

Role of Top Management in Developing and Using Planning Information

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• IN A HIGHWAY DEPARTMENT, as in any large organization, the administrator (as top management) simultaneously is the head of the organization to whom all others look and the bottom of the funnel where the knotty problems gravitate. In every respect, he is responsible for the overall work of the Highway Department.

In attempting to keep the organization moving toward its predetermined goals, the administrator has six generally recognized functions: (a) organizing, (b) planning, (c) directing, (d) staffing, (e) controlling and (f) non-delegated activities. Since the Highway Department is an arm of government, the highway administrator must spend much of his time in "non-delegated activities," that area of his work relating to external contacts such as appearing before legislative committees, meeting with various delegations and speaking to a seemingly infinite number of publicly oriented organizations. The necessarily large amount of time spent on non-delegated activities not only adds to the highway administrator's work hours, but also means that he must be more efficient in performing the other five basic functions relating to the general work of his Department.

IMPORTANCE OF PLANNING

Attention in this discussion will be directed largely to the second mentioned basic function of the administrator, that of planning. In the purely administrative sense, planning has been defined as "the function of selecting, from among alternatives, an effective economic basis of action for the achievement of specified objectives." (1)

In a comprehensive paper (2) W. L. Haas summed up the Planning function very effectively by this statement:

Planning is one of the least understood and least effective aspects of highway manage-

ment, yet it is an indispensable part of administration. It is the key operation from which all other activities flow. It serves to activate the enterprise and gives direction and guidance in accordance with the principles and philosophy of the administrator.

Planning of this nature, as the key operation from which all other activities flow, is the all-encompassing type of planning which is being discussed at this conference.

A highway administrator is not only concerned about planning in the narrow sense of highway planning surveys or specific route or system planning or financial management planning—but with all of these, and a few more. The administrator must develop planning as a concept in all phases of the work of the highway organization: long-range planning of goals, planning of objectives, planning in determining policies, planning in financial management, planning of the highway program, both long range and short range, and planning for personnel management.

Without effective planning in the highway organizations, those in top management become fire chiefs, spending most of their time putting out conflagrations, both large and small, which would not have developed at all if the organization had planned properly.

Any organization without a strong planning function is like a ship without a rudder, drifting aimlessly across the seas with little chance of docking at any port of consequence.

DEVELOPING AND UTILIZING PLANNING

With planning as one of his important functions, the administrator must develop planning, as a concept, within the organization. This he does first by practicing planning himself, and giving it status within the organization. In his contacts throughout the organization, both orally and through written direc-

tives, he must make it known that he is concerned not only about the everyday operational and administrative problems, but also is concerned about looking ahead and properly charting the course. He must develop the planning function by giving it organizational status and by insisting that it permeate every functional part of the organization. Planning is a requirement, not only for the planners, but also for every administrative and operational part of the highway department's organization.

Once plans have been developed, again it is the responsibility of the administrator to see that these plans are utilized. Too many good plans have been developed by staff units, only to be put on the shelf and largely forgotten by the line personnel in the organization who would most benefit by their knowledge and application of these plans.

It is true that the manner in which plans are presented, "the package in which they are wrapped," often has a great deal to do with how well they are accepted and used. Therefore, the administrator must insist that the plans of the organization be as clear and as simple as feasible so that they will gain acceptance further down the line. In addition, he must institute controls which will guarantee that the plans he has sanctioned will be used effectively.

STATUS IN THE ORGANIZATION

Much of the effectiveness of the planning function is determined by its importance in the organization. If planning is to be a principal function of the administrator, it must be given a status to reflect this importance.

As a function, planning should be tied directly to the administrator with the planning head reporting directly to him. An example of this may be found in the organization of the Pennsylvania Department of Highways in which there are four deputy secretaries, one of whom is the Deputy Secretary for Planning and Programing. Under him are three bureaus: (a) economic research and programing, (b) advance

planning, and (c) highway planning statistics. The function of the bureau of economic research and programing is to develop various highway economic studies such as road classification and highway needs, to conduct economic research and to handle programing activities involving long- and short-term projects of the highway construction program. The function of the bureau of advance planning is to develop long-range generalized plans on a state-wide, regional and specific urban area basis. It is their charge to coordinate these long-range plans with other State regional and local urban bodies which would be concerned. The function of the bureau of highway planning statistics is to collect, develop and interpret the basic planning information which will be needed for the planning process, not only under the planning deputy but also in other areas of the department.

