to their own ends. At other times they act severally or through their government with an aim toward achieving mutual ends. Some times they act wisely; sometimes they act unwisely. The net result is the city."

These decisions more often than not directly involve the transportation system. Over past decades literally hundreds of plans have been made concerning specific problems related to the field of transportation. Despite this unusual concentration of effort, the problems in transportation have continued to compound and expand themselves inordinately. In considering the number of separate public planning projects carried out as against the number of major problems solved, one cannot help but wonder why so few solutions have been forthcoming.

Maier³ (p. 328) states that "many cities experienced difficulty in adopting a modern traffic engineering program because political expedience and special interests have limited the necessary and often painful application of restrictive controls and regulations. Other cities have mistaken short-range programs as the ultimate solution to the urban problems."

Irwin⁴ (p. 521) says "the metropolitan planner knows he and his fellow urbanites wish to achieve the best possible regional urban environment, but he is often unable to achieve agreement on just what this is."

The planner uses only those tools to which he has access, tools of planning technology. However, our hardware technology is not as yet capable of handling all the problems

involved in the complex planning process.

⁵About these complexities Herberg states in Howe⁵ (p. 556) that "when the city planner or transportation planner stops to realize that he works with both technology and human beings, he must know that he can never hope to evolve truly optimum plans,"

Howe⁵ (p. 554) further states that "Optimization may be considered as a maximizing of pleasures and/or advantages, and the minimizing of hazards and/or disadvantages. It involves many value judgements which vary from person to person. Two of the more important aspects of judgement involving urban transportation today, for example, are the conflict between engineers and esthetically inclined citizens over the location and appearance of interstate highways, and the conflict between advocates of highway transportation and advocates of mass transportation."

Cook⁶ (p.3) states that "Observation of various official planning activities indicates that a limited number of stereotypes can cover many of the common characteristics seen in the planning-community relationship. No community-planning operation in fact, will correspond exactly to any of the types presented below. However, use of the stereotypes has aided people to identify some characteristics that previously went unnoticed in the way their community's planning was carried on."

B. PLANNING COMMUNITY RELATIONSHIP

As developed by Cook, the five common forms of the Planning Community relationship are the isolated, the agency oriented, the imposing, the imposed upon and the immersed.

Isolated

Cook⁶ (p. 5) further states that "This type represents official planning operations which have a very low level of contact with the community at large.

The planning group, it's staff, and consultants raise questions and discuss these themselves. Often very difficult and sophisticated studies and reports are made concerning these issues. The results, however, are simply fed back into the planning operation. Aside from an occasional news release, the results of the planning efforts do not find their way into the community's decision-making process.

Frequently this type results in a small corps of people who develop a high level of information and knowledge about the community. This, however, does not result in any particular benefit to the community because the planning group maintains no effective relationships with other officials, agencies, voluntary groups, or citizens. For the most part, those directly involved in the official planning do not communicate with anyone outside this limited network.

There are many different reasons why a planning group may become this way. The one common work of The Isolated type is that there is an extremely low level of interchange between the planners and other elements of the community.

Agency Oriented

Cook⁶ (p. 7) goes on by saying "This type covers the official planning operations which direct all their efforts to the demands, concerns, and needs of an outside agency. Usually, the outside agency has a particular program or grant funds which some element in the community wants. Planning is done simply to qualify for this program or for the grant or loan funds.

In recent years many American communities have established planning organizations in order to meet the requirements of an external agency. Some of these continue to operate their planning completely oriented to this agency. What they plan about, what procedures they use, the form, content and timing of reports they produce are all directed by the criteria of the outside agency. Those involved in planning feel the purpose of their operation is to please the agency with the program or money they want sufficiently that they will qualify.

Not all planning groups that were started by this kind of stimulation from an outside agency remain in this agency oriented pattern. But some, year in and year out, plan only for the review of a particular external agency. They do not intend for the planning to affect the community at large, except as the particular program they are after might do so. The effects of planning in the community are considered accidental for operating purposes.

This type of planning operation often produces extensive plans which only a handful of people in the community are aware of, but which are often circulated around the country through agency channels as examples of good local planning.

Imposing

Cook⁶ (p. 9) continuing, says "This type of planning operation is designed to actually affect the community. It involves the intention of developing a plan and then to impose this plan on the community.

During plan development, this type of operation appears similar to the Isolated type. While the studies and plan work up are underway, the planning group has very little relation outside those directly involved in the planning organization. But once the plan or part of the plan is complete, instead of just feeding this back into the planning operation for review and refinement, an organized effort is made to get the community, or at least selected segments of it, to accept the plan. This phase of the operation is commonly called "selling the plan to the people."

The community's part in this type of planning is basically to implement the plan as devised within the planning group. The planning group attempts to develop relationships with the community on the basis of a strategy calculated to bring about adoption and implementation of the plan.

The reasons for taking this approach vary from one place to another, but often the integrity of the plan in practice is of more concern to the planning group than the integrity of the community.

One common aspect of the Imposing type of official planning operations is that relationships with the community are considered important

only after the plans or part is completed. The plan is pre-designed and then overlaid on the community.

Imposed Upon

Cook⁶ (p. 11) continues with "Planning operations of this type are recognized by the tendency of the planning groups to show no initiation. The official planning organization does nothing except in response to very specific pressures and demands. Various organized interest groups in the community largely determine the questions with which the planning agency will deal, how they will be dealt with, and often tell the planning agency what its recommendations are to be.

As long as there is no strongly organized opposition group, the planning body tends to go along with those who forcefully put forth their point of view. If there are counter demands coming from several organized sources, the planning operation is likely to be immobilized. The planning group is unable to function under its own directive, and when several sources are giving it directions simultaneously it usually becomes confused, insecure, and unable to act.

The Imposed Upon planning pattern represents one in which the official planning groups makes no input into the community decision process on its own. It is used generally to perform a ritual of giving formal recognition to various interest groups' projects as they come along. There is no effort to develop planning beyond a disjointed series, studies, recommendations, and specific project proposal.

Immersed

Cook⁶ (p. 13) continues "the work of the Immersed type of planning operation is that it carries on as a regular part of the community. The planning group maintains relationships with external agencies, local officials, interest groups, ad hoc groups and citizens. Many avenues of access to the planning operation are open to any interested party. Multiple channels for sending information about what is happening and what will be happening in the planning operation are used to reach many segments of the community.

The planning group will accept inputs from any element in the community as well as from sources beyond the community. Initiation of activities may come both from sources within the planning group and in response to inputs from outside of it. The output of the planning process is transmitted into the community. Feedback, even negative feedback, is accepted from the community, and when appropriate will lead to making corrections in the planning process.

The planning group itself controls and/or carries out a variety of procedures on its own, while at the same time accepts that it is only one part of the enterprise when it comes to setting and conjuring out community policy. Interchanges between and among the planning group, elements affected by planning and elements affecting planning are expected to be a main ingredient in working out plans and plan implementation."

Conclusions of the Planning Community Relationship

As stated by Cook⁶ (p. 15) the conclusions are:

"If one believes the purpose of the official planning operation is to produce studies and plans on paper, then the Isolated pattern is most productive.

If one believes the purpose of the official planning operation is to qualify the community for a particular program or funds available from some external agency, then the Agency Oriented pattern is efficient.

If one believes the purpose of the official planning operation is to permit a select group in the community to determine what ought to be done and to get the community to go along, then the Imposing pattern is appropriate.

If one believes that the purpose of the official planning operation is to provide the interest groups in the community a place to get some formal recognition of their projects and recommendations, then the Imposed Upon is reasonable.

If one believes the purpose of the official planning operation is to assist in finding what changes are needed and aid in bringing about desirable changes, then the Immersed pattern is practical.

The pattern of how the official planning operation relates to the community generally is associated with what the people involved consider its purpose. It is suggested that the first four patterns result from a confusion between a needed ingredient in planning and its purpose.

In order for planning to be effective in a specific community, all the following may be necessary:

1. Studies and plans expressed on paper
2. Funds and programs available from external sources
3. Opportunities for knowledgeable people to get their ideas across, and
4. A means to get projects and recommendations of special interest groups considered as they relate to the community as a whole.

But none of these constitute the purpose of planning. The purpose of the official planning operation is to improve the community's ability to (a) adopt to the expected, (b) create the desirable and (c) avoid the undesirable. In American communities, experience indicates that this is practical only when there is broad involvement in the planning process. The talents, energy and knowledge of highly trained professionals, governmental officials, and the citizens are all necessary in the planning process. Planning to be practical must be a joint enterprise among many different kinds of people. Plans and how they are to be adopted and implemented must be worked out in a continuous process. The Immersed pattern provides the best model for the relationship between the official planning operation and the community in which workable plans can be developed and carried out for the purpose of improving the community as a whole."

The pitfalls of these methods of planning are many.

Wood and Ames¹ (p. 383) state that "planning a transportation system on the basis of present travel desires can meet the requests of the moment, but planning on this basis makes future inadequacies inevitable."

Wood and Ames¹ (p. 391) further state that a "planner can try to control and predict population changes using the factors which are to some extent under his control such as transportation facilities, urban renewal, public utilities, taxes, zoning, and open space policies."

Howard⁷ (p. 425) states that "state and federal highway programs cannot succeed without effective general urban development planning.

First, the state and federal highway programs will stand or fall on their success within urban, especially metropolitan, areas.

Secondly, without knowledge of future land-uses, and of local feeder street and transit proposals, both within the purview of urban planning programs, success will be limited.

Thirdly, once designed, a long-range highway plan cannot be protected against right-of-way invasion (without extraordinary advance land acquisition) except through cooperatively administered subdivision controls, again a local planning function.

Fourthly, a highway once built cannot retain its capacity without controls over land development on its frontage and near its interchanges--controls, via zoning and subdivision regulation exercised by local government in response to local city-planning. And, finally

A system of highways, once built, cannot function as designed without urban-planning controls over the pattern of land-uses, population density and distribution, employment location, and the like that will produce the general outline of future urban development assumed as a basis for the design of the system.

None of these five prerequisites for a successful highway development can occur, except by the most improbable accident, in the absence of effective general urban development planning."

C. STATEMENT OF THE PROBLEM

The problem that stands out is the development of planning techniques and methodologies which are workable under the American system of urban development.

