

MONITORING CONTRACT RESEARCH

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●ALTHOUGH the title does not so state, these comments on monitoring contract research center on policies and procedures of the National Cooperative Highway Research Program (NCHRP), many of which apply equally well to any contract program. To provide complete perspective, a good bit of philosophy is included, because monitoring (or "surveillance" as we term it) is a function to both ensure and assure that research progresses as intended along technical and administrative lines. It must be remembered, however, that surveillance is only one function well along the way in a sequence of activities calculated to enhance the probability of achieving overall goals. Notwithstanding the desire for this function to be a major contributor to a high probability of success, there is a delicate balance to be maintained in the practical and realistic exercise of it. Surveillance must be penetrating enough to be effective, yet the requirements on the research agency must not be procedurally complex or burdensome to the point of distracting the researchers from their primary efforts or adding to an agency's cost of doing business. In this regard, a major NCHRP consideration in the establishment of requirements has been the hope that they will be tools useful to the agency's project management. Streamlined procedures are also important to the ability of the NCHRP to do its job, because the large number of projects to be monitored always results in too many projects per staff engineer.

The NCHRP is now in its eleventh year of operation under a three-way agreement among the American Association of State Highway Officials, the Federal Highway Administration, and the National Academy of Sciences. The Program's purpose is to be the central source of administrative control for AASHTO's national program of cooperative research. As time passes, it is easy for others to lapse into the thinking that the Program is an autonomous entity. This is not so, and it bears repeating that primary responsibility for Program operation lies with the National Academy of Sciences and that this responsibility has, in turn, been delegated to the Highway Research Board. Inasmuch as the three-way agreement requires the Academy to sign contracts each year with AASHTO's member state highway departments for the planning, organization, and administration of the Program, the Academy is placed in the role of a prime contractor. Agencies contracting with the Academy for NCHRP research then become subcontractors.

A contract is an agreement to accomplish certain things, and its acceptance automatically imposes responsibility. Consequently, the NCHRP framework embodies two levels of responsibility—that of the Academy to the sponsors and that of the research agency to the Academy. "Responsibility" is then the keystone of NCHRP's operational philosophy because it is synonymous with "accountability." Everything that we do, including the requirements that we impose on ourselves and others, is geared to respond to that issue and, although the Program maintains a firm stance in administering them, it is one in which every attempt is made to be fair and objective. This is the pervading theme to keep in mind in reading these remarks as well as any of the various publications addressed to Program organization and operation.

Because the Highway Research Board does have surveillance responsibility yet is not sponsoring the research, we, in turn, are monitored by our sponsors. Although this aspect of overall management of monitoring is not covered here, let it suffice to say that our sponsors do have procedures for monitoring our performance and that we do have to answer to them periodically concerning all aspects of Program management on their behalf.

Project surveillance is carried out by a staff of engineers assigned by the Highway Research Board to the NCHRP. Staff members have individual specialties and training in the broad areas of physical research, traffic planning, and special projects and are responsible for administrative and technical surveillance of research contracts. Besides reviewing various agency reports and maintaining telephone contacts, they visit their assigned projects at least once every 6 months for in-depth reviews of all administrative and technical matters. In addition to determining if research is in line with the plan approved by the advisory group, they help the researchers maintain a perspective of the relationships between research objectives and the needs of the practicing engineer and see that all project developments, from beginning to end, center around these needs. At the same time, they are responsible for maintaining liaison with an advisory group of experts that is constituted for each project to provide technical guidance and counsel. Finally, they and the advisory group review the completed research to determine the degree of technical compliance with the contract.

A first requirement of the research agency immediately after contracting is the development of the working plan, which is a comprehensively detailed amplification of the approved research plan, including a specific schedule of events (presented in chart form) for the major tasks. This document is used by the staff in the day-to-day surveillance of the project's progress. Should review of this document by staff and the project advisory group bring to light necessary changes not previously apparent, these can be accommodated readily by contract amendment without hindering prosecution of the work.

As you have seen emphasized elsewhere, the NCHRP is not a grant operation. It is a contract program employing contractual constraints in the conduct of applied research to solve operational problems. Understandably, cost and time have long been considered by the scientific community to be unnatural constraints; only technical performance mattered. Because all of these factors are important in our operation, it is obvious that the individual preferences of anyone wanting to do NCHRP research must be subjugated to contract commitments. At no time, however, is there any intent on the part of the NCHRP to work against a creative environment where creative people can make recognizable contributions. On the contrary, mutual understanding and cooperation must prevail in seeking a common goal. Meeting the sponsors' expectation that their resource allocation will be expended in the best possible way to acquire research results that are practical and directly amenable to practice is fundamental to the Program's accountability and is, therefore, the central focus of all operation. By and large, the resource allocation goes for brainpower, and brainpower is expensive. The fact that the allocation might be high does not guarantee efficient performance or ultimate success. Obtaining the right competence will usually result in getting our money's worth; however, this does not obviate the need for surveillance, because the agency's performance obligation entails both technical and administrative matters.