AN EXAMPLE OF PLANNING DEVELOPMENT AND UTILIZATION

One area of planning activity which was mentioned previously is that of personnel management. This is an example of one type of planning that would not be the responsibility of the planning unit itself. Rather, it is typical of administrative planning which would be the responsibility of the particular administrative head.

Looking into the future through planning of personnel development and personnel management often has been neglected. However, it should rank in importance with all of the other planning activities in a highway department if the department is to perform its functions effectively.

In Pennsylvania, through a study conducted by the Automotive Safety Foundation, it was determined that the department should hire approximately 500 additional engineers in order to keep pace with the expanding highway program. These engineers were to be recruited as college graduates in civil engineering and from the ranks of civil engineers with 5 to 10 years of experience. Through 1958, 1959 and into 1960, the effort to recruit college grad-

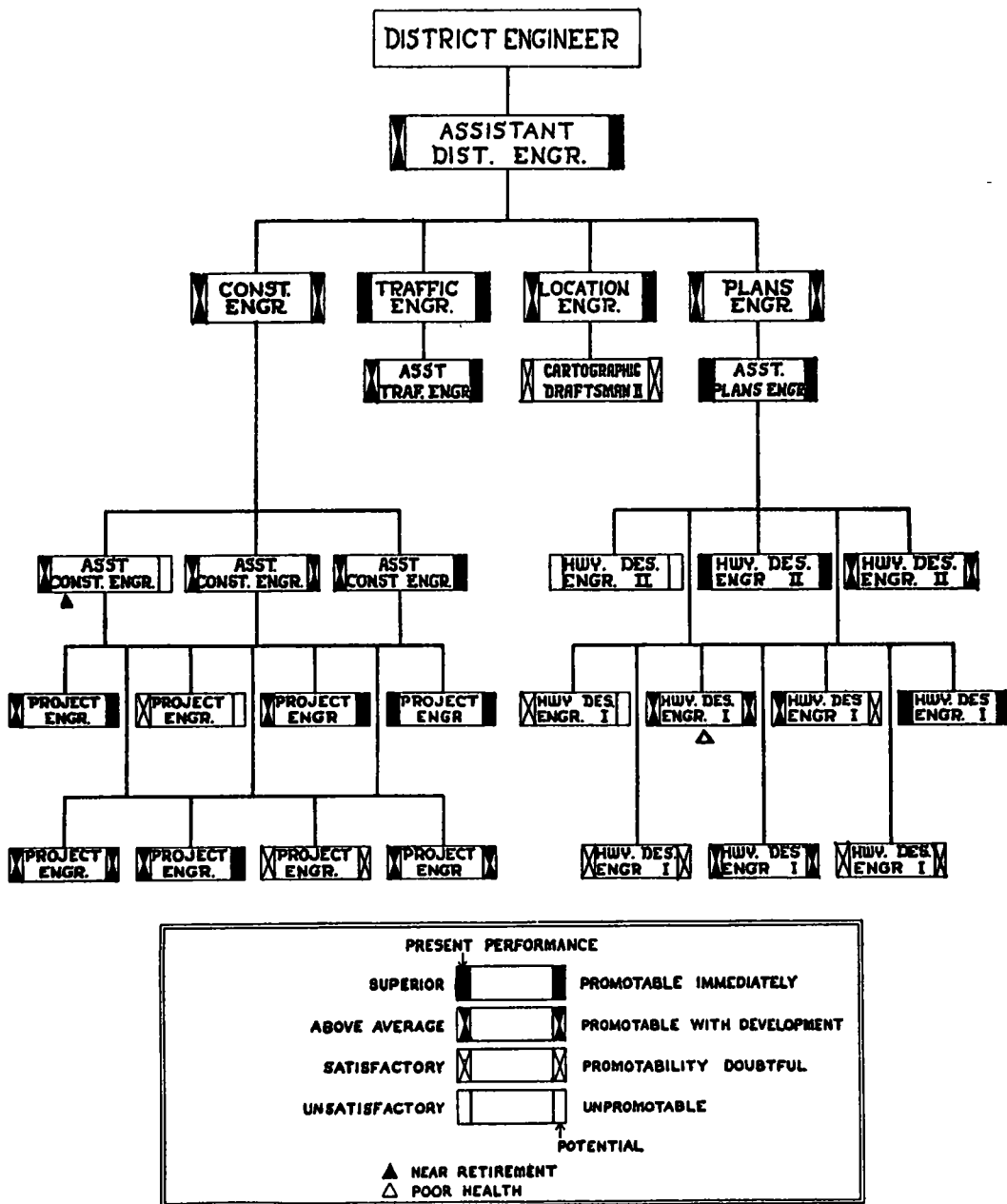


Figure 1. District organization.

uates was very successful, but the recruitment of engineers with several years of experience was not particularly successful. Therefore, a comprehensive management development program was initiated beginning in 1960 with the goal of determining those engineers in the department with good potential

and developing them for early assumption of greater responsibility. This was accomplished in several ways: (a) a series of management seminars was held to bring the problem into focus and to give direction to the management development program and (b) all engineers were required to complete a man-

power inventory questionnaire which determined their background, experience and job desires. Concurrently, each engineer was evaluated and appraised by at least three of his superiors. In this manner the present performance and potential of each individual was determined. This was charted graphically for each highway district and central office bureau. Figure 1 illustrates one segment of a district organization showing the present performance and appraised potential of each individual. A chart such as this compels advance planning on the part of the district engineer or bureau head, because impending requirements are indicated and personnel problem areas stand out effectively.

Again, such a planning device is effective only if it is used. Therefore, the Secretary of Highways has directed that all district engineers and bureau heads state in their recommendations for promotions that they have examined and considered the organization's status chart and the appraisals of those individuals eligible for promotion.