The objectives of this study are as follows:

First, to evaluate commonly used planning techniques against the newly developed federal planning procedures of the Planning Programming and Budgeting System (PPBS).

Second, to demonstrate the usefulness of value analysis and objective setting in the implementation of PPBS.

Third, to make recommendations to improve the future planning effort.

D. IMPORTANCE TO SOCIETY

In the past three decades since the beginning of World War II the life style of the average American has shifted from a rural setting to the much more complex urban setting. The rapid expansion in the number of privately owned vehicles has further complicated the lives of the millions who have moved from the rural areas to urban areas. Cities have shifted in character from the

compact and convenient, centralized location to a nightmare of urban sprawl, with the working and living facilities seemingly distributed at random.

Mayer⁸ (p.2) states that "we are using up new land at a rate of 1 million acres a year, our population is increasing at a rate of some 30 million, or 15 percent, per decade, and much faster in metropolitan areas."

Dr. Jerome Pickard states that in 1980 the nation's population will have increased by 36 percent since 1962, but the population of twenty-one metropolitan regions by 73 percent: i.e., twice as fast. Population is declining in the farm areas and in the central cities and is increasing at tremendous rates out in the metropolitan countryside.

Gallion and Eisner⁹ (p. 357) states "The population of the world is exploding. Mechanization is driving people to the cities. The rising flood of urbanization is surging outward from the center and engulfing the surrounding countryside. Congestion festers within and eats about the edges. Communications are breaking down. Medical science is sustaining health and prolonging the life span. Famine and pestilence are no longer the leveler of excess population, nuclear war may be. If mankind is to live on, the urban pattern he occupies will require major unravelling and reweaving. Much understanding will be required, and the nature of the metropolis will undergo severe examination."

The urbanization of America has caused the citizen to move about continuously, using virtually every means of transport modern technology can provide. The transportation problems are, without question, welded to other

major problems in the modern society, including the mass migration to urban areas, the population explosion, air pollution and solid waste.

Mayer⁸ (p.1) states that "technology and the mastery of nature are causing or permitting a series of galloping maladjustments and uneasiness. There are massive unprepared immigrations from rural into urban areas and at the same time out-migrations within our ever-expanding metropolitan complexes. There is massive involuntary and uncreative and even dangerous leisure. The ubiquitous automobile may be considered a symbol of the Jekyll-and-Hyde character of modern man and modern development-deterioration. It enables us to do wonderful things--to visit distant places, to constitute a new family unit, to have, as it were, a mobile hearth. In actuality, it does something of this. But far more does it result in the city's intolerable congestion, in the countryside's despoilment by unbridled road building and anarchic scatter, in excessive distance between living, work and recreation, in family disorder and disunity. We are not nearer nature, as we could be, but pushing farther away--not only in distance but now in time as well, as the inexorably lengthening journey to work negates the extra leisure of the shorter work day; in the quality of the nature we can reach and the tired condition we reach it in."

The modern city tends to herd the urban poor into a fringe about the central city which, due to the migration of business and industry into the fringes of urban growth, leaves them isolated from society.

Beckman¹⁰ (p. 163) states that "Kenneth Galbraith in The Affluent Society and Michael Harrington in The Other America, two of the more influential books of this decade, have driven home the argument that today many of our problems lie concealed beneath the attractive surface of abundance, wealth, and power. As a nation, we enjoy abundance beyond any previous measure but there are still groups shut out

from this abundance. Increasingly, these groups, which include the racial minority, the elderly, the unemployed, and the broken family, tend to reside in the central cities of our larger metropolitan areas."

The most important single item which isolates these groups is the lack of the transportation facilities which could carry them into the mainstream of modern society. An example of this situation was stated by Beckman¹⁰ (p. 162) that:

"the investigating commission brought into clear focus the fact that the inadequate and costly public transportation currently existing throughout the Los Angeles area seriously restricts the residents of the disadvantage areas such as south-central Los Angeles. This lack of adequate transportation handicaps them in seeking and holding jobs, attending schools, shopping, and in fulfilling other needs. It has had a major influence in creating a sense of isolation, with its resultant frustrations, among the residents of south-central Los Angeles, particularly the Watts area."

The solution to the major problems will depend upon the new developments taking place in the field of transportation and the planner's ability to adequately plan for their implementation.

In the light of the aforementioned the importance of refining our ability to plan and develop new, innovative transportation systems is vital to our national stability.

II. DISCUSSION

In this study ten typical traffic and city plans were selected as representative of various planning methods. Each of these plans was examined as to its particular approach to the planning process such that reasons for their lack of success might be obtained.

A. METHODOLOGY

1. Planning, Programming, and Budgeting System

Recently the Federal Government required that all federally sponsored planning be done according to the Planning, Programming, and Budgeting System (PPBS) in an effort to apply a scientific approach to planning.

According to Roman,¹¹ (p. 429-433) "The planning, programming, and budgeting system (PPBS) was first suggested by Hitch and McKean as a method for using resources more effectively. The system was subsequently applied by Hitch during his service in the Department of Defense. The impact and general success of PPBS within the department was instrumental in its being extended throughout the federal government. The system has considerable applicability of other than military and government organizations.

Purpose of PPBS

The planning, programming, and budgeting system requires program directors to think and plan well into the future, delineate objectives, analyze costs and benefits of existing programs, and find better and cheaper ways to accomplish objectives. President Johnson stated that as applied to government operations, PPBS has the following purposes:

1. Precisely and continually identifying national goals.

2. Selecting the most urgent goals
3. Examining alternatives in order to achieve goals effectively and at the lowest possible cost.
4. Maintaining awareness of future as well as immediate costs.
5. Measuring program performance as a means of evaluating the relation of output to input.

As the organizational scope of PPBS is enlarged, the components of the system might be:

1. Definition of the program and of output objectives.
2. Possible methods to employ.
3. Costs of alternative methods.
4. Evaluation techniques for determining how effectively objectives are being achieved.
5. Information requirements for continuous comparison of cost with accomplishment.
6. Review and analysis of plans and programs, and revision where necessary.

Concept and Design

As stated in the Bureau of the Budget Bulletin 66-3, a budget is a financial expression of a program plan. A budget should be prepared and submitted after goals are established, objectives are defined, and programs for achieving objectives are planned. Before PPBS, it was common practice to establish mission requirements for a period of several years but to budget on a year-to-year basis: planning and programming were mission-oriented where as budgeting was task-directed. Under such conditions, program review and decision-making often concentrated on too short a time span.

Several faults became apparent owing to the lack of coordination in programming, planning, and budgeting: the activities of different agencies were often vague and their programs intangible; accomplishments were not always determinable; alternatives were not explored and presented for management's consideration; in many instances, it was difficult to ascertain the cost implications

in the future of current decisions; and formal planning and systems analysis had an insufficient influence on budget decisions. PPBS helps remedy such defects in planning and budgeting by providing the information and analysis required for determining the need and allocation of resources.

PPBS is founded on three major concepts:

1. The in-house capability of each agency to conduct continuous depth analyses of its objectives and the programs which support these objectives.
2. A multiyear planning and programming process incorporating an information system which classifies and presents the essential data required by agency heads and the President for making major decisions.
3. A budgeting process which can refine broad program decisions for subsequent review and action by the President and Congress.

For the system to work, several essential requisites must be fulfilled. First, the program structure must be mission-oriented so that pertinent data covering agency operations and activities may be assembled in classifications consistent with the agency's purposes and objectives. Second, the shifting mission orientation of the agency needs to be explored, as do its programs and the requirements to support changing objectives, and the costs and benefits of alternative programs must be weighed. Next, programs must be given time-cycled reviews which analyze objectives, accomplishment, costs, and contemplated changes. And finally, the organizational elements involved must accept the responsibility for establishing and implementing the system.

Program Structure

The program structure is a vital part of PPBS. The implementing agency must break down its total effort in a series of mission-oriented categories. The classification of activity into programs categories, program sub-categories, and program elements is the foundation for the planning, programming, and budgeting processes.

Program categories comprise programs, activities, or operations which are related to the same general mission. Common or

closely allied objectives provide the basis for grouping. An example of a broad program objective cited by Bulletin 66-3 is the improvement of higher education. Higher education is a program category, and is composed of government programs involving different levels of education, facilities, related research, library support, and so forth.

Program subcategories are subdivisions established within each category. These combine agency programs, activities, or operations to reflect more restricted objectives which still contribute directly to the program category objectives. In the case of higher education, program subcategories might be social science research, improved training in mathematics, and the like.

Program elements represent an additional refinement, and are subdivisions of a program subcategory. They are made up of the specific items that contribute to the agency's objectives. Each program element is an activity which includes personnel, services, facilities, and equipment. A program element consistent with the higher education category and the supporting subcategories might be the number of teachers to be trained in the new mathematics.

As the system is envisioned, direct compatibility between program and organizational structures is not necessary. It may be advantageous in some instances for basic program categories to cross organizational lines. This process encourages comparisons and suggests beneficial tradeoffs among interchangeable elements.

With basic research, it may not be possible to establish mission orientation, in which case research can be identified as a separate program category or subcategory. Applied research, on the other hand, can be associated with a specific program objective and can be incorporated in the same program category as other activities related to that objective.

The program structure needs to be carefully thought out. If too few program categories are established, it causes confusion, as when apples and oranges are reduced to a common denominator. Too many classifications make review and management difficult.

Multiyear Program and Financial Plan

The PPBS process has been designed to consolidate and present logically the information essential for important decisions. The system provides for program review at different government echelons, and converts agency objectives into combinations of agency operations and activities developed to accomplish the objectives within stipulated time periods.

The program and financial plan normally cover a five-year period, but this can vary according to the nature of the program. The plan should be flexible enough not to be compromised if legislative authorization expires prior to the completion of the program; the package should recognize this possibility and incorporate provisions for extending, renewing, or modifying the program in keeping with legislative action.

Objectives and planned accomplishment should be set forth wherever possible in quantitative, nonfinancial terms. As an example, the physical description of the program elements should include such factors as the facilities needed to carry out the program, the number of people participating in it, the hours of effort, and specific incremental benefits. In line with this principle, Bulletin 66-3 recommends that where relevant, a correlation should be drawn between the program and the universe to be served.

