

# National Cooperative Transit Research and Development Program

## *Ten Years of Service to the Transit Community*

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**I**t is exceedingly difficult to rate the success of research results. Since the National Cooperative Transit Research and Development Program began in November 1980, 34 research projects have been completed and published (see box). The NCTRP is a national program that provides a mechanism by which the Urban Mass Transportation Administration's principal client groups across the nation can join in an attempt to solve near-term public transportation problems through applied research, development, testing, and evaluation.

Some NCTRP reports cover a broad spectrum in the transit field, others deal with a narrow portion of the subject technology. Research results, by their nature, have a limited audience, and NCTRP has covered a diverse group of problem areas. It follows that each publication will not be viewed as equally appropriate, useful, or appealing to every recipient. The ultimate success of the various research results publications can best be measured by answering the question "Is anyone using the research?"

To find the answer, a simple questionnaire was sent to 695 potential users in the

spring of 1990. Of the 153 (22 percent) returns received by the Cooperative Research Programs office, 114 (16 percent of the total sent or 75 percent of the returns) indicated familiarity with one or more of the 34 NCTRP publications listed. Some self-selection bias can be expected in the results of this type of survey (e.g., those who respond are likely to be aware of the research and to have found it useful). Seventy-five of the respondents (11 percent of the questioned population, 66 percent of the respondents) were aware of applications of at least one of the publications. The total known applications numbered 518.

The distribution of the applications is shown in Figure 1 for NCTRP Reports, Syntheses of Transit Practice, and Research Results Digests.

### Awareness Factor

Of course, no respondent had sufficient knowledge of the publications to rate each one on a scale of 0 to 10. Because the questionnaire asked the recipients to rate the usefulness of only those publications with which they were familiar, the number of ratings is an indication of the size of the audience for each publication. These ratings, divided by the total number of respondents (114), are presented in Figure

2 as the "%—AWARE" for both the Report and Synthesis categories. The most widely rated publication was *NCTRP Report 8: Simplified Guidelines for Evaluating Transit Service in Small Urban Areas*, in the planning-impact analysis area. In this publication, procedural guidelines are offered for transit and municipal agencies to use when analyzing proposed transit and paratransit alternatives and presenting their proposals to decision-making bodies. Of the respondents, 56 percent were familiar with this publication. It also topped the known applications list with 32 percent of the respondents confirming that they knew of at least one practical application of the research results.

The most widely evaluated Synthesis Report, *NCTRP Synthesis of Transit Practice No. 12: Transit Marketing: Successes and Failures*, describes several types of marketing programs designed to increase ridership or revenue or to improve operations, and gives a general indication of why some were more successful than others. This publication was known to 43 percent of the respondents. It also leads the Syntheses publications in known applications, with 21 percent.

## Rating Usefulness of Publications

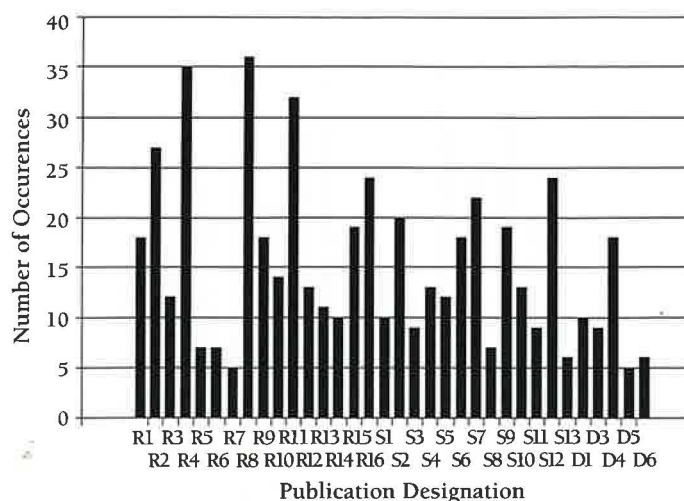
Each publication was evaluated for its usefulness by the respondents. The ratings were reported as a whole number, on a scale of 0 to 10, with 10 being the most useful. The average ratings (i.e., the sum of the ratings for an individual publication divided by the number of those ratings), ranged from 7.3 to 3.5. Ratings were made independent of the known application question and were intended to measure the interest in content of the publication rather than the immediate applicability of the results. Ratings were based only on the titles familiar to the evaluator. The highest average rating for an individual publication (i.e., 7.3) was shared by two Syntheses: Synthesis 12 already cited and NCTRP Synthesis of Transit Practice 2: Enforcement of Priority Treatment for Buses on Urban Streets. This Synthesis covers the role of enforcement in the success of various priority treatment techniques used for buses on freeways and arterials. It had the eighth largest number of known applications: 20.