As another element of the manpower planning and development program, the

department is beginning to embark on additional work and study which has the goal of determining manpower requirements during the next several years, taking into consideration shortages of qualified personnel, anticipated rate of turn-over and the projected work load. Once these requirements are determined, the department then can proceed to give even more effective direction to its management development and personnel program.

This has been one example of the application of the planning principle in an area of highway department's activity where, in the past, planning has not been seriously considered. It may serve as an illustration that the planning concept should be all-embracing and applicable in every segment of the work of a highway organization.

REFERENCES

1. KATZ, ROBERT L., "Skills of an Effective Administrator." *Harvard Business Review* (Jan. 1955).
2. HAAS, W. L., "The Role of Planning in Highway Administration." *HRB Proc.*, 40:79-94 (1961).

DISCUSSION

Hill.—It seems all comment and discussions both this morning and yesterday have been on the basis of continuing planning with all the traffic being carried by the wheeled vehicle, just as it is now. I wonder how much consideration is being given to rapid transit, and rapid transit carrying a part of the load away in advance. I am not saying within 5 or 10 years, but we are developing highway systems which may in some areas be partially obsolete by the year 2000, and we are putting terrific investments in highways.

I wonder whether any State is planning for a part of its load to be carried by other than wheeled vehicles. For instance, Mr. Telford I am sure has had to consider San Francisco's thinking. Is California taking into consideration the possibility of the mono-rail system coming into the San Francisco area? Will that lessen their high-

way needs and their highway planning in the future?

I believe our advance planning must take those things into consideration, if we are actually doing planning, rather than just going ahead and developing and continuing in a better way what we have been doing than in the last 10 or 20 years.

Froehlich.—I do not think this is being neglected, or completely neglected, in the highway departments. Two studies in Pennsylvania, the Pittsburgh transportation study and now the Penn-Jersey, have included all forms of transportation.

The charge of the Penn-Jersey study will be to evaluate metropolitan transportation, not highways alone. This has included railroads and rapid transit. The various breakdowns and models that are being prepared will reflect that.

