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THE INTERDISCIPLINARY APPROACH IN TRANSPORTATION PLANNING AND DESIGN

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A Summary by Hays B. Gamble of Conference Session 48 of the Fifty-seventh TRB Annual Meeting, January 17, 1978, Washington, D.C., Bernard H. Rottinghaus, Presiding

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PURPOSE OF THE SESSION

This session presented the experience of five state transportation agencies in the use of the interdisciplinary team approach in project planning and design. The speakers described how their states organized their staffs to assure a desired relationship between the various disciplines, the mix of disciplines considered most helpful, means set-up to compromise differences in viewpoints, problems encountered in the use of such an approach, and ways such problems may be solved. In addition, the speakers brought out the lessons that have been learned in the use of an interdisciplinary approach by their states. These lessons should be of value to other states interested in an interdisciplinary approach to transportation planning and design.

Federal Highway Administration: Michael Lash

Michael Lash, of the Federal Highway Administration, provided an introduction and background for the interdisciplinary team approach. Legislation over the last decade has resulted in much broader responsibilities for state transportation agencies in meeting transportation goals. It has required greater variety of expertise in the decision-making process in order to adequately consider the diversity of community interests prevalent today. The National Environmental Policy Act and Section 109(h) of the Federal-Aid Highway Act are examples of legislation requiring broader input to the transportation decision-making process.

Three principal functions that can be effectively performed by an interdisciplinary staff were identified. They were:

1. To conduct or supervise thorough impact studies of proposed transportation improvements for the alternatives being considered;
2. To represent the various interests or values (engineering-design, environmental, social, and economic) held by segments of the American public in the transportation decision making process; and
3. To facilitate communication among local, state, and federal agencies and the public.

Progress in developing the interdisciplinary approach can be shown by reviewing the change in problems and issues of concern to transportation agency managers. These were briefly discussed by Mr. Lash. Early on, issues raised were concerned with the kinds of disciplines that were needed and could contribute the most, the use of paid outside consultants versus the use of on-board staff, and the use of borrowed staff from sister agencies.

Current issues involve the use of multidisciplinary individuals versus an interdisciplinary team, the proper role for an interdisciplinary team in the actual decision-making process, and promotional opportunities and problems for non-engineers

in agencies traditionally dominated by individuals with engineering-design backgrounds.

The next 5 speakers described their experiences with the interdisciplinary team approach in their respective states.

Washington: Russell Albert

Washington State's experience with interdisciplinary teams goes back to about World War II when the State hired consultants, such as ground water experts, for projects with special problems. As projects became larger and more complex issues were involved, additional types of consultants, such as traffic and right-of-way experts, were hired to assist in acquiring land for highways. In the last decade, influences on transportation planning have included:

1. changing values and priorities;
2. concern about the quality of life, the economy, and energy; and
3. citizens becoming more involved in transportation planning.

The major problem has been in reconciling the desire for fast, safe, and efficient transportation with demands to avoid social disruption, to protect the environment, to reduce government spending, to provide employment, and to conserve energy.

These concerns over transportation services and facility effects resulted in the establishment of interdisciplinary teams. The interdisciplinary approach in Washington State provides the necessary expertise for technical studies and an active public involvement program. In addition, an interdisciplinary team develops a departmental recommendation. The team is a problem solver, not just a problem analyzer or solution justifier. The team as a whole is responsible for the departmental recommendation; each member shares this responsibility as a technical analyst in the engineering, social, economic, or environmental disciplines.

Teams vary in size and composition. About 5 to 7 member teams have been the most effective. Team members are drawn primarily from the department but other agencies or private consultants may be used to provide special expertise.

Team success depends on members who have good perspectives of the relative importance of their disciplines to the overall problems. Team management, to be successful, depends on defining the problem so that a workable solution can be developed. The State is considering leadership workshops for potential team chairmen.

Interdisciplinary teams appear to be most successful in implementing community involvement programs, in evaluating a range of problems, and in achieving team interaction that improves decisions. Problems include communications, completion of work, costs, and confusion about team responsibilities. For example, communication

problems arise if administrators fail to discuss all ramifications of a project. Completing team work on time may be a problem if team duties are simply added to previous tasks of the team members.

Interdisciplinary teams have responsibility for department recommendations, but final decisions rest with Washington's 7 member Commission. Teams generally reach consensus informally, seldom by a formal vote. The interdisciplinary approach may take more time in project planning, but this may be due to covering more concerns earlier which in turn may avoid court problems later. Communication needs include those between the team and district engineers who often have special information, including information about financing.