The third most useful publication, with an average rating of 7.2, was NCTRP Research Results Digest 4: National Transit Computer Software Directory, a nine-page publication that catalogs almost 300 transit applications programs by function, submitting organization, and hardware compatibility. This publication ranked 22nd out of the 34 publications surveyed (24 percent or 31 rankers) in the awareness category but accounted for 18 known applications to provide the highest ratio of applications to evaluations: 0.58.

The highest individual average rating for usefulness of a Report (7.0) was fourth in the overall average ratings. It was shared by the following two Reports. NCTRP Research Report 4: Improving Decision Making for Major Urban Transit Investments, evaluates recent alternatives analysis and related study experiences of the federal, state, and local decision-making process for major urban mass transportation investments; identifies potential improvements in policy, procedures, and use of technical information; and formulates recommendations on planning procedures. NCTRP Research Report 11: Small Transit Vehicles; How to Buy, Operate, and Maintain Them, is a manual that presents a life-cycle cost analysis that is developed as a step-by-step procedure for use as one important factor to be accounted for when purchasing a bus. It provides a data base to use in the analysis and provides qualitative information and guidelines for other factors that must also be considered.

## Another Approach to Evaluating Applications

A second method of answering the question on whether the research is being used is to determine the percentage of respondents who knew of research applications from the total number of evaluations submitted for an individual publication. This method normalizes the size of the audience for each publication, which is known to vary, and concentrates instead on the





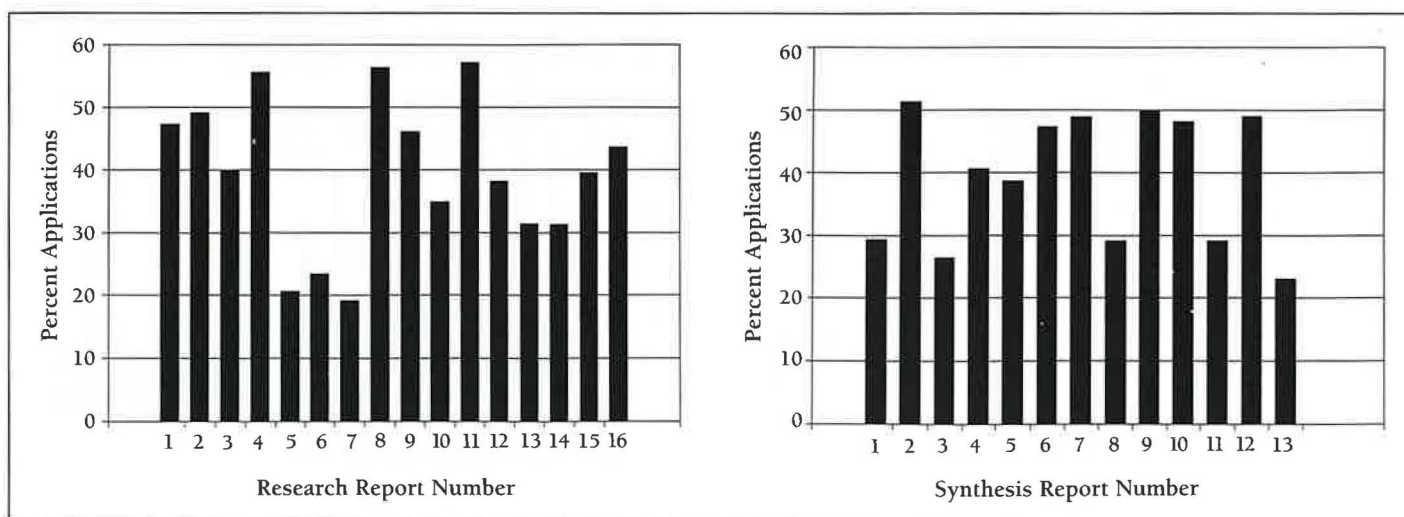


FIGURE 3 Percentage of respondents listing known research applications for CRP Reports and Syntheses.

applicability of the results within the intended research area.