Both Mr. Wiley and I this morning made rather strong positive statements

about where the planning function should be in the organization; that is, that it should report directly to the chief administrator. I wonder whether anyone would want to challenge or question that. I do not believe that this is true of all highway departments.

Haas.—When I wrote a paper about a year ago, I made a quick check and I know there were approximately 40 that would appear to have some direct connection with the top administrator.

Froehlich.—In other words, they may report directly to the chief administrator, but they are not given comparable status?

Haas.—Quite often they do not have status and the effective relationship with the administrator that planning requires. We still have a long way to go. The progress is in that direction, and there is more and more dependence on the planning function to be organized along the lines that you have mentioned previously. There is more and more dependence on the administrator for his decisions on particular matters.

Froehlich.—Of course, speaking as one of these so-called chief administrative officers, I am constantly aware of the fact that whether you have planning or whether you do not, you have got to go ahead. You have to make decisions, and you have to act. If you can act on the basis of planning information and work that has been developed for you, you are acting out of a lot more knowledge than you must in many other instances.

Oliver.—That is in effect the exact subject we are discussing this morning, which is utilization of planning information, regardless of what is on the covers. Those decisions do have to be made, and they have to be made sometimes more rapidly than we would like to have to make them. If we have that planning information, we are in far better shape.

Froehlich.—We have found that a number of our people in the districts, district engineers in particular and some of their assistants, are not completely aware of the information that is being turned out in our planning activities. We have taken some steps to communicate this through the de-

partment because these people are glad to have some of this information. They did not know it existed. This gets back again to the proper utilization of whatever information you do develop.

Babcock.—In my judgment, the weakest thing we have in the highway departments normally is administrative planning. Poor communication is 90 percent of the reason everything gets fouled up. The matter of administrative planning, financial planning, personnel management planning, operational planning, scheduling, all of this, to me is one of the biggest challenges that we face today.

We have been treating the highway business as engineering. It is not; it is big business. If we can get good administrative planning in all our areas, I think we could do the job much more efficiently and at a cheaper cost. I think we could have a group working at the management level looking into all phases of the management operation.

Paterson.—If I understand, you are suggesting that the planning operation should be a staff rather than a line position. If so, then we are running into difficulty because it seems that if you are going to operate it as a staff position, you are going to have planning activities under each one of your line positions.

Wiley.—It is a service unit within its scope to serve all areas of the highway department.

Paterson.—I think there are a number of places where you have a functional unit within the highway department itself, which is set up as a nice, contained little unit. I suspect in numbers of cases it is burdened mostly with surveys. To what extent is your capital budget planning handled in a division of planning, in any highway department?

Wiley.—For long term projections we make estimates, and we formulate programs against it. But the budgeting within the immediate forthcoming year is tied so definitely to the amount of money available that it is just a matter of taking that which is going to be available for the construction out of our priority list. That is the way the construction budget is formulated.

Then maintenance has to be taken out—administration planning and other miscellaneous items. Whatever is left is used for construction, and there is very seldom anything left except what is used to match Federal aid.

The accounting section has quite a lot to do with formulating those budgets, but when it gets down to detail, these are worked up in each individual section, and then gradually brought together among the region heads. We furnish certain information, and the budget is finally brought together by the accounting section.

Paterson.—I agree the planning should be a staff organization if it is done in each one of the units.

Wiley.—Perhaps it is not clearly only staff. There might be certain things that you might call line. But generally, we think of it as being advisory, not only to the chief, but also to other divisions or sections or wherever that information is needed.

Froehlich.—Wherever the line is affected they should participate and they do in our operations.

Paterson.—The only point I am making is that if you have a separate division of research and planning, and this division is supposed to bring together all of the planning activities of the department, then it would be better to have it represented by a line position equal to and commensurate with the other line officers.

Wiley.—Of course Mr. Froehlich was talking about planning in terms that we do not think of in just the planning division itself. To that extent there is planning at the top and in all of the divisions and sections of the department.

