

Evolution of Environmental Analysis at the State Transportation Department Level

LOUIS F. COHN

The implementation of multidisciplinary environmental laws and regulations at the federal level during the past 10 years has greatly affected the structure and operations of state transportation agencies. These impacts are analyzed through an examination of the New York State Department of Transportation (NYSDOT) as it has attempted to maintain and expand its capital construction program. NYSDOT has passed through four organizational phases during this period, during which priorities shifted from planning and development to design and construction. Each of these phases is discussed, and conclusions are drawn about organizational structure as it relates to environmental advocacy. One particular area of environmental analysis—noise impact—is used in parts of the study to help illustrate the shift in emphasis at NYSDOT.

The unforeseen concentration of environmental legislation passed and enacted during the five-year period around 1971 presented two separate and distinct challenges to transportation agencies. The first and more definable was the development of the technical tools and criteria necessary to quantitatively evaluate environmental impacts from proposed transportation projects. This has in general been accomplished through the expenditure of large amounts of research-and-development funds, which, in effect, amounts to forced technology.

The second and more-complex challenge has been the modification of the organizational structures within the affected state and federal agencies. Until this time, the typical state highway agency (SHA) generally maintained the position that highway and transportation projects should be selected primarily on the basis of low cost and feasible engineering. The environmental regulations, however, mandated the consideration of many additional factors.

At the federal level, the Federal Highway Administration (FHWA) modified its executive administration to include an associate administrator for right-of-way and environment and placed within the administrator's domain the Office of Environmental Policy (OEP) (1, p. 87). The function of OEP is to recommend and disseminate positions on environmental issues for FHWA, as well as to perform headquarters review of SHA environmental-impact statements. The regional offices of FHWA each created an office of environment and design, which reviews and recommends decisions to the FHWA regional administrator. At the state level of FHWA (division office), environmental matters are typically handled by the individual project engineers, as are many other engineering tasks. Many division offices have also designated certain engineers as resource persons for noise and air pollution and the other environmental specialties but generally have allocated no full-time staff to these positions. The division offices typically rely on the regional and headquarters offices for specific environmental expertise and guidance. Thus, the forced reorganization within FHWA occurred not at the field or project level but at the review and procedural-direction levels.

The following is a discussion of the approach taken by one major state transportation department—that of New York State—as it has attempted to maintain and even increase the level of its highway program while it copes with the environmental process. One element of that process will be emphasized in order to provide additional

detail and insight. That element is noise impact.

CASE STUDY: NEW YORK STATE DEPARTMENT OF TRANSPORTATION

The New York State Department of Transportation (NYSDOT) dates back to 1846, when the Office of the State Engineer and Surveyor was created to construct and operate the state's canal system. The state Department of Public Works (DPW) was constituted 32 years later for the primary purpose of canal supervision. The Highway Act of 1909 authorized the creation of a state Department of Highways (DOH). DOH was directed by a commission that consisted of the DOH commissioner, the state engineer, and the DPW director. In 1923, DOH was merged into DPW to give the state a unified public works agency. In 1967, New York became one of the first states in the nation to form a department of transportation when it combined the highway and canal functions from DPW, the state Office of Transportation from the Executive Department, the aviation function from the Department of Commerce, and the state Traffic Commission from the Department of Motor Vehicles into NYSDOT (2).

This newly created department may be viewed as having progressed through four phases of organizational development concerning environmental considerations since its inception in 1967. These are, in relation to the National Environmental Policy Act (NEPA) of 1969: (a) the pre-NEPA phase, 1967 through 1970; (b) the NEPA gear-up phase, 1971 through 1972; (c) the NEPA phase, 1973 through 1976; and (d) the post-NEPA phase, 1977 to the present.

During the first period (1967 through 1970), NYSDOT attempted to emphasize long-range planning and modal considerations by forming the Office of Planning and Development (OPD) at the level of the assistant commissioner. OPD thus became a primary organizational function in NYSDOT along with the offices of operations, management and finance, legal affairs, public affairs, and manpower and employee relations.

OPD played a major role in giving NYSDOT its character of low modal split, which means that consideration of the various modes of transportation (highway, air, rail, bus, and other mass transit) takes place at the staff level rather than at the executive level. This allows assistant commissioners and division directors to evaluate and optimize multimodal solutions for complex transportation problems. In contrast, an agency that has high modal split, like the U.S. Department of Transportation (DOT), has separate executive-level compartments that stress their own special-interest modes. In the case of DOT, the heads of the various modal administrations are appointed not by the Secretary of Transportation but by the President. It is quite possible under those circumstances for the head of a given modal agency—for example, the FHWA administrator—to have more influence in the White House and in the Congress than the department head (the Secretary) does. The potential of such an organization should be implicit; that is, the optimal multimodal solution to a transportation problem may be replaced

by a special-interest single-mode solution (3). NYSDOT sought to avoid such problems with its low-modal-split approach, which is demonstrated by OPD.