Financial data should be associated with the physical descriptions to show the degree of cost and accomplishment. All costs associated with a program element should be assigned to that element. These include capital outlay, research and development costs, grants and subsidies, and current operations costs. The component costs can generally be derived from accounting and appropriation categories. In situations where revenue is generated from the program, an estimate of income should be made and included.

The agency-approved program and financial plan will be submitted to the Bureau of the Budget, which will also be informed of any program revisions. Additionally, provision must be made for the annual reappraisal and updating of the program and plan by specialized agency staffs, which have the function of keeping them under continuing analysis.

PPBS and R & D

As the PPBS concept is used, improved, and publicized, it is highly likely to be adopted in less complicated environments and for activities totally unrelated to government operations. The planning, programming, and budgeting system provides management with a method for targeting in on objectives and comparing actual achievement with planned goals by classifying and accumulating resource expenditures. Significantly, the system furnishes information which is not obtainable through traditional budget processes; it helps isolate the major issues and provides a more rational base for decisions. It provides management with a tool which can substantially improve the directing and supervising of research and development.

As suggested by Representative Henry S. Reuss's Committee on Government Operations, PPBS can be used to explore alternatives to present R & D programs. If management decided that continued investment in a certain R & D program would not improve present performance, it could use PPBS to establish a basis for new R & D activities and to increase the probability of selecting specific projects which would render the greatest return. The exploration of alternatives and cost-benefit studies could be used by program directors to recommend new R & D activities. The constant pressure for program efficiency and economy which a process of systematic analysis would exert could lead to more R & D proposals and a greater allocation of program budgets to research and development.

While PPBS is an excellent vehicle for improving R & D decision making, it does not eliminate an innate defect in the R & D management process--insufficient initiative at the program level. The fact that the system makes more and better information available does not guarantee that the information will be used, either for creative purposes or for analysis. As the Reuss report points out, PPBS will not automatically result in an imaginative search for R & D alternatives. Uninspired program managers may look for other paths, but will limit their search to tried and -tired methods rather than push beyond the frontiers of knowledge to seek new

ideas, build new techniques, and develop new technology,"

2. Implementation of PPBS

In using PPBS the most important functions are those of setting goals and objectives and determining the most economically feasible way of pursuing them. Planning, as yet, does not have a formalized method of doing this. However, the adoption of value analysis as a formalized planning technique will provide this function.

This study was carried out as a modified value analysis of public and transportation plans which cover a span of 40 years representing the typical approaches to modern planning. The reasons for using the techniques of value analysis is that it can isolate those factors which tend to make the implementation of those plans less than optimal. Most of the past planning techniques appear to be a hodgepodge of methods and procedures usually not directed to the heart of the problem. The use of value analysis will introduce a scientific approach to the isolation of the study areas and the setting of objectives.

3. Value

Value analysis, which is an analytical method used by product engineers, will be discussed in detail later. However, before the discussion on value analysis can be begun, it is necessary to establish a parallel between the finished plan and a manufactured product. Value in product engineering is the cost of manufactured products. The processes used in the

product manufacture are carefully examined by engineers in order to cut the cost and still maintain the value of the product. The overall value of a product can be subdivided into four forms of value; use value, cost value, esteem value and exchange value.

According to Weiss:¹² (p. 3)

- "Use Value: Based on the properties and qualities of a process, system, product, material or procedure, which accomplishes a use, work or service.
- Cost Value: Based on the cost of a process system, product, material or procedure; always expressed in monetary terms.
- Esteem Value: Based on the properties, features or attractiveness of the process, system product, material or procedure. In other words, the extent of its ego-appeal to the user.
- Exchange Value: These are properties which allow the system, process, product, material or procedure, to be exchangeable for something else."

Plans also exhibit these same four divisions of value. For example, use value of a plan consists of its ability to provide a guide toward the implementation of planning goals. Cost value is that expense incurred in the development of the plan. Esteem value of a plan is exhibited in the fact that communities consider it to be essential to their continued orderly growth. It is also used as a selling point to

encourage migration of new business and industry. Every town has to have a plan and a planner because it's now the popular thing to do. Exchange value is induced in planning because of governmental interest in the planned growth of the country. The government puts a great deal of influence and money into the development of these plans i.e., they put up 75% of the money that goes into planning efforts. Therefore plans have an exchange value in federal funding.

A city plan, whether it is land use or traffic, has the same values as does a factory product. Therefore, the plans and the methods of devising these plans lend themselves to an analysis similar to that applied to manufactured products.

In product engineering the intent is to reduce the cost value of the product while still maintaining as high or higher levels of use, esteem, and exchange value. Thus, the product will still have the same market value and utility but the cost of production would be substantially reduced. This process, as used in industry, has resulted in the continuance of high quality of product in the face of increased labor and material costs without greatly increasing the product costs. It is assumed that this same scientific process applied to planning will reduce the cost of planning and yet provide a clear, concise plan which will be consistent with the planning goals.

4. Value Analysis

A value analysis consists of five separate phases: an information phase, a speculative phase, an analytical phase,

a planning and execution phase, and a reporting and implementation phase. The definitions of the value analysis phase is paraphrased.¹³

First, Information Phase

The purpose of the information phase of a value analysis is to gather and to tabulate data concerning the problem, to determine the desired function, and to evaluate that function. Thus, the actual problem definition is obtained in the information phase.

Second, Speculative Phase

In the speculative phase, alternative methods of achieving the desired function are generated. In this manner various approaches to the problem are postulated.

Third, Analytical Phase

The purpose of this phase is to develop the alternative methods generated during the speculative phase, listing the advantages and disadvantages of each. To estimate the dollar value of cost value of each method, and to select those methods which offer the greatest potential return for the planning dollar.

Fourth, Planning and Execution Phase

The purpose of this phase is to establish a program of investigation for a study of alternative methods selected in the analytical phase, to assess the technical feasibility of the alternative methods and to gain firm information concerning those alternative methods.

Fifth, Reporting and Implementation Phase

The purpose of this phase is to prepare a value engineering report, to issue the report to, and discuss with the decision-maker and to insure that the report recommendations are implemented. It is through this report that the goals and objectives are prepared.

5. The information Phase Used in This Study

This thesis is concerned with only the information phase of value analysis since these ten planning reports have already been completed. An attempt is being made to critically evaluate the planning techniques commonly used.

The value analysis information phase consists of the following areas each of which must be considered. The purpose, techniques, key questions, tests for value, and techniques of functional evaluation, all of which are contained in the check list (sixth item) at the end.

First, Purpose:

1. To gather and tabulate data concerning specific public transportation planning projects.
2. To determine the functions of each study reviewed.
3. To evaluate the function.

Second, Techniques:

1. To consider human factors involved in each plan.

2. Obtain all facts on the study.
3. To obtain information from the best sources.
4. To obtain cost information where possible.
5. To define and evaluate the planning function of the study.
6. To evaluate by comparison.

Third, Key Questions:

1. What is the study?
2. What does the study do?
3. What should the study do?
4. What is its basic weakness?

Fourth, Tests for Value:

1. Would its use contribute universal value in solution of major problems?
2. Was the scope of the study properly fixed?
3. Does it need all features in its format?
Does it lack features in its format?
4. Has its effect been proportional to the amount of effort expended?

Fifth, Techniques of Functional Evaluation:

1. Evaluation of the basic function of the study.
2. Evaluation of techniques.
3. Evaluation with respect to systems elements.

Sixth, Check List for Use in Information Phase:

1. Are the basic objectives of the study properly developed?

2. Were the objectives required by the contract or were they guidelines only?
Are they stated clearly and specifically?
3. What is accomplished in the study?
4. What method was used in the study?
5. Did the study comply with the objectives?
6. Did the study design do more than the objectives required?
7. Was the study structured to solve problems, or merely consolidate data?
8. Why was the specific approach used?
9. Is a severe environment involved?
10. Were special criteria developed?
11. Were conclusions tested adequately?
12. What probabilities for broad utilization of results were indicated?
13. Would implementation costs appear to be excessive?
14. Is new technology required for its implementation?
15. Is the problem studied viewed as a part of an integrated system, or analyzed as an isolated problem?

6. Goals

The broad general targets towards which all your objectives are aimed. These goals should be realistic enough such that they can be logically approached through the completion of a specified series of objectives. Some goals

are never attained, however, the progression through a series of objectives toward these goals result in an improved system.

7. Objective setting

If the goals are determined, then the objectives are set in such a manner as to attempt the achievement of these goals. In the critical inquiry of any planning effort, the most important area of analyses are the objectives. The method used to set the objectives and the quality of these objectives will usually determine whether or not the plan itself will be successful. The objective setting techniques were paraphrased from Argyle Analearn Associates Text,¹⁴ in three areas; standards, implementation and feedback. First, Standards

In the analysis of these plans selected for study the following standards of objective setting were utilized:

1. The objective must be specified in a manner that clearly delineates the work/performance and the required output for the predetermined goal.
2. Once information has established a project to be undertaken, three steps are involved in setting the objective.
 - a. Determination of the requirements for work/performance and output.
 - b. Organization and consideration of pertinent factors.

- c. The preparation of a requirement specifying statement of the objective.
3. The types of questions an objective-setter needs to consider in order to formulate and set a good business objective are:
 - a. What (specific job[s] to be done)
 - b. Who (who will do the job)
 - c. Where (location where the general project will be accomplished)
 - d. When (the time element)
 - e. Why (reasons for undertaking the project)
 - f. How (methods, materials, man, machines)
 - g. How much/How many (quantity factors)
 - h. Of what quality (kind of output tolerance allowed)

Thus, a properly set objective would be of the following type. Goal: The improvement of traffic flow on present cross-town routes. Objective: The city planning commission will determine the present traffic ways used most often as cross-town routes. The project will be accomplished on only those streets which are direct east-west routes and which penetrate the downtown business area. The project will begin at the first of the year and it will be completed in May of that same year. The project will be conducted using the standard origin-destination techniques. A written report will be prepared and submitted to the city

council at that time. This objective clearly delineates who, how, where, when and why of the project and enables the city council to check the work.

Second, Implementation Check List

Listed in the proper order are the steps to be taken if non-provided-for work/performance or output is observed during implementation.