Froehlich.—I was talking about planning as a concept in that each one of these segments should have planning as one of its functions. You asked about financial planning. In the Pennsylvania Department of Highways, you have a fiscal management unit under the deputy secretary for administration. They put together many of the figures relating to the budget, but the budget itself is determined by a budget com-

mittee. On it are represented the deputy secretary for planning, the other deputies, including administration, and the people in fiscal management who have the responsibility for actually doing the job. Also the deputy for planning gets into the act wherever we get into questions of economic research and other areas where he would be affected.

This is a committee kind of structure which brings in all the people who are concerned about the budget because this is the ultimate end of all operations, and all the people who are affected by it should be involved in the final decision.

Telford.—The staff work of planning is included in each district. The details of the organization of that section will vary, depending on the size and the burden.

Included in that planning is fiscal planning as well as the long-range group planning. I found it essential to take the engineering planning and segregate it from the fiscal planning, so that each would have an independent view.

We find that that leads to budget recommendations from each district, developed within the framework. Then it is put together in the planning section in headquarters. This is a continuing operation, with a continual exchange of information between the district and headquarters, as to funds that may be available and other matters which may affect long-range programing.

As your program moves and comes closer to you, you then have a budget. It is a continuing process of planning at both the district and the headquarters level—that applies to budgeting and to other things that are closely related in the whole concept of planning.

Hager.—As an administrator, you have to plan the maintenance operations and the capital outlay program. You need new garages as you get more roads. You need more equipment. You have personnel planning. So really your planning unit does not come up with a package for you with all your decisions. You still have much planning going on in all other parts of the organization.

Froehlich.—There is much other planning in the organization, beyond what is done in the planning unit itself.

Hager.—But the fewer the people that report to the administrator the better off the administrator is. There is no place in the organization that you can get everything in one package from the standpoint of planning. Then is it really necessary that this planner be on the staff? In Connecticut, the planning unit as such reports through the chief engineer, and the chief engineer reports to the administrative officer, and he comes up with the maintenance program—with the construction program, and the fiscal services come up with a balance of money that can be thrown into capital outlay. Then the administrator has to divide it up, among the four or five functions of the department, which he feels more important. But there is no one person you can lean on for a program or a plan for all your operations and your construction and maintenance.

Froehlich.—Planning activities go beyond just engineering. You get into areas such as economic research, the broad guiding type of decisions which must be made. Having it come through the engineer alone would distill it and dissipate it somewhat if you have reflected merely the engineering approach. This is one reason why we think it is important that the planning deputy report to the chief administrative officer.

Steele.—It might be worthwhile to think for a few moments about the relationship of planning organizations to planning concepts.

In planning—and in this sense I am including research, except for some fiscal research—we need to have a broader conceptual idea of planning than we sometimes do. We need to be doing several things. One is that we have to take care of day-to-day activities. The planning and research group is a service organization, which puts things together in a hurry for the administrator, for legislative hearings, for other hearings, etc. Then there is relatively short-range planning, which has to do with such things as sufficiency ratings. I have been a little concerned to see so

much brought into the long-range need studies as a concept.

Then we need to get into long-range planning, the development of the program over 15 or 20 years. But beyond that we need to be thinking about these conceptual approaches. After all, what are we here for? Is highway transportation going to play the same sort of a part in the future that it does at the present time? What about these so-called monorail systems?

Personally, I think these are a step backwards. We tore our elevateds down because they created Chinese walls. What would we be doing but building them up again? We ought to study them and study other means of mass movements of people and vehicles. That part of the program should not be related to any particular time schedule.

We do not have any pure research, but the nearest thing we have to it should not be related to any particular time schedule. I realize that many of the smaller highway departments do not have the staff and the funds to do very much of long-range planning.

That brings me to the next point: How much staff can we and should we have? There has been too much emphasis on the engineering phases. We have no place, really, in the hierarchy for people who are not engineers. Consequently, we cannot hire economists and sociologists because there is no place for them to go. Perhaps we should integrate our planning, to that extent at least, with some of the other State planning activities.

But if we cannot have a broad gage organization in which we have all the necessary disciplines represented at a high level, maybe what we need to do is to maintain a skeleton force to do more work on a cooperative basis or on a contract basis.