Consideration of environmental issues in general and noise in particular had not yet begun in earnest by NYSDOT in the period 1967 through 1970. The extent of such activities was to assist and advise the legislature and the New York State Police in the development and implementation of the motor vehicle noise legislation enacted in 1965 (N.Y. Vehicle and Traffic Law, Section 386). The obvious reason for the inactivity of NYSDOT in the area of legislation about highway transportation noise during this period is that the federal legislation that brought about changes in technology and organization had not yet been passed.

In 1971 and 1972, OPD began to mature as a major force within NYSDOT. The development division within OPD was still concerned exclusively with the nonhighway modes, particularly aviation and mass transit (2). However, with the emergence of the NEPA implementation package, which included guidelines from the Council on Environmental Quality (CEQ) and FHWA, it became evident from the organizational viewpoint that the most effective mechanism for developing the multidisciplinary approach for highways was through OPD, in which most of the planning, sociological, environmental, and economic specialists were housed. In addition, it was quite logical to consider the highway mode as coequal with the other modes in the development division.

During this gear-up period, the consideration of transportation noise impact became more intensified in NYSDOT. Analysts in the planning division became concerned with the potential impacts on policy as a result of the Federal-Aid Highway Act of 1970 and began seeking methods to quantify existing and predicted noise levels from proposed highway projects. In addition, several major noise-level prediction models became available and the environmental analysts within the planning division began rudimentary attempts at model evaluation. Concurrently, the Engineering Research and Development Bureau within the Office of Operations was performing basic research activities aimed at quantifying noise impacts from highways (4, p. ii).

The period from 1973 through 1976 was the most productive for NYSDOT in terms of reorganization for the purpose of environmental emphasis. Certain elements of the reorganization were forced by regulation, but others were the result of conscious efforts to maintain and reinforce the emphasis on low modal split within the department. The promulgation of FHWA process guidelines required NYSDOT to implement a multidisciplinary approach for highways as well as to document and modify its project-development process where needed through the Environmental Action Plan (5,6).

The efforts of NYSDOT in implementing a plan of action for multidisciplinary environmental input resulted in the creation of the Environmental Analysis Section (EAS) within the OPD development division. The functions of this section were to (a) advise the executive-level administrators concerning environmental issues that required technical or procedural expertise, (b) develop the methods and advance the state of the art in the areas of environmental technology, and (c) cause the implementation of new technical methods and policies at the regional (field) level of NYSDOT through effective training and consultation (6).

Because NYSDOT is a highly decentralized agency, most of the project-related work (including preparation of environmental-impact statements) is

performed at the regional level. It is therefore critical that EAS-type expertise be available to the regions. NYSDOT has been committed to the concept of strong regional offices because transportation is primarily a local and regional activity. Effective decentralization does not have to reduce the authority and responsibility of the NYSDOT main office but should take the power and expertise that exists there and concentrate it in the hands of local engineers and administrators (7, p. 269). The regional director of transportation for NYSDOT within a given region must therefore have on the staff adequate environmental expertise for day-to-day operations as well as for the usual projects. Extraordinary projects may require significant input from EAS at headquarters.

Within the specific area of highway transportation noise, the period from 1973 through 1976 showed many changes in NYSDOT. The creation of EAS included positions for two transportation environmental noise specialists at senior levels. In addition, a Noise Measurement Unit (NMU) was created within the Office of Operations for the purpose of providing technical support to the regional offices on project-related noise-measurement studies. During this period, NMU was allocated five full-time positions, including two senior engineers, two assistant engineers, and one engineering technician. At its peak, the total annual funding for these seven positions plus equipment and support exceeded \$200 000.

This \$200 000 allocation for NMU covered only expenses incurred at the main-office level and not regional expenditures. The level of investment into the noise program in the regions varied considerably; most made use of existing staff for limited expertise. Extensive training efforts by EAS and NMU provided the expertise. Because the engineers and technicians used in the regions have other responsibilities besides noise studies and because their time is charged to project codes rather than to specific activities such as measurement of noise, it is not feasible to determine accurately the dollar investment made at the regional level in the NMU program.

The implementation of FHWA noise-analysis guidelines (8) was achieved by NYSDOT mainly during this period. EAS prepared and distributed, through the development division, a set of guidelines for use throughout the department for the application of the FHWA noise standards (9). In effect, these guidelines interpreted FHWA procedures in relation to New York State policies and directed the use and adherence to those procedures on federal-aid highway projects in the state.

The NEPA era for NYSDOT peaked in the mid-1970s and began to subside due to the rising of more-timely issues in New York State, namely, the crises of financial instability, energy shortages, and excessive unemployment.