1. Check personnel
2. Check machines
3. Check materials
4. Check methods
5. Check supervision
6. Check communication

Third, Feedback

The primary purpose of objective setting is to establish a set of priorities with a feedback system included which will guarantee the planner the visibility necessary to supervise the progression toward the established goals. (There are many methods are critical path method (CPM)¹⁵(p. 87), Program Evaluation Review Technique (PERT),¹⁶ Planning Network (Plannet),¹⁷ and Phased Project Planning.¹⁸ Each of these methods evaluate a project as it progresses against an allotted amount of time.

B. DISCUSSION OF PLANNING PROJECTS

The following is a discussion of ten planning projects. These plans are typical of city and transportation plans done

in the past by consultants, government agencies and semi-official planning groups. These discussions are arranged by similar groups rather than by chronological order.

Each discussion contains a short summarization of the planning methods used in that project and a critique of that method based upon the information phase of value analysis and objective setting as previously reported in the methodology. The critique of these plans was made not to attack these earlier efforts, but rather to enable others to profit by analyzing the mistakes of these pioneering efforts. It is hoped that some errors might be common such that they, in particular, might be pointed up as specific areas to avoid in future planning efforts.

1. A Street Traffic Plan for Iowa City*¹⁹

First, Summarization of the Plan

This plan for street and traffic development in Iowa City, has, as one of its principal foundations, the data contained in "A Report of Urban Area Traffic Survey in Iowa City;" published in June 1953 by the Iowa State Highway Commission with principal data collected in 1947. The state's original destination survey was directed primarily at the problem of movement of state highway traffic through Iowa City with particular attention to the problem of bridge crossings over the Iowa River. In the summer of 1954, as a part of the following report, certain studies were made as a recheck of the

* Associated Consultants, Evanston, Illinois, November 1954

state's 1947 data to determine what adjustments were necessary in the earlier data to make them applicable in 1954. In addition, other data was collected upon traffic movement and parking throughout the city as a whole, areas of interest not covered by the state's 1947 study.

Street traffic volume increases have been predicted on the basis of three things; the growth in population, the intensity of ownership, and the degree of use of the average motor vehicle. Since a principal element in the economic base of Iowa City is the state university of Iowa, the population trend is closely related to the university enrollment. University officials estimated a reduction in student enrollment of 4.4 percent from 1950-1960.

The extent to which the intensity of automobile ownership will increase is partially dependent upon the current degree of automobile ownership and the general economic level.

The extent to which each individual automobile owner will use his car is influenced by a number of factors such as the general economic level, the dispersion of population, and the availability of other forms of transportation.

The trend toward suburban living is visible in Iowa City where much new housing is developing near or beyond the municipal limits. Of greater significance, however, is the trend in public transportation. From 1947 to 1953, riding on the local bus system dropped 57 percent. Such a reduction in transit riding necessarily is reflected in a sharp

increase in automobile traffic.

Recommendations are made to build a new bypass south of the city, reconstruct the Burlington Street Bridge and modernize the approaches to this bridge and the Iowa Street Bridge, to build a new bridge, to attain better use of existing curb parking facilities, increase the fine for overtime parking, to build off-street parking facilities and to modernize the down-town signal system.

Second, A Critique of the Plan

The method of this study was an origin and destination type which seems to be typical of these studies done by state highway departments. In this particular case, data was taken to check the accuracy of an earlier 1947 study. Thus, by checking this data and modifying it by using population trend data a city-wide traffic pattern would evolve.

The results of this evolved traffic pattern was to be used in planning improvements of present city routes, in particular, the bridge crossing the Iowa River, and the possible construction of new ones.

This study, like many others, considers only one phase of the problem and that is the present traffic patterns. This approach was adopted because the methods of study were selected before the study goals were set. In other words, the study results were determined by the method used rather than determining the method used by the type of results desired.

This study was probably relatively effective in this

particular case because of three reasons. First and most important, was that this study was intended for only short range planning. This type of planning itself can sometimes cause problems. Second, the community studied has a rather constant nature in that it is a city with a large state university as its principal employer. This city will grow continuously as does the university. the community will probably not be influenced by overnight expansions or reductions in population due to industrial movements. Third, is the homogeneity of the population itself. Iowa University is one of the nation's larger universities and thus the students and the employees make up a large percentage of the community population. This university population is distributed throughout the community thus keeping ethnic and race problems to a minimum.

Third, Information Phase Check List for Value Analysis

1. Are the basic objectives of the study properly developed? No.
2. Were the objectives required by the contract or were they guidelines only? Guidelines.
Are they stated clearly and specifically? No.
3. What is accomplished in the study? Recommendations to control traffic.
4. What method was used in the study? Origin and destination survey.
5. Did the study comply with the objectives? Yes.

6. Did the study design do more than the objectives required? No.
7. Was the study structured to solve problems, or merely consolidate data? Solve problems.
8. Why was the specific approach used? The origin and destination was used because of a prior 1947 study, apparently to check this prior study for accuracy thus saving the cost of a complete study.
9. Is a severe environment involved? No.
10. Were special criteria developed? No.
11. Were conclusions tested adequately? No.
12. What probabilities for broad utilization of results were indicated? The reconstruction of some routes and the adoption of a new route.
13. Would implementation costs appear to be excessive? Yes.
14. Is new technology required for its implementation? No.
15. Is the problem studied viewed as a part of an integrated system, or analyzed as an isolated problem? Isolated problem.

2. West Des Moines, Iowa Traffic Study*²⁰

First, Summarization of Study

This study was made to assist the city in solving their traffic problems by providing factual data and suggested

* Rowat-Murry Engineers, Belmond, Iowa, November 1956.

plans for present and future traffic control. It includes a study of the general pattern of traffic flow over the city with hourly and daily variations noted, a collection of data on parking use, durations and turnover in the commercial area and a special study of school crossings and student flow. The data has been reduced and analyzed with results shown in map, graph or chart form. Conclusions and recommendations have been drawn from the results and recommended. Master plans for major streets and for school crossing are included.

One of the essential elements of a traffic study of this type is to obtain a map of the relative traffic flow throughout the city. This map is a basic instrument for the planning of traffic controls and major street plans and can be obtained only by making actual traffic counts. The traffic count data can also be used to obtain hourly variations in traffic for various days and other detailed information valuable for traffic planning. In addition to the local traffic flow information, it is always desirable to obtain as much information as possible on the traffic flow in the surrounding region. Data of this nature is periodically gathered by the Iowa Highway Commission and is available in map form for use by interested parties.

The detailed study of parked cars was made in the downtown commercial area on Saturday, August 18, 1956. The survey was carried out continuously from 7 a.m. to 7 p.m. During this period, each parking space was visited each half-hour and the license plate or vacancy of the space was noted.

The total downtown commercial area was subdivided to give a more complete picture of the parking at various points.

The detailed field work for the school crossing study was made on Thursday, September 6. Both vehicular and pedestrian traffic were tabulated so that the results could be correlated and checked with traffic flow counts made in August. All intersections at which there was considered to be a possible crossing problem were checked.

Second, Critique of the West Des Moines, Iowa Traffic Study, 1956

This study was designed to determine which traffic routes were the most heavily used, vehicle parking data, and school pedestrian routes. The study was taken to determine what type of traffic controls and the direction traffic planning should follow. The study, as such, considered only the present situation and, therefore, the traffic plan generated was outmoded at its origin. This plan also had no provision for surveying potential land uses. Therefore, the plan derived from this information had no controls which would guarantee that facilities which caused the use of these travel routes would continue to remain the center of attractiveness in the community. The study provides only an accounting of the present situations and the recommendations presented therein would not constitute a basis for any comprehensive planning effort.

The study lacked a formal goal and a list of objectives for obtaining a goal. It seemed to revolve around the use of origin and destination techniques, in this particular

case, the traffic count. The study appeared to be designed around the method rather than defining the objectives of the study and finding methods to achieve them. It would seem that for any study to be effective it must have a goal or direction to be pursued. The goal must then have a series of objectives which direct the planning effort toward that goal. Lastly, the methods should be developed to achieve the intended purpose of those objectives.

This study would be helpful, but only as a part of a comprehensive traffic plan as it only gives a small portion of the information necessary. However, this was the basis for the future planning effort of West Des Moines.

Third, Information Phase Check List for Value Analysis

1. Are the basic objectives of the study properly developed? No.
2. Were the objectives required by the contract or were they guidelines only? Contract.
Are they stated clearly and specifically? Yes.
3. What is accomplished in the study? Recommendations for traffic flow, parking facilities, and school crossings.
4. What method was used in the study? A traffic count to determine the most used traffic routes, parking facilities, and school routes.
5. Did the study comply with the objectives? Yes.
6. Did the study design do more than the objectives required? No.

7. Was the study structured to solve problems, or merely consolidate data? Consolidate data.
8. Why was the specific approach used? Ease of taking data (count cars at intersections for the generating traffic flow map).
9. Is a severe environment involved? No.
10. Were special criteria developed? No.
11. Were conclusions tested adequately? No.
12. What probabilities for broad utilization of results were indicated? Very great, most recommendations have been implemented, however, others will recognize the total cooperation of the community so that implementation is doubtful.
13. Would implementation costs appear to be excessive? Yes.
14. Is new technology required for its implementation? No.
15. Is the problem studied viewed as a part of an integrated system, or analyzed as an isolated problem? Isolated problem.

3. Carthage, Missouri Transportation Study*²¹

First, Summarization of the Study

To properly evaluate the existing highway facilities and future improvements necessary to serve the Carthage area, a traffic study was conducted during the latter part of June

* Missouri State Highway Department, Division of Highway Planning in cooperation with U.S. Department of Commerce Bureau of Public Roads, 1961.

and the first part of July, 1961. This was an external origin and destination type survey, which made possible a study of traffic patterns and movements in the Carthage survey area.

To obtain travel information in Carthage, an external origin and destination type survey was conducted. In this survey, information is obtained from drivers as they cross an imaginary boundary line surrounding the survey area. This includes drivers entering or leaving the survey area and those passing entirely through the survey area.

This origin and destination type of survey makes possible a study without regard to the actual route used to make the trip. From this information, an analysis of alignment changes and proposed new locations can be made.

Predicted population and vehicle registration were used as a basis for predicting future traffic. A population projection was made for Carthage and Jasper County on past trends. The population projection for the state of Missouri was taken from a University of Missouri Projection. A vehicle registration projection was made on data available based on only a few previous years.

