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These Digests are issued in the interest of providing an early awareness of the research results emanating from projects in the NCHRP. By making these results known as they are developed and prior to publication of the project report in the regular NCHRP series, it is hoped that the potential users of the research findings will be encouraged toward their early implementation in operating practices. Persons wanting to pursue the project subject matter in greater depth may obtain, on a loan basis, an uncorrected draft copy of the agency's report by request to: NCHRP Program Director, Transportation Research Board, 2101 Constitution Ave., N.W., Washington, D.C. 20418

Summary of Project 3-18(3) Traffic Signal System Surveys

An NCHRP staff digest of the essential findings from the first objective (survey task) of Project 3-18(3), "Traffic Signal System Surveys," by Thomas L. Stout, JHK and Associates, Atlanta, GA

THE PROBLEM AND THE RESEARCH APPROACH

NCHRP Project 3-18(3), "Cost-Effectiveness Methodology for Evaluation of Signalized Street Network Surveillance and Control Systems," began in May 1975, with the objectives of developing and demonstrating a practical cost-effectiveness methodology for evaluating alternative traffic signal control systems. The methodology will take into consideration all factors bearing on the choice of the best control techniques, including such factors as types of hardware components used; extent of real-time human operator interface required or desired; degree of automatic traffic sensing employed for either on-line control or off-line system support purposes; physical and traffic flow characteristics of the street network being controlled; the technical skills and other resources of the operating agency; and any other factors having an important effect on control system requirements.

The first major task of the project was described as follows: to identify and define the range of traffic surveillance and control system alternatives to which the cost-effectiveness methodology is to be applied. In order to carry out the task, and to aid in determining the methodology design, the research agency developed questionnaires for circulation to two different groups. One questionnaire was circulated to 50 representative researchers, signal system designers, and manufacturers. The second was distributed to 199 representative public agencies at the federal, state, and local levels. Some addressees, as both researchers and system users, received both questionnaires.

The results of analyzing the survey returns are given in a preliminary report from the research agency. Because these interim findings may have immediate value to traffic engineers, this Digest has been prepared to announce their availability on a loan basis.

INTERIM FINDINGS

The returns from the surveys have been analyzed and compiled into a report of 105 pages, the contents of which can be only briefly abstracted here. Eventually, the data and the conclusions drawn from the analysis will appear in the final report on the project.

1. Survey of Researchers, Designers, and Manufacturers

Nineteen returns were received from these recipients, who were asked for both qualitative and quantitative answers to questions about preliminary studies; plans, specifications and estimates; construction management; and system effectiveness. The summary report contains tables and commentary on their responses. For example, Table 5 indicates that application software caused the greatest management difficulty for six respondents. Communications systems were identified in four replies as being difficult to control, whereas computer main frame and peripherals created no difficulties for most respondents.

2. Survey of System Users

A total of 80 responses, or a 40 per cent return, was obtained for the 12-page questionnaire sent to public agencies. This survey was intended to collect system characteristics and selection criteria concerning: a) the range of alternative systems in use; b) the evaluation, design, and implementation of systems; c) the operational and maintenance aspects. The returns provided listings of the characteristics of 114 signal systems. These have been fully tabulated in summary charts. In all, the report contains a total of 20 tables on the results of this survey.

3. Some General Findings From Both Surveys

A. There seems to be no broad consistency in the expectations of traffic engineers for traffic control systems. Thus, evaluation methodologies must be sensitive to local policies and a range in traffic control philosophies and expected system levels of performance.

B. Respondents from agencies with digital computer systems reported a greater need for engineering personnel, rated components as having lower reliability than agencies with non-digital systems, needed and used more timing plans, and felt system flexibility was more important.

C. Backup capabilities of the reported systems were generally equal to or greater than the operations level of the systems replaced.

D. Agencies having a display map reported that its greatest value was in public relations, but that its use to display system status was nearly as valuable a function.

E. Researchers and designers reported that the most important aspect of an evaluation study was to establish performance criteria for the system.

APPLICATIONS

The two surveys were conducted to aid the project in arriving at its objectives by identifying the range of system design alternatives and by suggesting methods that might be suitable for evaluating them. Yet the fact that there is not now a "consistency in expectations" among users is evidence that the survey results may also be directly and immediately useful to traffic engineers faced with design choices. The summary report may be helpful, for example, as a yardstick against which to compare criteria and characteristics for proposed traffic systems.

This Digest has been prepared in order to advise possible users of such potential values. As only a limited number of copies of the report have been prepared, however, it can be made available only on a short-term loan basis upon receipt of requests directed to the NCHRP Program Director.

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