Capital construction of transportation projects became the major thrust for the department and objectives that featured record-breaking expenditures were adopted. The highway construction program alone for FY 1977-1978 was set at \$1 billion, which was more than twice that for the previous fiscal year.

In keeping with this new direction, NYSDOT underwent a reorganization in late 1976 that in effect reduced the emphasis on environmental input and increased the emphasis on program management and the expediting of projects. It was at this point that NYSDOT entered its post-NEPA period, which came to its peak in early 1977.

The reorganization created the Program Planning and Management Group (PPMG) within the office of the

commissioner of transportation. This group was to consist of four sections, which included two that had been within OPD. EAS was moved from the development division and the program-planning section was taken from the planning division. To complete the new PPMG, the capital projects coordination section, from the Office of Management and Finance, and the newly created program management section were added. Each of these sections was subsequently upgraded to bureau status.

The establishment of the PPMG transformed NYSDOT into a matrix organization (10,11). In addition to the functional responsibilities mandated by department procedures, mid-level and senior managers became subject to the authority exercised by the project managers from PPMG (12). This placed a strong power base within PPMG, which caused the remaining personnel of the department to respond accordingly.

The primary duty of PPMG was to manage the capital construction program as expeditiously as possible; procedural questions that involved the environment were left to the functional personnel. Established federal and state guidelines for the environment were not the responsibility of PPMG. The major change in this era concerned the primary environmental executive within the department. When EAS [now named the Environmental Analysis Bureau (EAB)] was in OPD, the assistant commissioner for planning and development and the director of the development division had as part of their primary duties the development and implementation of comprehensive planning for environmental consideration. The primary responsibility of the PPMG director, on the other hand, was realization of the capital construction program. The director therefore tended to view environmental regulations as possible delays in the fulfillment of PPMG's major assignment. The reorganization that created PPMG, then, reduced the level of environmental advocacy within NYSDOT from the level of the assistant commissioner to the level of the EAB director.

Other effects of the shift in emphasis at NYSDOT included the reduction in size of NMU from five full-time to two part-time staff members. The role of NMU at that point was principally equipment repair, calibration, and distribution, because the unit was below the critical-mass size required both to perform special studies and to properly support the regional offices in their project-measurement needs. The reduction in force for NMU was incited by significant NYSDOT layoffs in 1975 and 1976. However, the percentage reduction for NMU was much larger than that for the Materials Bureau, in which it is located, even though the same title series [civil engineer (materials) and engineering technician (materials)] is used in NMU and throughout the Materials Bureau. The reasoning used in the extraordinarily sharp reductions for NMU was that those functions that relate directly to highway construction must have a higher priority than such ancillary topics as noise measurement.

DISCUSSION OF NYSDOT APPROACH

The approach of NYSDOT to the problem of implementing a variety of effective programs in environmental-impact assessment and noise analysis has both strengths and weaknesses. The key to the approach--and possibly its greatest strength--has been the rapid transfer of information and on-line project responsibility to the engineering and management staff at the regional level. Because NYSDOT is a strongly decentralized agency at the staff level, it has been necessary to provide adequate policy direction and technical training to

the regional offices. The creation and implementation of EAB appears to have met this need; this is shown by the fact that the department was able to mount nearly a \$1 billion capital construction program in FY 1977-1978, notwithstanding the environmental regulations that were met along the way for the individual highway projects.

The decentralized nature of NYSDOT means that, from a technical viewpoint, it does not really matter whether EAB is located in OPD or in PPMG because the basis for evaluation lies in the competency (in environmental matters) of the regional staff. In that sense, the direct line of authority between PPMG and the regional offices (because both are responsible directly to the commissioner of transportation) is better organization than having EAB in OPD. With the OPD organization, there is potential for conflict below the level of the commissioner because the assistant commissioner for planning and development has a different task than the assistant commissioner for operations, who processes highway projects. In other words, the PPMG approach has more potential for departmentwide influence than does the OPD approach. The major weakness with the PPMG approach is that the group director has a primary functional task of capital program management, which has much potential for conflict with the legitimate goals of environmental advocacy.

As a summary to this case study, it would be helpful to examine the NYSDOT organizational structure in the light of the traditional framework of organizational overlays. Three overlay patterns will be used as a basis of study: (a) the system of function contacts (the functional overlay), (b) the grid of decision-making centers (the decision overlay), and (c) the pattern of power (the power overlay) (13). In effect, the questions to be asked concerning NYSDOT include, Who has the authority for decision making? Who has the power for decision making?