Arkansas: Charles Venable

Arkansas uses an Interdisciplinary (I.D.) staff in close coordination with the rest of the department personnel to carry out the interdisciplinary approach on transportation planning.

The I.D. staff is a part-time group that is comprised of a transportation planner, a sociologist, a wildlife ecologist, an economist, a biologist and the Assistant Chief Engineer for Planning, who serves as the Chairman, and is under the Deputy Director and Chief Engineer. This staff is the key to the systematic approach.

The I.D. staff concept provides for a thorough evaluation of each project in the early system planning through the location and design of a project. An Environmental Committee, comprised of Division heads and the state FHWA advisor, works with the I.D. staff. They meet only when necessary.

The I.D. staff's function is to provide a direct method of close coordination between the members of the staff and those responsible for project development. The staff is charged with the responsibility of anticipating the area of sociological, economic and environmental conflict, seeing that they are resolved and assisting in the orderly project development.

The information gathered through the use of profiles on the various parameters is designated to various groups outside the department as well as within. By maintaining a close coordination with everyone, there is an interest in all social, economic, environmental and engineering features. An information trailer, open to the public, is used in the field and has proven very successful during the public hearing stage of project development.

The I.D. staff is also capable of making recommendations necessary to expedite the project as well as measures to litigate adverse impacts, etc. Our experience indicates that the I.D. approach gets projects to contract much sooner.

The I.D. staff approach in Arkansas is probably not the ultimate answer to all problems; however, if alternate courses of action, public and other agency involvement, and social, economic, and environmental

effects are to be adequately considered during project development, the I.D. staff approach has to play a very important role.

Minnesota: Kermit McRae

The consideration of environmental factors, and the concept of an interdisciplinary approach in transportation development are not new in Minnesota. The Highway Department, the forerunner of today's Transportation Department, had employed for many years a variety of social, economic, and natural environmental resource disciplines to assist in the development of highway projects. Our Action Plan was a contract with the public that an interdisciplinary approach would be used.

In retrospect, there was a reluctance to involve non-engineering disciplines in the decisions affecting the overall planning process. This may have been due to the fact that the various disciplines were both physically and organizationally separated. The majority of non-engineering specialists traditionally worked in the Central Office, while the bulk of project development was handled by the districts. In addition, within the Central Office, the disciplines were separated between various divisions. In effect, then, the interdisciplinary approach was really multi-disciplinary - various disciplines - but each working independently of the others.

During this time, federal and state environmental requirements were becoming more complex and the time required for internal and external review and resolution of concerns was consuming a longer and greater portion of the total project development time. It was becoming apparent that environmental concerns would have to be addressed early in the process, that a true interdisciplinary approach was needed, and that the entire department would have to recognize and accept the fact that involvement in environmental analysis and in making decisions regarding environmental tradeoffs and mitigation were indeed necessary if the highway program was to be implemented.

The Minnesota DOT has recently reorganized into two major bureaus and two independent support units. The Bureau of Policy and Planning is responsible for transportation analysis, environmental services, program evaluation, and policy, plan and program development.

A significant element of the new organization was the emergence of a new philosophy regarding the proper role of environmental considerations in transportation decisions. This new philosophy, that environmental considerations are a legitimate and integral part of the process from the beginning, marked the start of a new direction in the concept of interdisciplinary planning in Minnesota.

To accomplish this goal would involve breaking down organizational barriers so that communications could flow freely between districts and Central Office divisions.

It would make public involvement mandatory, and would require inter-agency liaison procedures so that all parties concerned with an action could participate in the early planning decisions that would later affect them.

To implement this new concept, it was necessary to bring the various disciplines together physically and to give them decision-making power within the organizational structure. In April of this past year the Office of Environmental Affairs was organized within the Bureau of Policy and Planning.

The Office of Environmental Affairs is organized under five major units - Policy, Liaison, Planning, Development, and Bikeways. The interdisciplinary staff handles a diverse scope of activities. Currently, the Office has staff members with expertise in landscape architecture, agronomy, wildlife biology, aquatic biology, forestry, hydrology, recreation, economics, urban planning, engineering, air quality, noise abatement, ecology, botany and graphic design.

The primary thrust of the Office of Environmental Affairs has been to carry out the department's goal of placing environmental considerations on a shared decision basis with engineering concerns. The office staff provides technical support in the determination and analysis of environmental impacts. They also identify environmental trade-offs and make recommendations regarding mitigative measures.

The coordination of the state review process and liaison with other state agencies, local governments, city and regional planning units, the FHWA and private citizen interest groups, and obtaining adoption by the FHWA and approval by the Minnesota Environmental Quality Board of the Final EIS, are the primary responsibility of the Liaison Unit.