Now, by cooperative research, of course, I am thinking of the AASHO program and some joint work the States have done together, and the States and universities.

Babcock.—I am going to be a heretic, probably, but I believe one of the basic faults is the fact that there is no national planning, what I am going to

call an over-all agency. I think you are going to have to approach this on a nationwide scale in the same way you would approach solving an urban problem.

I think you first have to take a look and find out where the country is today in its land use and typical planning process. Then you have to look into the future, 20, 40, 60 years ahead, at the possible ramifications and directions that the country could possibly go by technological developments and by environmental change. At that point, if you can do some crystal ball gazing, you may be in a position (if you had the forces to do this) to start to determine how transportation ultimately will fit into this thing, and be able to see the various directions that we might go. Possibly we might get some ideas as to how it should be guided in its development.

I have never been convinced that you are ever going to be able to solve the urban problem with the automobile or an existing form of transportation. If I had my preference and was in a position of authority I would like to see this country spending in basic research \$10, \$20, \$30, or \$40 million a year on the over-all transportation problem, because we are dealing with a \$100 billion industry, and it is splintered up into a million aspects.

I question whether it can all be done through a State planning agency. I think you have to move it to a national scale. I am not for federalization, but I feel strongly that more has to be done in basic research, and I think it is going to have to be done at the national level.

This so-called national transportation policy that we have had for years is merely a set of isolated bodies regulating various agencies under a historic concept of 60 years ago, which in my judgment does not hold water today.

Winfrey.—I reached the same conclusion you have. We are not getting down at all to where we ought to be until we get into some real honest planning of a basic nature on transportation.

We are too much concerned about getting a construction program ready

for tomorrow. We want to look a long way into the future to find out why we need transportation, and where we are going to need it. That is real planning. I do not think we have reached that stage yet.

Telford.—I think one trouble is that the engineer is too inclined to narrow down his interest and concern, and too afraid to bring into partnership some of these people we have in the schools of business administration, etc. Engineering is a broad field, accomplishing things with what you have: Those in other disciplines are a part of the team, and I do not think we should be afraid to call them in and ask them for help because we need all the help we can get.

I think it is somewhat in that field that the engineer has been deficient. He has been defending himself because he has had a slide rule in his hip pocket and has been engaging in a dubious exercise in arithmetic. Bring these others in, and let them take some of the burden.

There is a terrific fear on the part of local governmental agencies that has to do with any cooperation and any work at the State level or the national level. I have found that if you are going to get from your local agencies, the cities and the counties, effective planning organization, you must give them assurance that you are not going to dictate to them the use of the information they develop. You have to guide and you have to help, but just as soon as someone talks about a requirement, you have lost your team right away.

Therefore, the problem lies in—How can we develop this national program in which, at a national level, there is a real need for research, and bring the usefulness of this down ultimately to the local application, without scaring away the support?

We have, I think, made a mistake in trying to consider them all at once. But it is a broad field, and it does stem all the way from the beginning at the national level right down to the local application. You are dealing with human beings, and all their idiosyncracies and whims all the way down the line.

Quinnell.—I think one of the things

we are doing is going out too far on a limb with basic planning by the highway departments. I have to agree with Mr. Telford that this thing is a far greater and larger problem than we realize.

Now, our research and planning work for the Montana Highway Department takes into consideration the accounting, of course, engineering, and a few basic principles, small or large—but not in the scope that they should be. Eventually some big program is going to have to go all out, to give us the information we need, so that we can go into our little planning organizations within our State highway departments and do a good job. I do not think any of us, even in the larger States, are large enough to have a planning section, or a research section, with the capabilities that are necessary to solve the problems that we have now.

Paterson.—I should like to agree that the schools of business administration in the country are very much interested in assisting with projects with State highway commissions.

In the first instance, usually, there is a difficulty. The terminology that is used tends to scare off some academic people. This is unfortunate. It can be overcome very quickly, as I think Mr. Steele will attest.