Future traffic estimation was divided into two groups, local traffic and through traffic.

The local trips were further divided into resident and non-resident trips. The resident trip growth factor was based on the increase in population and the increase in vehicle registration in Carthage.

The non-resident trips were divided into three groups based on the non-Carthage end of the trip. The three groups were Jasper County except Carthage, the state except Jasper County and all trips except Missouri. In each case, the trip expansion factor was based on predicted population and vehicle registration for the respective area.

The through-trip expansion was based on the Interstate Growth Formula. This formula takes into consideration the accepted state-wide growth, the local growth, and traffic generated by improving facilities.

The conclusions reached were on the streets that would require alterations and improvements by 1981 and those which would not. These conclusions were derived from estimated traffic predictions based upon a previously described origin and destination survey.

Second, Critique of the Carthage, Missouri Transportation Study, 1961

This study was based upon the typical origin and destination survey procedures. On the basis of these surveys and the growth predictions for Carthage, Jasper County, and the State of Missouri conclusions were derived and estimated and traffic predictions were made. The origin and destination survey classified travelers into three groups--Carthage residents, Jasper County residents and Missouri residents. Then the growth predictions for each of these groups was applied and a 1981 traffic prediction was obtained. A plan for street improvement, routing, etc., was based upon the trends

thus determined.

This study considered only the present traffic conditions, land use, and social environment. An attempt was made to extend the prediction of traffic conditions to the year 1981 via a growth model. This type of procedure will work only if the city continues on a continuous growth pattern. If however, as often happens, an industry moves into the community causing a sudden surge in population; this destroys the validity of the study.

The planning procedure outlined above is devoid of the flexibility necessary to keep a plan usable over an extended period of time. The study appeared to be based upon a planning tool rather than on goals and objectives determined in advance which would lead to selection of an appropriate planning tool.

Third, Information Phase Check List for Value Analysis

1. Are the basic objectives of the study properly developed? No.
2. Were the objectives required by the contract or were they guidelines only? Contract.
Are they stated clearly and specifically? No.
3. What is accomplished in the study? The selection of streets which will require alteration to meet future demands.
4. What method was used in the study? Origin and destination combined with population projections.

5. Did the study comply with the objectives? Yes.
6. Did the study design do more than the objectives required? No.
7. Was the study structured to solve problems, or merely consolidate data? Consolidate data.
8. Why was the specific approach used? No reason given (probably a standard method).
9. Is a severe environment involved? No.
10. Were special criteria developed? No.
11. Were conclusions tested adequately? No.
12. What probabilities for broad utilization of results were indicated? None, only the proposed minor alteration.
13. Would implementation costs appear to be excessive? Yes.
14. Is new technology required for its implementation? No.
15. Is the problem studied viewed as a part of an integrated system, or analyzed as an isolated problem? Isolated problem.

4. Major Thoroughfare Plan, Columbia, Missouri^{*22}

First, Summarization of the Study

The study objectives of the Columbia Area Transportation Study is to develop a continuing, coordinated and comprehensive transportation process for the Columbia area.

* The City of Columbia and the Missouri State Highway Department, 1968.

The study organization, as set forth in the contract, consists of a coordinating committee and a technical planning committee.

The primary function of the coordinating committee is to provide guidance, establish policy, and coordinate the planning of the transportation study. This committee provides direction for the study; serves as a reviewing body for all study procedures, recommendations and reports; and is responsible for the release of public information and obtaining necessary approval from the respective governing bodies for actions by the study organization.

The technical planning committee is a working committee under the direction of the coordinating committee and is composed of persons concerned with the planning, design, and operation of the transportation system. The primary purpose of this committee is to advise the coordinating committee on technical standards, and exchange ideas and concepts concerning possible solutions to technical problems.

Within an urban area, no single street can serve all the types of travel demands. To operate efficiently, the major thoroughfare plan must be an integrated system of individual streets and highways with each segment designed to serve a particular function. Streets and highways serve two major functions: "Traffic Mobility" and "Land Access."

In order to guide the orderly growth of the Columbia area, it is necessary to analyze the needs of individuals, families, neighborhoods, communities, and the city as a

whole. These needs include streets, open space, houses, school, churches, public buildings, recreational area, local, community and regional shopping facilities, etc. In order for Columbia to experience healthy growth, each of these essential elements must be planned and located in proper perspective.

Without a well-defined and free-flowing circulation system, the urban environment cannot grow and prosper. The city, communities, sub-communities, and neighborhoods served by the circulation system provide the justification for its existence. Therefore, the practical assumption is that land use and traffic circulation are dependent and must be considered as a total environment.

The basic objective of the major thoroughfare plan is to provide an adequate system of transportation facilities that will insure logical development of the community, safe and efficient movement of people and goods, and will provide for the economical expenditure of public funds. The major thoroughfare plan depicted here recognizes the neighborhood-community concept and applies it in the areas where it is pertinent. The application of this concept provides a basis for the locationing and interrelating of various land use and circulation elements.

Second, Critique of the Major Thoroughfare Plan

The goal of this plan was to achieve an adequate system of transportation facilities that would insure a logical community development. This plan recognized the necessity

of an integrated plan, realizing that land use and the transportation system are interdependent.

The study, however, was set up only to determine the major thoroughfares and thus to determine which routes are the most used. The administrative system set up by the city is such that it could be a vehicle for complete comprehensive planning. However, as stated in the city's planning objectives, a determination of the city's present transportation via a major thoroughfare plan will not provide a complete enough picture on which to base the future development of the city.

The development of a major thoroughfare plan, though an important tool, cannot be considered as an end in planning. Only through the use of this and many other tools can a plan be formulated. Here is where the proper determination of objectives can be used to determine which tool should be applied to the particular situation in order to provide the required information.

Third, Information Phase Check List for Value Analysis

1. Are the basic objectives of the study properly developed? No.
2. Were the objectives required by the contract or were they guidelines only? Contract.
Are they stated clearly and specifically? No.
3. What is accomplished in the study? The development of a major street or thoroughfare development plan.

4. What method was used in the study? Traffic count.
5. Did the study comply with the objectives? Yes.
6. Did the study design do more than the objectives required? No.
7. Was the study structured to solve problems, or merely consolidate data? Solve problem (to determine the major thoroughfares).
8. Why was the specific approach used? Ease of operation.
9. Is a severe environment involved? No.
10. Were special criteria developed? Yes (street and land use classifications).
11. Were conclusions tested adequately? No.
12. What probabilities for broad utilization of results were indicated? The city plans to use the results in future transportation and land use planning.
13. Would implementation costs appear to be excessive? Yes.
14. Is new technology required for its implementation? No.
15. Is the problem studied viewed as a part of an integrated system, or analyzed as an isolated problem? No, it attempted to integrate land use and transportation, however, the approach was that transportation systems controlled land use which is not entirely correct.

5. Preliminary Engineering Economy Analysis of Puget Sound Regional Transportation Systems*^{2 3}

First, Summarization of Analysis

Preliminary engineering economy analysis of five alternative urban transportation systems formulated and studied by the Puget Sound Regional Transportation Study. Each transportation system is based on the possible inclusion and uses of the following facilities in various degrees: highway facilities (freeways, expressways, and arterials) bus transit facilities, rapid rail transit facilities, automobile parking facilities, ferry vessels, and a floating bridge.

The principles of engineering economy analysis are applied to the evaluation of the transportation system using three methods of engineering economy analysis: (a) the total annual transportation cost methods (b) the benefit-cost ratio method and (c) the rate-of-return method.

They did not evaluate the socio-economic factors which must be considered in transportation planning.

Engineering economy analysis is used as a means to compare the tangible cost of competing alternative uses of funds. Socio-economic or intangible factors, although they are important considerations, are difficult to evaluate in monetary terms. These intangible factors are not always included in an engineering economy analysis. Because of their importance, however, they must be included as a part of the decisionmaking process.

*

Nicubur, Howard Duke, Highway Research Record, No. 180, 1967.

Second, A Critique of a Preliminary Engineering Economy Analysis of Puget Sound Regional Transportation Systems, 1967

In the analysis of any planning study the economic factors are of major importance to the implementation of the resulting plan. This study was conducted as a facet of an entire planning operation.

This study had a specific objective of evaluating an economic basis of five alternative urban transportation systems using three proven analytical methods. This was done and no fault can be found with the study.

This study was selected because it was a very good example of engineering economic analysis. This study cannot be considered a complete tool for the implementation of a plan for the transportation system. Many more factors other than engineering economy must be considered.

For example, sociological, psychological and intangible factors could render the resultant system obsolete or otherwise unsuitable.

Third, Information Phase Check List for Value Analysis

1. Are the basic objectives of the study properly developed? Yes
2. Were the objectives required by the contract or were they guidelines only? Guidelines.
3. What is accomplished in the study? The preliminary selection of a transportation system based upon economic criteria.

4. What method was used in the study? Engineering economic analysis.
5. Did the study comply with the objectives? Yes.
6. Did the study design do more than the objectives required? No.
7. Was the study structured to solve problems, or merely consolidate data? Solve problems.
8. Why was the specific approach used? Three methods of economic analysis were used. (a) total annual cost method. (b) benefit-cost ratio method. (c) rate-of-return method.
9. Is a severe environment involved? Yes.
10. Were special criteria developed? No.
11. Were conclusions tested adequately? Yes.
12. What probabilities for broad utilization of results were indicated? The selection of a transportation system.
13. Would implementation costs appear to be excessive? Yes.
14. Is new technology required for its implementation? No.
15. Is the problem studied viewed as a part of an integrated system, or analyzed as an isolated problem? Isolated problem.

6. Comprehensive Plan for Ames, Iowa^{*24}

First, Summarization of the Plan

Ordinance No. 407 creating a City Plan Commission was

* City Plan Commission, Ames, Iowa, 1954.

passed on March 17, 1930. This ordinance created the Plan Commission and fixed and prescribed the duties and powers thereof.

The City Plan Commission consists of seven members who are citizens of Ames and they must be qualified by a knowledge or experience in planning.

The Commission will have the power to make surveys, studies, maps, plans or charts of the area which has any relationship to the comprehensive plan.

The location of improvements such as buildings, bridges, etc., is subject to the approval of the commission. No street plan shall be constructed without the approval of the commission.