During the next stage - the location design study - the Development Unit continues its close involvement with the districts, by making water, vegetation, wildlife habitat, and aesthetic resource assessments.

In the final design stage the Office of Environmental Affairs liaison staff again provides advice and assistance in obtaining the necessary permits, agreements, and FHWA PS&E approval.

Although there is still resistance by some district project managers, the Office of Environmental Affairs has made significant in-roads and contributions in the project review. Once the bastion of total control, districts must now share the decision-making role with the Office of Environmental Affairs at every stage from preliminary design to contract letting.

The influence of the Office of Environmental Affairs is not limited, however, to project development. In addition to developing environmental policy, as mentioned earlier, the Office of Environmental Affairs is involved in a multitude of diverse activities.

It is somewhat difficult to evaluate the operations of an office that has been in existence only nine months. We feel that the Department, as a whole, has made encouraging strides towards remedying historical problems and moving in the direction of early and continuous interdisciplinary involvement. Although many still view the role of the

Office of Environmental Affairs as unnecessary, unimportant, and a time-consuming hindrance to be hurdled, there are just as many who support the Office and readily accept that the interdisciplinary approach is the only way to plan, implement and maintain an environmentally sensitive transportation system.

New Hampshire: Donald Rhodes

New Hampshire uses a systematic interdisciplinary evaluation process to identify early those environmental, social, and economic effects a highway project will have on its surroundings. Department staff does this with the help of experts from other agencies.

The interdisciplinary evaluation team (IET) consists of the Assistant Chief Engineer (the Chairman), the Assistant Design Engineer, the Secondary Roads Engineer, the Advance Planning Engineers, a biologist, an air and noise quality specialist, the Chief Appraiser, the Chief Relocation Assistance advisor, a water quality analyst and a Federal Highway Administration representative as an ex-officio member. The makeup of the team reflects an emphasis on the physical environment. Because New Hampshire is still primarily rural with no widespread areas of dense development, it is nearly always possible to locate highways to avoid disrupting neighborhoods and displacing large numbers of households.

The role of the IET is primarily one of project review to ensure that all pertinent factors are being considered as a project proceeds through the systems planning, location and design phases. The IET determines whether a project is major or minor and whether a negative declaration or an EIS is needed. The team analyzes hearing and draft EIS comments and participates in the selection of the corridor location and the design alignment. Additionally, the IET conducts random monitoring of post construction effects. The interdisciplinary evaluation team generally makes its recommendation based on the consensus of the team; if no consensus is reached, a vote is taken.

The IET lends guidance throughout all phases of project development. The detailed studies are conducted by the Division of the Department which is responsible for a particular phase of the project. The Advance Planning Section of the Planning and Economics Division uses the interdisciplinary approach to carry out in-depth evaluations of alternative corridors during the location phase. Many in-house disciplines, including biologists, land use and transportation planners, engineers and air and water quality analysts, are supplemented by experts from outside the Department during these studies. The numerous public informational meetings held by the Advance Planning team have been instrumental in gaining public support for a project prior to the corridor location hearing.

The drawback of the team approach is that it increases red tape. However, the red tape or delay associated with interdisciplinary teams may really result from the full review that environmental matters

are now undergoing, whether or not an interdisciplinary team is involved. It was felt that the full consideration of environmental matters that interdisciplinary teams afford is helping New Hampshire stay out of court on environmental impact questions.

COMMENTATOR: TED WATERS, NORTH CAROLINA

While the organization for interdisciplinary team planning varies somewhat between the four states heard from above, and the teams' purpose and functions differ slightly, the process does seem to be working and accomplishing its stated goals. Some problems exist, of course, but with experience these have a high likelihood of being resolved.

It is noteworthy that no previous speaker mentioned any disciplines as being more important than another, despite the fact that engineers generally ramrod the process. It is quite apparent that the role of the various disciplines differ with the nature and type of project.

In North Carolina, the interdisciplinary team utilizes the expertise in other state agencies. The only staff added to the North Carolina Division of Highways brought in expertise in air quality, noise, biology and sociology. The interdisciplinary team makes recommendations only -- not decisions.

A matrix approach is used where a weighting is given to impacts. The weighting represents the average of the judgemental weights given by the various I.D. team members. The I.D. team then makes recommendations to the transport planning board, comprised of division heads, who in turn make the final decision. On controversial projects a very detailed presentation, with recommendations, is given by the I.D. team to the planning board.

The interdisciplinary team approach has shortened the time required for project implementation. Environmental impact statements are prepared in less time than before and are of higher quality, but environmental impact statement requirements have added considerable time to the overall project planning process.

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