The functional overlay is not usually identical to the formal authority overlay (the organization chart) (14). It is assumed that each has the commissioner of transportation as the final authority and decision maker. The difference between these two overlays is the path a decision in reality takes as opposed to the path it is supposed to take according to the organizational chart. The NYSDOT Environmental Action Plan delineates the prescribed path (the project-development process) and, consistent with the decentralized approach followed by NYSDOT, places the operational responsibilities in the regional offices. Project planning and design activity responsibilities ultimately held by OPD and the Office of Operations are located in the headquarters office (6). Therefore, decisions are supposed to travel up the following ladder: from the public (through adequate citizen participation) to the regional planning or design engineer to the regional director to the commissioner.

There is no mention in this ladder of the assistant commissioners of OPD or of operations or of the director of PPMG, who are supposed to act as advisers to the regions and to the commissioner and not as rungs in the decision ladder. However, the functional overlay to the ladder gives a significantly different scenario, particularly in the areas of process direction and environmental considerations. Because EAB is the source of environmental expertise in NYSDOT, it is potentially able to provide a strong argument for or against a particular project decision on environmental grounds. The director of PPMG, under whose

jurisdiction EAB operates, is therefore in control of both the capital construction program and the environmental program. He or she is in a position to emphasize either program before the commissioner, who will use the director's advice as an input to his or her decision.

The organization chart for NYSDOT does not show this concentration of power within PPMG, but functionally it exists. In the authoritative sense, the assistant commissioner for operations should have the responsibility for the construction program, which would be consistent with the other duties of that position. By vesting this responsibility in PPMG, however, the director is put in the position of administering conflicting programs. The result is that the one that will probably be emphasized is the one that is politically beneficial, which is usually the construction program. This type of decision-making activity is ordinarily reserved for the commissioner, who has the authority for ultimate decision making.

CONCLUSION

Efforts by NYSDOT to implement environmental requirements have evolved in a manner similar to the evolution of similar national priorities. During the late 1960s and early 1970s, when the environmental movement was at its peak, the department was integrating environmental concerns fully into its project-development process as a high priority. In the mid-1970s to late 1970s, however, the national mood shifted toward emphasis on more-prudent government investment and energy conservation. NYSDOT followed these trends by creating an organizational structure designed to expedite projects. Because a design-and-construction thrust is not always compatible with a strong environmental position, the new emphasis at NYSDOT has resulted in a lessened environmental advocacy.

The environmental function, wherever it is located in the organizational structure, should assist and not hinder the highway agency in providing fast, safe, and efficient transportation [P.L. 91-605, Title 23, U.S. Code, Section 109(i)]. Environmental engineers and analysts on the agency staff should seek to avoid the appearance of conflict with the highway program. Instead, they should try to achieve technical and policy objectivity in their analyses and maintain a strong advocacy for their specialties. Their ultimate advocacy, however, should be for the best highway program possible for the state. The most effective way to ensure that is to implement as fully as possible federal procedural requirements relevant to environmental assessment.

REFERENCES

1. Federally Coordinated Program of Highway Research and Development. Federal Highway Administration, U.S. Department of Transportation, 1976.
2. Your Future in Transportation. N.Y. State Department of Transportation, Albany, 1970.
3. J. Burby. The Great American Motion Sickness. Little, Brown, Boston, 1971.
4. General Electric Co. Study of Noise Pollution Aspects of Various Roadway Configurations. U.S. Department of Transportation, 1971.
5. Process Guidelines. In Federal-Aid Highway Program Manual, Vol. 7, Chapter 7, Section 1, Federal Highway Administration, U.S. Department of Transportation, 1974.
6. Environmental Action Plan. N.Y. State Department of Transportation, Albany, 1974.
7. I. Kristol. Decentralization for What? In Public Administration (R.T. Golembieski, F. Gibson, and G. Cornog, eds.), Rand McNally, Chicago, 1972.
8. Procedures for Abatement of Highway Traffic Noise and Construction Noise. In Federal-Aid Highway Program Manual, Vol. 7, Chapter 7, Section 3, Federal Highway Administration, U.S. Department of Transportation, 1976.
9. FHWA Noise Standards: Interim Project Development Guidelines. Project Development Rept., N.Y. State Department of Transportation, Albany, 1976.
10. G.H. Hicks and C.R. Gullett. Organizations: Theory and Behavior. McGraw-Hill, New York, 1975.
11. S.M. Davis and P.R. Lawrence. Problems of Matrix Organizations. Harvard Business Review, May-June, 1978.
12. W.J. McLoughlin. Reassessing Project Management for State Transportation Departments: An Interstate Survey. Troy, NY, 1978.
13. J. Pfiffner and F. Sherwood. Administrative Organization. Prentice-Hall, Englewood Cliffs, NJ, 1960.
14. J. Pfiffner and F. Sherwood. Organization as Overlays. In Public Administration (R.T. Golembieski, F. Givson, and G. Cornog, eds.), Rand McNally, Chicago, 1972.

Publication of this paper sponsored by Committee on Transportation Environmental Planning and Review.