For the purpose of making a comprehensive plan for the physical development of the city, the commission will make comprehensive studies of present conditions and future growth of the city with regard to its neighboring territory. The purpose of this plan is to accomplish a coordinated and harmonious development of the city and the environment within it.

The comprehensive plan is composed of the mapping of all the physical elements that form a community and solutions or recommendations for the use of these elements for the future growth of the city. The complete comprehensive plan consists of maps, plans, tables, illustrations, reports and recommendations projected from a long-range viewpoint which covers at least twenty years.

The plan takes into account major streets, land use, traffic surveys (origin destination), parking, other forms of transportation, parks, recreation, education, municipal utilities and services, cultural and civil developments and housing.

Second, Critique of Comprehensive Plan for Ames, Iowa

The study reviewed was the method by which the city of Ames, Iowa set up a comprehensive plan commission for the purpose of developing a city plan for the orderly physical growth of the city. This study establishes the guidelines for the planning process. The study also outlines the methods and procedures that the planners are to use, and a specific planning period.

The plan of action outlined in this study would definitely contribute to the solution of future problem areas. The scope of the plan which includes the planning for the total physical plant of the city, is probably as broad as possible at the time of its inception. The format for selection of commission members and procedures is well specified and rigid. Here lies the possible weakness of this study. The rigidity of the format may be so inflexible that the commission would not be able to cope with the changing demands placed upon the planning process itself.

The plan commission might better be utilized if they were less rigidly restricted. This is not to say that they should not have well-defined goals and objectives, but rather the goals and objectives should be in a format such that

they can be re-evaluated and re-formulated throughout the planning period. For example, the goal of the planning commission is to accomplish a coordinated harmonious development of the city and the environment within it. Yet the commission objective is the mapping of all the physical elements within the community and to recommend the use of these elements for the future growth of the city. This restriction to only physical elements must be considered incomplete as a planning effort, because it fails to consider the human factors which sociologists and other humanists say is the planning area most needed in successful planning efforts.

As well thought out as the Ames plan is, its objectives though restrictive in many ways, neglects to specify the work performance and outputs necessary to achieve their goal. Yet the restrictions are such that the planning procedures will become stereotyped and lack the dynamics of change necessary to cope with the changing environment.

Perhaps the primary objective should have been one which would compel the plan commission to reexamine their planning procedures and even their secondary objectives periodically.

Perhaps the primary objective should have been that the plan commission should begin on the first of January on even years and completed by the first of March on that same year, a study to determine the effectiveness of its

objectives and methods of obtaining these objectives by surveying a percentage of those citizens involved to determine if the overall objectives should remain intact.

Here all the considerations are presented which are necessary for the formulation of sound, flexible objectives. The commission is instructed as to what it must do, who will do it, when it will be done, how long it should take, how the evaluation will be conducted and at what quality the research should be. Using this sort of an approach the plan commission should be able to establish objectives which could handle their planning needs and still maintain the overall flexibility necessary to cope with a changing environment.

Third, Information Phase Check List for Value Analysis

1. Are the basic objectives of the study properly developed? No.
2. Were the objectives required by the contract or were they guidelines only? Guidelines only.
Are they stated clearly and specifically? No.
3. What is accomplished in the study? Recommendation for the future needs and developments in the Ames area.
4. What method was used in this study? A physical mapping and planning effort.
5. Did the study comply with the objectives? Yes, with it's own objectives.

6. Did the study design do more than the objectives required? Yes.
7. Was the study structured to solve problems, or merely consolidate data. Consolidate data to make recommendations from.
8. Why was the specific approach used? A city ordinance No. 407 calls for a complete area plan.
9. Is a severe environment involved? No.
10. Were special criteria developed? No.
11. Were conclusions tested adequately? No.
12. What probabilities for broad utilization of results were indicated? This type of planning organization will influence zoning and other public regulations such that its effect could blueprint or inhibit the future growth of the city.
13. Would implementation costs appear to be excessive? Yes.
14. Is new technology required for its implementation? No.
15. Is the problem studied viewed as a part of an integrated system, or analyzed as an isolated problem? An attempt was made to study the entire system. However, the inflexibility of the format will, of necessity, negate this attempt.

7. Comprehensive Planning for the Chicago Crosstown Expressway*²⁵

First, Summarization of Plan

1946-1966--112 miles of limited access motor expressways have been planned, designed, and constructed along with 100 miles of tollways.

Objectives:

1. To achieve a harmonious balance between transportation goals and other community impact and goals.
2. Transport industry group formed and make recommendations.

Group-planning approach was defined in an instructional memorandum on the subject of Urban Transportation Planning from the U.S. Department of Commerce (Instructional Memorandum, March 27, 1963) which said, in part:

"It is declared to be in the National interest to encourage and promote the development of transportation systems embracing various modes of transport in a manner that will serve the states and local communities efficiently and effectively. To accomplish this objective the secretary (of Commerce) shall cooperate with the states...in the development of long-range highway plans and programs which are properly coordinated with plans for improvement in other affected forms of transportation and which are formulated with due consideration to their probable effect on the future development of urban areas."

* Pikarsky, Milton, Highway Research Record, No. 180, 1967.

Chicago's present radial system of expressways is oriented to the central business district.

Criteria of study (a) engineering aspects, (b) impact upon the existing communities and (c) potential land use improvements.

The engineering aspects category include criteria for considering all technical and economic requirements of expressway facility itself in its primary purpose of moving people and goods more safely, rapidly, and effectively and evaluating alternative alignments to other transportation facilities.

The impact upon existing communities category analyzed community groups on ethnic, religions and political bases and considering the number of people and business establishments that would be directly dislocated by the alternative alignments. This study element considered such factors as the displacement of schools, churches, and parks and the splitting of school, fire, police and other special districts. The distinction between the highly neighborhood-oriented grocery or drug store and the used car lot, or the small specialty plant employing neighborhood people also was of great concern.

The third category, potential land use improvements, explored opportunities presented by the alternative alignments as a possible catalyst for achieving desirable objectives--a means of linking the community as it is to an

image of what it might ideally be. Chicago's basic policy requires that transportation facilities should be used as a positive factor in improving Chicago's communities and in establishing the future form of the city.

These three categories constituted the framework of the study. Each had its own set of objectives criteria and each was to be treated separately in analysis because, while often complementary or overlapping they would sometimes conflict.

Second, Critique of the Comprehensive Planning for the Chicago Crosstown Expressway

The study was subdivided into three parts: engineering aspects, impact upon existing communities, and potential land use improvements. The purpose of the three-part study was to design and build one hundred and twelve miles of limited access motor expressway along with one hundred miles of tollways. By subdividing the study into three areas and by not placing the primary emphasis on the engineering aspects, the attempt was made to better the communities through which the highways passed rather than the usual destruction of community cohesiveness. The study placed a major importance on the displacement of schools, churches, and parks; and in the splitting of schools, fire, police, and other special districts.

A project of this magnitude will effect the lives of millions of people and whether the effect is good or bad is

a direct result of the planning effort. The Chicago Planning Commission responsible for this plan must be commended for the forthright effort in considering both the economic and intangible social factors which are encompassed by this project.

The only possible criticism would be that they did not have a broad enough approach. This criticism is not directed at the plan commission which was directing these highways. Perhaps the commissioning agency should have examined the effects of such a system upon its city. Such questions might well have been asked as: Will the central business district continue to be the center of business and industry or will these services be dispersed throughout the area? Does the central business district have facilities to handle the greater influx of vehicles caused by these new highways? Will the city gain more revenue from the new highways than they would have from the previous land use? Will the new highways benefit the majority of the citizens directly? These are serious questions which many of the city planners are now asking before such decisions are made. If the answer to these questions is "Yes" then the project will have positive results if it is conducted as carefully as this one.

Third, Value Analysis Check List

1. Are the basic objectives of the study properly developed? True objectives were not listed, however,

it is suspected that in actuality, they were formulated and sound.

2. Were the objectives required by the contract or were they guidelines only? Guidelines.
Are they stated clearly and specifically? No.
3. What is accomplished in the study? The decision of a route for a crosstown expressway.
4. What method was used in the study? A comprehensive plan to study engineering, landuse, and social factors. With appropriate methods for each.
5. Did the study comply with the objectives? Probably.
6. Did the study design do more than the objectives required? No.
7. Was the study structured to solve problems, or merely consolidate data? Data consolidation?
8. Why was the specific approach used? To try to achieve a harmonious balance between the transportation system and the community.
9. Is a severe environment involved? Yes.
10. Were special criteria developed? Yes.
11. Were conclusions tested adequately? Yes.
12. What probabilities for broad utilization of results were indicated? None.
13. Would implementation costs appear to be excessive?
Yes.

14. Is new technology required for its implementation?
No.
15. Is the problem studied viewed as a part of an integrated system, or analyzed as an isolated problem? An integrated transportation system.

8. The Boston Regional Survey*²⁶

First, Summarization of the Survey

The Boston Regional Survey was designed to provide a basis for a major regional transportation planning effort. This was done, not by gathering massive amounts of socio-economic and travel pattern information, but by concentration on a detailed investigation of economic, land use, population, and transportation patterns.

The objectives of this survey were stated as follows:

1. Preparation of an inventory of transportation and planning studies in the region.
2. Analysis of regional-research and proposals with respect to population, land use patterns and economic base.
3. A transportation inventory including public transit, railroads, highways, ports and airports.
4. Identification of regional problems and recommendation of measures to develop comprehensive regional planning.

* Abend, Norman A. and Levin, Melvin R., Traffic Quarterly, April, 1963.

The survey was divided into three reports. (1) The overview, including the three basic elements of coordinated transportation planning; population, land use and economic base. (2) The transportation inventory--a report on each major transportation system. The final report which integrates the previous reports with an analysis of regional development prospects.

The survey found that many of the problems in transportation systems stem from the need to adjust to two major trends. The first is decentralization and suburbanization and second is the persistence of the traditional core area of high density and the governmental and political structure that accompanies this area and tends to diffuse decision-making power.

With respect to the need for a comprehensive plan, that will effectively integrate core and suburban transportation systems and coordinate the separate activities of governmental and private agencies, their findings were:

1. Transportation activities have been uncoordinated.
2. Land use, population, and economic needs have not been considered in transportation planning.
3. No adequate measure of the consequences of alternate courses of action exist to guide decision making.
4. Many localities and neighborhoods believe inadequate consideration is given to local needs in the

transportation decision-making process.

