

Survey Defines State Research Needs

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State highway and transportation departments use research to guide them in providing safe, effective, and efficient transportation for public use. Most research is practical and problem-solving in nature and is designed to produce results for immediate application. The nature of state research needs changes slowly over time. Each year most state research managers solicit research problems from committees, operating staff, universities, or their own in-house research units. Many research units could undoubtedly strengthen their positions as generators of their states' research needs and as the prime source in seeking solutions to these needs.

In a questionnaire mailed in May 1987, state research managers from the 50 states were asked to respond to questions about the development of their research needs, the extent of management review of research, the resources used for carrying out the research program, and the perception of the usefulness of the research carried out by the research organizations.

Needs were defined as those research problems that were either evaluated and selected for the state's Fiscal Year 1987 program or put on a priority list for future consideration. For this survey, research needs are defined by the number of problems rather than actual costs.

Forty-nine states responded to the questionnaire. More than 1,500 research needs were listed by the states in 1987. Of the 11 states that had more than 50 needs each, fewer than one-half were developed as research projects in 1987. Virtually all of the needs of the remaining 38 states were being addressed by these states from the resources available to them (see Table 1).

TABLE 1 *Research needs determined by the states in 1987.*

Needs Determined in 1987	No. of States
0-9	11
10-19	10
20-29	10
30-39	4
40-49	3
50+	11

NOTE: Texas generated the largest number of research needs, which were included in the survey tabulations only when they would not skew the comparison.

The average number of needs per state by category (design, traffic, materials, etc.) is shown in Figure 1. The categories of research needs are defined in the box. The states' research needs varied by category from less than 1 for administration to more than 8 for design. There is also a wide range in the percentage of states that listed needs in each category (43 percent for administration and 94 percent for design). The survey results indicated a tendency by the state research units to conduct a greater proportion of "hard" research in-house (30 to 43 percent of the research needs in these categories) compared with 20 to 25 percent of "soft" research.

Origin of States' Research Needs

Some interesting patterns can be observed in the states' research programs when the position of the research unit within the department is examined. A smaller number of research needs are associated with materials-oriented re-



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search units when compared with research that is organizationally within administration, planning, or engineering units. Further, a larger number generally results when needs are solicited from many units within the department, especially from the research unit itself. If the research unit is involved in the development of needs and is directly responsible to top management, a larger and more varied research program results. The evolution of a research unit is different for each of the states. Its status within the organization, however, may be enhanced by the development of a research program that is responsive to most of the functional needs of the department.

TABLE 2 *Organizations conducting research.*

Source	No. of States	Percentage of 1987 Projects
State	40	40
University	42	35
Consultant	13	8
NCHRP	18	5 ^a
Other ^b	—	12 ^a

^a These represent submissions, not the actual research accomplished.

^b This includes the U.S. Department of Transportation, other federal agencies, or other units of the transportation department.

Sources Used To Address Needs

Research programs in state highway and transportation departments frequently depend on a combination of sources to conduct research. Once the research needs are reviewed and assigned a priority, each state applies its own methods to decide the sources that will be used to address them. As observed from Table 2, 42 states used universities to conduct a portion of their 1987 research, and 40 states addressed a portion of their research needs in-house. Overall, almost as many research problems were addressed by universities (35 percent) as were addressed by state research units (40 percent).

Research managers were asked to rank their perceptions of the organizations conducting research on a scale from 1 to 5 (see Table 3). When asked about the practicality of the research conducted by these organizations, the state research units, the National Cooperative Highway Research Program (NCHRP), and the Federal Highway Administration (FHWA) were ranked relatively high. Universities and consultants were ranked lower; their research was perceived as less practical by many states. Ironically, although FHWA and NCHRP each use universities and consultants to conduct research, both these organizations are rated higher. There are surely many reasons for the differences in these perceptions, but they may be related to the differences in the development of the project scope and the review and contractual procedures used by NCHRP and FHWA.

The survey results provide a brief look at the handling of more than 1,500 research needs in one year by 49 states. Research managers can use the results to compare their own research programs, and the extent of research needs generated within their own departments, with those in other states. The results can also help stimulate further thought and discussion on the use of the various organizations available to address research needs.

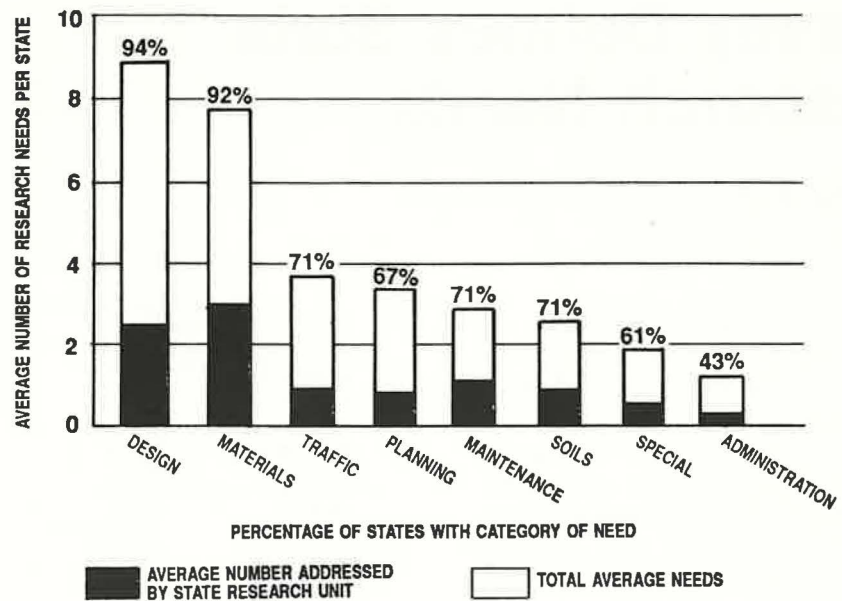


FIGURE 1 Research needs by category (1987).

Definitions of Research Needs Categories in Figure 1

Administration	Economics, law, finance.
Planning	Statewide, forecasting, systems, environmental, freight, public transit, aviation.
Design	Pavement, bridges, general design, roadside development, vehicle barrier systems.
Materials-Construction	Bituminous, specifications and practices, concrete.
Soils and Geology	Testing, instrumentation, properties, mechanics, foundations.
Maintenance	Snow control, equipment, maintenance of way.
Traffic	Operations, control, visibility, traffic planning, capacity, safety, user characteristics.
Special Projects	Personnel, training, computers.

TABLE 3 Perception of practicality of research.

Perception Index	State	NCHRP	USDOT	University	Consultant
4-5	25	18	16	10	7
3	13	19	24	16	9
1-2	4	6	4	16	19
Average Index	3.62	3.35	3.30	2.81	2.49

NOTE: Number shown indicates number of responses.