Hill.—What I have in mind is to develop how far highway departments should go in advance planning. Our planning division is to me an immediate planning division. It is going to the communities, each of the municipalities, and determining from their master plan—and that master plan is prepared for a projection of 20 or 25 years from now—and we are developing our plans to fit their plan.

Those are individual communities, so we are fitting our highway needs studies into the existing thinking. And we are developing a plan to serve these communities. But we can definitely see that from Detroit to Chicago, for example, there is one community developing, so that in the next 40 years there will be just one continuous urban area.

In our development, we are taking this community and this one and this

one, but nowhere actually are we planning the continuous community.

The planning we are doing is immediate planning, probably 20 years ahead. It is based on need studies, which are not actually need studies with new thinking in them, but are the present studies becoming obsolete and brought up from year to year without a fresh viewpoint. They are made by the same people who have been making them for the last 10 years.

Maybe we are doing our job in just doing a job to develop the highway needs, but the future projected transportation, which is not going to roll on wheels, will affect our highway needs.

What I do not want to see in future years is all these highways going into Detroit, and some other means of transportation taking the load of transportation, and the highways not being necessary, with the expenditure of that money partially wasted.

I heard the comment here yesterday where a legislature had built a road where the needs were not present. In Michigan no matter where you build a road, it is going to be crowded. The traffic is there. We can build it anywhere in the State, and it will be full in no time.

To me, the future of transportation needs is just too big. We are spending in our advance planning program about \$150,000 a year and I do not know how many years we can carry it. It is not a productive unit. It is a unit set aside in a separate building and it does practically pure research in transportation.

Our planning unit is an operating unit—it is working on the immediate needs and it is a production unit.

Campbell.—For the purpose of the record, I would like to ask Mr. Shaneman about the Mississippi Valley origin-destination survey as it may relate to studies in resource development and also transportation development; its concepts, its values; its techniques, and whether the concept would be worth trying to spread nationwide.

Shaneman.—Three years ago at the Mississippi conference of State Highway Officials, Illinois proposed a regional O-D survey to be conducted by

the 14 States comprising the Mississippi Valley Conference.

This survey was to be conducted simultaneously in the member States. It was to be keyed in to latitude and longitude coordinates throughout the States—the idea being that by doing this at the same time, and by using the same grid through the area, we would be able to get a picture of the traffic pattern throughout the region. The majority of the States participated in the study. The results are still being tabulated and being finalized.

However, we have had occasion to use the information in our own work several times, and I know the surrounding States have. This would be a worthwhile project on a national basis. I think it ties in to the point that was made that we should have some sort of national transportation concept.

I do not know that we would want to limit this study to a motor vehicle traffic origin and destination study like the Mississippi Valley study. I think certainly someone would have to take into account mass transit—public transit by rail, water, and air.

A study like that done on either a national or perhaps a regional basis, with the regions then being interrelated, would certainly give us much toward what we have all been feeling for and no one has put their finger on: What will the transportation picture be in the year 2000?

Campbell.—Is it the intent to tie it into resource development at the present time?

Shaneman.—Not at the present time. We have been slow in analyzing the study, and because of that it may be losing some of its effectiveness. This was a gigantic undertaking and there is a tremendous amount of information to be analyzed.

Campbell.—Is that being used in the projection of in-use facilities comparable to the Interstate Highway System?

Shaneman.—We are hopeful that within the next year or so we can, at least in Illinois, convince the legislature that we need several thousand more miles of freeways, and we certainly ex-

pect to use the results of this study in that.

We do not think that we can build a freeway system in Illinois that is not related to or connected with freeways in the surrounding States. And while our neighbors to the north and west have already laid out freeway systems, we think this streamlined Mississippi Valley study will certainly tie into those and substantiate what we are proposing.

Telford.—Are you relating that in any way to this population prosperity, which generates transportation demand, endeavoring to project forward on the basis of development in the area as to the needs for the future?

Shaneman.—We are not that far along with it yet. I think the point you are making is that perhaps on all of these studies there should be a land use study made in the entire State, or the entire region. We have done that, of course, in the Chicago area transportation study. Our projection there has been based on land uses. I think so far as a study of that kind is concerned, whatever you get from streamlined O-D's merely substantiates what has already been found out from land use and projected land use.