A peripheral issue that cannot be ignored in establishing policy that includes surveillance requirements is the influence that Program achievements have on the sponsors' desire to continue support of research. As is well known, there is a perennial argument whether sufficient return is received on the research dollar. Couple this with today's requirements for stretching available dollars, and there certainly is no apparent decrease in reluctance to commit resources where intangibles and risks are involved. Even though progress is evident through advanced technology, the question of cost-effectiveness persists because there is, unfortunately, no good way to measure it. The rising cost of doing business not only will result in even more critical scrutiny of resource allocations but also will certainly reinforce the imperativeness of NCHRP surveillance to protect the sponsor's investment. Seemingly overnight, for example, our estimates for labor have risen from \$35,000 to \$50,000 per man-year, including overhead rates that now range to 165 percent.

It was stated earlier that mutual understanding and cooperation between the NCHRP and the research agency are a must. This can be achieved only if there is effective communication. Without communication there will be misunderstanding and confusion. Consequently, establishing the base for dialogue is essentially the Program's first sur-

veillance step and is actually carried out prior to contracting. Although this may sound strange, it is a procedure that has been received enthusiastically by the agencies. Suggested modifications to the proposed research plan are taken by the Program's staff to the agency, and a clear meeting of the minds is established regarding what is specifically expected technically and administratively from the research, the personnel carrying it out, and the agency's contracts administrators. By means of copies of a "Procedural Manual for Agencies Conducting Research in the National Cooperative Highway Research Program," further emphasis is placed on the requirement for practically oriented research and the proper means for reporting it. Experience has demonstrated that, once contracted, the practical fact of life is that the destiny of the research is pretty well committed no matter how extensive the staff surveillance or how many administrative procedures are available to accommodate changes.

Because project funding is fixed by the sponsors, the need for budget control is another matter that receives considerable emphasis in the initial dialogue. We recognize that there is nothing sacrosanct about the project budget, other than the upper bound, and that deviations from original calculations are to be expected. Nevertheless, it is made clear to the researchers and contract administrators that budget control is part and parcel of their contract commitment. This is emphasized as much as possible, because the coupling of this activity with preparation of monthly progress schedules constitutes one of the useful management tools referred to earlier. Compliance by the agency will help to prevent internal confusion. All too often, the NCHRP encounters administrative problems because communication between the agency's contract administrators and the technical staff performing the research is inadequate. Consequently, researchers have found themselves unexpectedly out of money and their work incomplete because they were not advised of increased overhead costs. Agency invoices are checked monthly by the NCHRP staff against budgets as some measure of backup to the agencies, but not as a substitute for their responsibility. Budget control is effective only if it gives early warning of deviations so that timely corrective measures can be taken.

As another safeguard in this respect, the agency is required to notify the Academy when the total of past expenditures plus those expected in the forthcoming 60-day period will exceed 75 percent of the contract amount. Upon receiving such notification, the NCHRP staff explores with the researchers the prospects of work completion within the contract period.

Two types of progress reports are required from the agencies while work is under way. On a monthly basis, 1-page progress schedules are submitted that graphically depict (a) actual progress through the major tasks outlined in the working plan schedule of events; (b) actual gross expenditures versus those planned on a month-by-month basis; and (c) estimated percentage of overall completion versus that planned on a month-by-month basis. On a calendar quarter basis, narratives are required that fully describe accomplishments to date and outline future activities dictated by the accomplishments. Based on these reports and information gained through surveillance visits, the Program's staff prepares its own progress reports, which are sent to the sponsors to provide a current awareness of ongoing work.

Research agencies are required to report their final research results in language that is understandable and in a format that succinctly summarizes the findings for the highway administrator and highway engineer and clearly informs them of the practical application of the findings. Available to the researchers during report preparation are guidelines that have been developed with the objective of providing a report of maximum utility to the sponsors. Because our report format is quite different from others', the guidelines are discussed with the researchers during the first surveillance visit so that the agency can plan ahead. Repeated references to the format are made in subsequent surveillance contacts.

In conclusion, it is hoped that this summarization has revealed that the Program's surveillance requirements and procedures have been designed from a practical and realistic standpoint. It is further hoped that, when viewed objectively, the requirements will be seen to be minimal in extent yet sufficient to enable both parties to the contract to fulfill their respective responsibilities.