5. Previous development plans and reports seem to have been prepared more for mass distribution than for implementation.
6. The air must be cleared of transportation and regional development myths before realistic action programs can be formulated.
7. Cost information on capital investment for major transportation facilities is inadequate to make the two following important regional decisions:
 - a. Possible public subsidization or abandonment of public transit in favor of other alternatives.
 - b. Basic decisions as to MTA's future including possible extension into several suburbs.

Also, to develop a plan that will have an effect on political and economic decisions, all social, psychological and environmental factors in general must be considered in relation to these political and economic frameworks. This includes such things as a transit system's ability to attract passengers and how developments look and how they function. Second, A Critique of the Boston Regional Survey, 1963

The study was a survey of economic, land use, population and transportation patterns. The purpose of which was to provide a basis for a major regional transportation planning effort.

This study was for the purpose of determining the goals and objectives of a forthcoming comprehensive traffic planning effort. The survey included an overview of the area including the three basic elements of coordinated transportation planning, population, land use, and economic base. A transportation inventory, which included a report on each major transportation system within the area. The survey also included a final report which integrated the other reports with an analysis of regional development prospects.

This survey pointed the direction of the forthcoming comprehensive plan. With the information obtained in the survey the goals and objectives presented in the comprehensive plan will be realistic and accurate.

Third, Value Analysis Check List

1. Are the basic objectives of the study properly developed? Yes.
2. Were the objectives required by the contract or were they guidelines only? Contract.
Are they stated clearly and specifically? Yes.
3. What method was used in the study? The determination of goals and objectives of the forthcoming comprehensive regional plan.
4. What method was used in the study? A survey of available resources and potential problem areas.
5. Did the study comply with the objectives? Yes.

6. Did the study design do more than the objectives required? No.
7. Was the study structured to solve problems, or merely consolidate data? Consolidate data.
8. Why was the specific approach used? To survey the present situation in the fields of economics, land use, and transportation as a preliminary study.
9. Is a severe environment involved? No.
10. Were special criteria developed? No.
11. Were conclusions tested adequately? No.
12. What probabilities for broad utilization of results were indicated? It suggested areas that should be considered in planning that were formerly ignored.
13. Would implementation costs appear to be excessive? Yes.
14. Is new technology required for its implementation? No.
15. Is the problem studied viewed as a part of an integrated system, or analyzed as an isolated problem? An integrated system.

9. Planning and Decision Making in the Detroit Metropolitan Area*²⁷

First, Summarization of the Plan

The goal of this study was to use planning as a basis for decision making. They realized that most regional plans

* Matheason, Ken, of Highway Research Record, No. 137, 1966.

are formulated privately with no concern given to the local governments involved. Any plan which cannot be implemented because of local political and legal constraints is not usable.

Despite many pages of highly complementary description of Detroit's Metropolitan Regional Planning Commission's studies and activities over the past 20 years, the report contains repeated conclusions that final decisions on virtually all the really important regional physical problems which arose during that period were made completely apart from the mechanics of regional planning.

They are organizing all the local governmental decision makers into a formally established agency which will consider and act on regional matters on behalf of the entire region. This organization is a council of governments comprised of 404 cities, townships, counties, and school districts, which were recommended by a study on governmental organization by Metropolitan Fund, Inc. the regional planning agency in the Detroit area.

This agency will provide a continuing forum in which all of the public officials of the region may discuss these subjects which properly claim the attention of professional planners. It will also provide these planners with a source of direction and advice on the social, economic, and political realities of regional development. And, most important, this voluntary association of local decision makers will

provide an official agency for the implementation of planning recommendations.

Second, A Critique of the Planning and Decision Making in the Detroit Metropolitan Area, 1966

This study is concerned with the setting up of a political organization composed of representatives from 404 local cities, townships, and school districts within the Detroit Metropolitan Area. The purpose of the organization being setting down of guidelines and policies which would direct the efforts of the professional planners.

The intent of this organization is to provide the professional planners with a source of information and advice on the social, economic and political situations within the area. It would seem that this type of an organization would remove the planning function from the level of a rational professionally-oriented process and place it into an area like a political football to be bandied about by local power groups. An organization of this type and magnitude cannot help but suffer from an objective and slow decision making process. However, this might be the only vehicle by which a planned project could be completed within an area where too many local authorities have jurisdiction.

Third, Value Analysis Check List

1. Are the basic objectives of the study properly developed? No.

2. Were the objectives required by the contract or were they guidelines only? Guidelines.
Are they stated clearly and specifically? No.
3. What is accomplished in the study? A plan to set upon organization of governments which would act as an interim group between planning and decision making.
4. What method was used in the study? Not applicable
5. Did the study comply with the objectives? Yes.
6. Did the study design do more than the objectives required? No.
7. Was the study structured to solve problems, or merely consolidate data? Consolidate data..
8. Why was the specific approach used? To give all the parties affected a hand in the planning process, thus guiding the way for the implementation of any project.
9. Is a severe environment involved? Yes, 404 local governments.
10. Were special criteria developed? No.
11. Were conclusions tested adequately? No.
12. What probabilities for broad utilization of results were indicated? The use of such an organization in the planning effort means little utilization.
13. Would implementation costs appear to be excessive? Yes.

14. Is new technology required for its implementation?

No.

15. Is the problem studied viewed as a part of an integrated system, or analyzed as an isolated problem? Integrated system.

10. Minneapolis in the Motor Age Major Streets Planning

Goals*²⁸

First, Summarization of the Plan

The charge from city council was that:

"The Commission (should) report to the city council as to which specific streets in the several systems of the city approved by the council, Hennepin County Board and the State Highway Department are not fixed as to location; (and) which of such specific streets the commission consider should be fixed."

The planning director stated about the report:

"Minneapolis needs an up-to-date coordinated major street plan to accomodate its ever increasing traffic and to preserve its sound living and working areas. The first purpose of this plan should be to enable every major street to perform its proper function, effectively, safely, and pleasantly."

"To be realistic, such a plan must reflect general community objectives in attacking traffic and transportation problems, The definition of these common objectives is the subject of this report."

The purpose of this report can be summarized as follows:

1. It presents a brief background of current transportation situation and of the need for planning.
2. It describes certain assumptions which help provide a basis for planning major streets in Minneapolis.

* City of Minneapolis Planning Commission, 1960

3. It sets fourth common objectives which should be kept in mind as a major streets system is developed and coordinated.

The last subject forms the essence of this report.

The scope of this report is limited to two general questions relating to the common objectives for major streets planning for Minneapolis.

1. What is the major streets system of Minneapolis intended to do.
2. What general planning concepts should be followed in order to enable the major streets system to do what is expected of it.

In answering the general questions relating to the scope of functional goals, a number of assumptions must be made. These assumptions can be grouped into four areas of concern: the future of the city and the region, the social and economic forces shaping the city, the future of transportation and governmental organization and cooperation.

1. Minneapolis will continue to be the major center serving the region.
2. In Minneapolis, the population will continue to increase, but the rate, as it approaches saturation, will be much lower than in the past.
3. The general economic level will continue to rise.
4. As a whole, it is clear that air transportation will increase its role, the opening of St. Lawrence Seaway will affect Minnesota's economy and transportation, railroad's role will be stabilized and

- the role of highways will become more important.
5. Public transit is indispensable, not only today but also for the future.
 6. The various governmental units in the Metropolitan area will continue to cooperate in many administrative and technical functions.

Within the framework of the assumptions described a set of general community objectives for a coordinated streets system may be defined. The objectives are fundamental to the city's coordinated effort toward a major streets plan.

Objectives:

1. The major streets system should be integrated with other transportation networks.
2. The major streets system should work in complete harmony with the remaining streets to form an integrated network.
3. Planning for streets should go hand-in-hand with land use planning.
4. The major streets system should help preserve residential communities and neighborhoods as well as business and industrial districts.
5. The major streets systems should be classified according to their function and designed accordingly.
6. The major streets system should be planned and improved according to scientifically projected traffic needs.

7. The major streets system should be planned to facilitate transit flow (Mass transit system busses).
8. The major streets system should be planned accordingly to the best possible engineering practice.
9. Timing of major streets improvements should be coordinated with freeway construction and other private and public improvements.
10. From an economic standpoint, the major streets system should fall within community resources.

Second, A Critique of Minneapolis in the Motor Age Major Street Planning Goals, 1960

The purpose of this study as set down by the city council was to develop a major streets plan to aid in the cities future traffic planning effort. However, this report did not even attempt to follow the directives presented by the city council, but rather proceeded to come up with some obviously trite suggestions for planning. Setting useless objectives seemingly in an effort to disguise its ineptness in carrying out the prescribed function.

This study lacked all semblance of usefulness to any planning function. This, however, might have been prevented if the city council had set its goals and then backed them up with specific work/performance objectives. Objectives which would prescribe exactly the responsibilities to be assumed by the planning group, in accordance with prescribed techniques of objective setting.

Third, Information Phase Check List for Value Analysis

1. Are the basic objectives of the study properly developed? No.
2. Were the objectives required by the contract or were they guidelines only? Guidelines.
Are they stated clearly and specifically? No.
3. What is accomplished in the study? An attempt to set objectives.
4. What method was used in the study? Unknown
5. Did the study comply with the objectives? The objectives set forth by the city were seemingly ignored.
6. Did the study design do more than the objectives required? No.
7. Was the study structured to solve problems, or merely consolidate data? Neither, it just presented a list of objectives.
8. Why was the specific approach used? Unknown.
9. Is a severe environment involved? No.
10. Were special criteria developed? Yes, (the purpose of which is unknown to the reader).
11. Were conclusions tested adequately? No.
12. What probabilities for broad utilization of results were indicated? None.
13. Would implementation costs appear to be excessive? No plan of action was forthcoming, and no costs were apparent.

14. Is new technology required for its implementation?

No.

15. Is the problem studied viewed as a part of an integrated system, or analyzed as an isolated problem? Integrated system.

C. SUMMARIZATION OF THE TEN PLANNING EFFORTS

1. Are the basic objectives of the studies properly developed?

2--Yes

8--No

The value analysis answer to this question should be Yes.