Whitcomb.—In the Boston area we have planned three highway loops. One will be a complete circle, just going around the core of the metropolitan area. About 10 miles from that, there is Route 128 which has already been built and is now being widened.

Then, 15 miles farther out, or 25 miles from the city, is an outer belt, which circles around. From the core of the city, there are nine radials crossing all of the belts.

After we laid out this network, we hired a social economist and asked him what the land use would be in this area on the completion of this highway system. We have an answer, and from that we have to forecast the traffic.

The location of the highways and the location of the interchanges really dictate the development of the area—the various towns, the industries, the number of employees, the number of services to be constructed for these em-

ployees, and where these employees will live.

I think in this case the employee will live within a certain time zone, or within a certain distance of his place of employment. From that information, it was possible for the social economist to develop the zoning, the business areas, the manufacturing areas, and the residential areas.

From these developments, and the number of people traveling back and forth per car, the number of trips to work, the number of trips to the store, church, etc., it was possible then to develop a traffic pattern.

Now, we have a problem here because we must take into consideration the different means of transportation that we should develop inasmuch as the automobile cannot service all the people who want to travel. The minute you go outside of the field over which you have no control you are apt to get into trouble.

Mr. Hager and I are in trouble in that respect, because the New Haven Railroad is just about on its last legs, and probably before long will not be carrying passengers. It means the people who were using this railroad have to revert to some other means of transportation.

We have found in the Boston area that this means the transportation is the automobile, and that the roads that we had planned, and we think properly planned, 10 years ago, are overloaded because of the lack of train service. The railroad went out of business. Now these people are traveling by automobile, and the highway that was designed to carry 60,000 cars a day is carrying 90,000 ten years after it was built.

We should take into consideration other means of transportation, but you cannot control them and you cannot rely on them.

Wiley.—Did the railroad go out of business because people started to travel by automobiles or are they traveling in automobiles because the railroad went out of business?

Whitcomb.—I do not know. This railroad serviced New England and parts of New York, and I think that the point was brought up this morning

that, "Nobody is going to tell me where to live. I am going to live where I want." And the same thing applies to, "Nobody is going to tell me how I am going to travel. I am going to travel the way I want." And the people apparently have wanted to travel by automobile. They have done that, and the railroad is going out of business.

Telford.—We have been working as closely as possible with the rail transit and rapid transit people in Los Angeles, and neither they nor we have been able to come up with any satisfactory basis on which to stimulate the percentage of trips in a given corridor that you might tempt onto a railway system.

Whitcomb.—In the development of this traffic and the network, which was given, we have far more trip desires than we have capacity on the highway. As a result, it was necessary to determine a design that we would want to build. What we determined was an 8-lane facility with shoulders and with service roads on each side. That was for the inner belt and for the radials for some distance of the inner belt. It was necessary, then, to determine a carrying capacity of this system. And all other traffic then had to be pushed out.

There is enough desire for traffic for the highway system, plus mass transportation, because the traffic that we had, on some links over this highway system, was something over 3,000 cars per day. We cannot carry that on any one of the links. Even with the congested highway system there are still enough passengers for any mass transportation, if they want to use it.

Holmes.—It seems to me that is the key—if they want to use it. People will put up with what the transit people like to call intolerable congestion on the highway rather than use transit. If they would, they are going to do it. The transportation system is there. The New Haven is there.

Quinnell.—Is it not true that the buses in those rapid transportation systems are more or less getting in bad in a lot of cities because people will not accept them? Is it progression to the automobile?

In Montana there are no large towns, probably 45,000 being the biggest. Transportation bus companies have to be subsidized one way or the other to stay in business, because people will not accept them.

Paterson.—There are probably a host of considerations that are sociological in nature about all of this, but I would maintain that there has been a diminishing market for commuter service in

the last 15 years. It is peculiar that we do not know why this diminishing utility function has come about. This brings into proper focus this whole question of research because we will spend a billion dollars on metallurgical research, to find something that will withstand heats of 3,000 degrees, but we will not spend money to uncover the basic question of how people live and what they want in transportation.