Overview of Quality-Assurance Program

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Region 3 of the Federal Highway Administration (FHWA) recognized in the early 1960s that improvements were necessary in highway construction specifications in order to meet increased work loads. The quality-assurance system was determined to be our best approach. Our first step was to determine what the critical construction problems were. In 1965 we sponsored our first workshop on formal training for highway inspectors. In 1968 we held our first quality-assurance workshop. FHWA has also encouraged and participated with the state highway departments in administrative contracts, highway research projects, experimental projects, and demonstration projects to assist in the development of quality-assurance specifications. Indications are that the quality-assurance system is working in practice.

The region 3 Office of Construction and Maintenance of the Federal Highway Administration (FHWA) recognized in the early 1960s that improvements in highway construction specifications would have to be made to meet the expanded work load of the 1960s and 1970s in West Virginia. The quality-assurance system, as described in detail by Steele in a paper in this Record, was determined to be the best approach. A position was created within the office to promote the adoption of quality-assurance systems by the states in region 3. The first step was to determine what the critical construction problems were; management tools such as evaluations of various systems and coding were employed. During 1964-1966, we found that structural concrete, particularly bridge decks, and assignment to projects of a sufficient number of adequately trained inspectors were the items in most critical need of immediate attention.

With the cooperation of the highway departments and our divisions, we sponsored our first workshop on formal training for highway inspectors in 1965. Key state engineers and personnel associated with training attended. In 1966, a follow-up conference was sponsored by the state of Pennsylvania. The total effort was a tremendous success; all the highway departments either improved existing training manuals or developed new ones. In addition, all increased their winter training sessions and established a mutual program for the exchange of new training concepts.

In conjunction with the divisions and the state highway departments, we made a study of concrete controls from the inception of raw materials to the completed product. A formal 70-page report was published and distributed to the FHWA's Washington, D.C., office, states, and divisions for their review. This report was used as the basis for our first quality-assurance workshop, held in February 1968. As in the training workshops, the states' response was overwhelming: The completely objective approach to providing possible solutions to the concrete problems and the free exchange of ideas between states and FHWA were particularly noteworthy. Issues that received considerable attention were (a) control of water-cement ratio, air content, and plastic temperature; (b) use of trial mix methods in design; (c) acceptance of portland cement by certification; (d) gradation control of aggregates; and (e) testing of admixtures.

Since 1968, the region 3 quality-assurance workshop has become an annual event; the 15th was held in Harrisburg, Pennsylvania, in February 1981. This workshop was triregional. State highway departments, industry, and FHWA representatives from regions 1, 3, and 5 participated. This forum for encouragement of the development of quality-assurance systems has been beneficial to each of the highway departments in region 3.

The agency and our office have also encouraged and participated with the state highway departments in administrative contracts, highway research projects, experimental projects, and demonstration projects to assist in the development of quality-assurance specifications. Several of these have been described by Steele.

We have encouraged each state highway department to establish a time program or schedule that will lead to a total quality-assurance system for their construction specifications. Several states, including West Virginia, have developed a program that includes the research development, experimental use, education, and implementation phases of each specification area to be covered by a quality-assurance system.

The measurement of success of a quality-assurance system such as West Virginia's can be measured in several ways, such as work load. The West Virginia Highway Department used the same manpower in the 1970s as in the 1960s to meet a work load that was five times higher than that of the 1960s. Another measure of success is contractor response. The response of the contractors who have been involved in a quality-assurance system has, in our opinion, generally been positive, as outlined by Thompson in a paper in this Record.

NATIONAL NORMS

FHWA has recently published the 1979 Highway Condition and Quality of Highway Construction Survey (1). Although based on only a few bituminous paving projects from West Virginia, several comments with respect to the national data are noted. The quality levels were all above the 90 percent norm; many were 100 percent. The national data norm is somewhat lower than West Virginia's and lower than the 90 percent norm. The manpower distribution data indicate that the quantity per manhour exceeded the national data by a factor of two to four. The predominant classification for performing inspection and testing activities on the projects surveyed was the level-four technician. No engineers were reported on the projects surveyed.

The 1979 Highway Condition and Quality of Highway Construction Survey documents that the highway department, in its expanded program, is obtaining the level of quality desired with their existing technician-level inspection force. Although not everything is perfect, the above indicates that the noted quality-assurance system is working in practice.

ACKNOWLEDGMENT

The contents of this informal paper reflect my view and I am responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official view or policy of the West Virginia Department of Highways or FHWA. This paper does not constitute a standard, specification, or regulation.

REFERENCE

1. 1979 Highway Condition and Quality of Highway Construction Survey. Federal Highway Administration, Oct. 1980.