2. Were the objectives required by contract or by guidelines only?

1--Contract

9--Guidelines

The value analysis dictates that planning objectives should be required by contracts.

3. What is accomplished in the studies?

Ten attempted to set objectives.

None set goals.

The value analysis dictates the setting of both goals and objectives.

4. What methods were used in the studies?

6--Origin and destination surveys

1--Engineering economic analysis

1--Comprehensive planning approach

1--Survey of resources

1--Used no method at all

The value analysis dictates that the method of approach depends upon the goal itself.

5. Did the studies comply with the objectives?

8--Yes

2--No

The value analysis answer to this question should be Yes.

6. Did the study designs do more than their objectives required?

1--Yes

9--No

The value analysis to this question should be No.

7. Were the studies structured to solve problems, or merely to consolidate data?

3--To solve problems

7--To consolidate data

The value analysis dictates that a study be done to solve problems.

8. Why were the specific approaches used?

Refer to the individual studies

The value analysis dictates the use of any appropriate approach which will obtain the objective.

9. Were severe environments involved?

3--Yes

7--No

The value analysis answer to this question should be No.

10. Were special criteria developed?

3--Yes

7--No.

The value analysis answer to this question should be No.

11. Were conclusions tested adequately?

2--Yes

8--No

The value analysis answer to this question should be Yes.

12. What probabilities for broad utilization of results were indicated?

Ten listed no broad utilization of results.

The value analysis dictates that broad utilization of results should occur.

13. Would implementation costs of the studies appear to be excessive?

10--Yes

0--No

The value analysis answer to this question should be No.

14. Are new technologies required for their implementation?

0--Yes

10--No

The value analysis answer to this question should be No.

15. Are the problems studied viewed as a part of integrated systems or analyzed as isolated problems?

4--Integrated systems

6--Isolated problems

The value analysis dictates that the planning be done as an integrated system.

D. VALUE ANALYSIS IMPROVEMENTS OF THE PLANNING EFFORT.

The Minneapolis Plan was compared with value analysis for evaluation purposes. At the time this plan was proposed Minneapolis was on the threshold of adopting a new zoning ordinance, the interstate freeway system proposed by the State Highway Department was in an advanced stage and Hennepin County was seriously considering a highway master plan. The city's land use and traffic movement pattern will be affected by these factors, alone, for years to come. Thus, the need for a coordinated street planning program for Minneapolis was apparent and urgent.

Minneapolis, like other older cities, has certain constraints placed upon it. These economic, culturalized, physical constraints prevent the city from developing new transportation systems with ease. The city which needs to provide a totally integrated transportation network is thus restrained.

Therefore, a compromise must be worked out such that some measure of convenience can be adopted to the transportation system without totally disrupting the economic, cultural and physical environment of that community.

It is also quite evident that, if a great degree of coordination is not achieved by the aforementioned planning bodies, their resultant goals will probably be at cross-purposes to each other.

PPBS dictates that the total project be planned and budgeted as a complete unit. The decision must now be made to appoint one planning commission which would formulate a master plan that will provide for coordinating the efforts of these separate planning bodies.

This planning commission would have to formulate several preliminary goals which would lead to a desired system. At this point a complete, value analysis must be performed, on each of those preliminary goals.

This value analysis would trim all the fat from those goals leaving only a bare set of realistic goals. The value analysis will lead the way to the design of objectives which will lead to the attainment of these goals.

For example, if Minneapolis decides upon the development of a major thoroughfare system as one of its goals, a value analysis will determine the routes most economically feasible and it will suggest the modifications to those routes which will be necessary. The value analysis will accomplish this function because it will immediately show the

probable cost of each alternative and from this a cost-to-benefit ratio can be developed. Objectives can then be designed which will allow the development of a plan necessary for the implementation of the system. Those objectives will be such that the planning commission can at any time see the total progress toward implementation. The commission will also, through the series of objectives which make up the plan, be able to budget the entire project in accordance with the PPBS requirements.

Listed here are the value analysis improvements as indicated by the check list.

1. The Minneapolis City Council did not properly develop their objectives. They should have stated the requirements in such a way that ambiguity would have been impossible. The city council wanted a major streets plan so that they could coordinate the construction efforts of the state, county and city. Their objectives should have been stated as follows:

The Planning Commission starting January 1 will devise a major street plan by June 1. This plan will list the most used streets and it will be carried out in the manner of current planning and engineering practice. Progress reports will be issued bi-monthly in the form of a percent completion.

2. This objective should be required by contract with a penalty clause included for any delay or failure in compliance.
3. The study, if properly done, will provide the city with a usable tool for coordinating the planning efforts of the area.
4. This study will lend itself adequately to an origin-destination survey since few land use changes are expected.
5. If the objectives are specified unambiguously and a contract with a penalty clause is made with the planner; then the resulting study will, of necessity, comply with the objectives.
6. No study should attempt to do more than the objectives require because this would result in time and effort being wasted in non-essential areas.
7. This particular study should be done in order to obtain certain pieces of specific information. Recommendations from this information will develop into an integrated transportation network.
8. The specific approach suggested here is used because, as a goal, the city council decided to incorporate the new interstate system, county improvements, city improvements, and existing transportation facilities other than highways into an integrated network, thus making maximum use of the construction expenditure.

9. The planning environment in Minneapolis must not be considered severe because the coordination involved would be done with a few small well-organized groups. These groups, the state highway commission, the county and city planning commissions, are all interested in achieving the same goal.
10. The planning effort, as suggested, will not require any special criteria or innovative approaches, nor are any needed.
11. The methods of study suggested here are standard and, as a result, the conclusions thus reached should be reliable requiring little, if any, special testing.
12. The results of this study would be the basis of developing an integrated transportation network in the Minneapolis area.
13. The implementation costs of the planning effort should not be excessive in that this type of an approach is used often. The resulting transportation network may be expensive, however, the combination of federal, state, and local funds may make the project feasible.
14. The planning procedures suggested are such that no new technology is required. This is an advantage in that all the procedures suggested are well known and that their reliability is a matter of record.

15. The problem analyzed here is part of the development of an integrated transportation network. Thus, this problem must be analyzed in the light of a totally integrated system.

III. CONCLUSION

Most of the planning effort done in the past has one or more of the following faults. The 10 plans critiqued in this thesis are exemplary of the recent planning effort in the United States and are, therefore, examples of these faults. The aforementioned faults fall under the following categories: determination of goals, setting of workable objectives inadequate tools or methods, and finally, the planning organization itself.

A plan, itself the end result of the planning effort, can be compared directly to a manufactured product in that both have the same value form as previously defined in the discussion solution of this study. Therefore, the plan and planning effort can be dealt with in the same manner as a manufactured product such that in the design and manufacture of these products, the enhancement of these values are of primary importance. An attempt has been made to improve one of the planning efforts by using value analysis.

A common error found in eight of the plans in the discussion section of this study, was in the selection of realistic goals. Their goal selection is not based upon the premise of enhancement of the basic value of their end product, the community. A goal must result in the addition of value to the system. Here, planning agencies do not devote enough effort to the goal setting endeavor before the move into planning operations themselves. Goal setting is without a doubt the most important single area in the

planning effort because it is here that the direction and the eventual outcome of the planning effort is developed.

Goals must be determined by first surveying the present situation through the value analysis technique in order to decide if the apparent goals are really the goals actually desired.

Eight of the plans discussed in this paper had utopian goals which are totally impractical and unrelated to the process which evolved to their finished product.

Eight of the planning efforts mentioned in this study failed to use the objective setting process properly. This was done because a formalized technique for designing and using objectives did not exist. The objectives are the stepping stones which lead to the attainment of the goals. If a value analysis is performed (as demonstrated previously in the improvements of the Minneapolis Planning Effort) then this method will be the basis of formulating these objectives. The value analysis will tell the planner what must be done, how to do it, and in what order the events must take place. This information will be instrumental in the development of objectives.

The most important feature of objective setting is the creation of a feedback loop which will guarantee the planner a total visibility of the project as it progresses. None of these planning studies reviewed had an adequate feedback system, therefore, directing these efforts was much like driving an automobile with painted over windows and usually

a similar drastic effect was the result.

PERT, Plannet, CPM, and Phased Project Planning, are all tools used in the feedback of objectives or a series of objectives. The purpose of each of these tools is to feed-back to the project manager the progress the system is making toward achieving its primary and secondary goals.

Thus, none of the plans investigated above were adequate because they lacked a value analysis which assures the selection of realistic goals and the design of workable objectives with an adequate feedback network to permit the planner to control the entire project.

An estimated seven plans failed, not because of goal setting or objectives, but primarily because of the organization of the planning agency itself. The planning agency, if it is to have any chance at all to be effective, must adhere to the practices of good management. Good management depends most of all upon good communication, feedback and also the power to design and implement. This statement cannot be adhered to unless clear lines of authority are established. This bridgework of planning and implementation authority provides the channels of communication and feedback, but it also dictates a single head of this authority whether he is the project director or the city manager. This communication must be gathered from a single source at the top.

There are many reasons why this type of management structure is not always employed in planning agencies. Quite often the vast number of separate political entities

involved precludes this. In other instances political rivalries and petty jealousies prevent a sound managerial approach. In each instance where this occurs, clear channels of communication and feedback are obstructed with predictable confusion and disorganization.

In every case where sound planning and management practices are employed, the resulting machinery is capable of producing valuable products.

IV. RECOMMENDATION

In controlling urban growth planning is essential in properly directing that effort, In order to completely fulfill its function as a plan, it must be approached scientifically using value analysis.

The federal government has specified the use of Planning, Programming, and Budgeting Systems as a method of achieving this scientific planning approach. PPBS specifies that a preliminary study be conducted in order to set realistic goals and to design workable objectives around these goals.

1. It is recommended that value analysis be used in the preliminary study specified in the PPBS approach.
2. It is recommended that proper objective setting techniques, as stated in the methodology; purpose, implementation and feedback, be employed as a means of specifying the achievement of the various functions which direct the system toward its goals. The clear statements of these objectives with the necessary feedback included is the resulting plan as demonstrated in the section on value analysis improvement of the planning effort.
3. It is recommended that the management of any planning project be built around the specific objectives. The objectives provide the clear channels of communication and feedback necessary for the completion and implementation of that project.

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