The range of known applications by this analysis varies between 58 percent and 19 percent (see Figure 3). The highest-ranking Report is Number 11, with 58 percent, followed by Reports 4 and 8, each with 56 percent. These have already been described as the highest-ranking Reports in other categories. The highest-ranking Synthesis is Number 2 (also described previously) with 51 percent, followed, at 50 percent, by *NCTRP Synthesis of Transit Practice 9: Use of Part-Time Operators*. Information is presented in this Synthesis on the factors that influence the use of part-time operators, and general guidance is given to assist in the consideration of part-time operators within the context of a system's operating environment, labor agreement, and work rules.

The percentages appear to be the most significant indicators of usefulness, given the variety of publication subject matter and the consequent breadth of possible applications. For example, *NCTRP Report 7: Detection of Low-Current Short Circuits*, identifies and evaluates detection methods and equipment used to enhance transit system safety through reliable detection of electrical faults that are not detected by circuit breaker overload protection. This research addresses a limited audience because there

are relatively few existing rail transit facilities, yet of the 26 reviewers who rated the publication, 5 (19 percent) reported known applications.

### The Ultimate Payoff

Although it is assumed here that success can be measured by whether the research is being put to use, there are obviously other criteria that can be applied. One of these is peer acclaim. *NCTRP Report 2: Strategies To Implement Benefit-Sharing for Fixed-Transit Facilities* received the Category III Award of the National Capital Area Chapter of the American Planning Association's 1986 Awards Program. The techniques and consequences of implementing benefit-sharing approaches during the planning and design phases of transit terminals, rapid transit stations, and light rail transit lines and stops were investigated in this report.

Perhaps the most important measure of a research program's success lies in its economic benefits. These are difficult to measure in the near term and harder to project into the future. However, the July-August 1990 *TR News* included a Research Pays Off article, "Vehicle Replacement Strategies," that describes the application of the principles outlined in *NCTRP Report 10: Public Transit Bus Maintenance Manpower Planning*, and

*NCTRP Report 15: Transit Capital Investment To Reduce Operating Deficits—Alternative Bus Replacement Strategies*, to develop guidelines for reducing cost impacts. When these guidelines were applied to each bus fleet owned by the 13 Los Angeles County transit operators, the alternative replacement schedules produced an estimated cost savings of \$117 million (in 1989 dollars) over 10 years. When the guidelines were applied to the van and support vehicle fleets, the alternative replacement schedule produced an estimated cost savings of about an additional \$8 million. A total of 33 respondents reported known applications for these two reports (14 for Report 10 and 19 for Report 15).

### Summary

Every publication proved useful, as indicated by some number of reported applications known for each report familiar to survey respondents. However, there is no direct correlation between the number of readers who were able to rate a publication and the number of reported practical applications of the rated material. Although the survey did not ask respondents which publication format was most suitable, all three series of *NCTRP* publications appear to be appropriate for presenting research to potential users. The choice of format is usu-

ally governed by the type of research undertaken (e.g., Reports for new research and Syntheses for the review of current practice); Digests are used to summarize findings of a more immediate, short-term character. The survey showed that intended users accepted and found useful research results presented in the three formats.

Identified users find the research valuable even when they are not aware of immediate practical use for the research results. It would appear that the reports provide

resource information to those not currently involved in its immediate application. The percentage of those rating the various publications who reported known applications indicates the success rate of the selection of the research subjects and the subcontractors who undertook the research.

If using the projected savings from only one reported application provides any indication of NCTRP's success, it can be concluded that the program has contributed a manyfold return for the investment.

#### **NCTRP Reports**

1. Transit Bus Energy Efficiency and Productivity—Bus Equipment Selection Handbook.
2. Impacts of Federal Grant Requirements on Transit Agencies.
3. Reduction of Peak-Power Demand for Electric Rail Transit Systems.
4. Improving Decision-Making for Major Urban Transit Investments.
5. Assessment of Quality-of-Work-Life Programs for the Transit Industry—Research Report.
6. Assessment of Quality-of-Work-Life Programs for the Transit Industry—Model Programs.
7. Detection of Low-Current Short Circuits.
8. Simplified Guidelines for Evaluating Transit Service in Small Urban Areas.
9. Modular Approach to On-Board Automatic Data Collection Systems.
10. Public Transit Bus Maintenance Manpower Planning.
11. Small Transit Vehicles; How to Buy, Operate, and Maintain Them.
12. Strategies To Implement Benefit-Sharing for Fixed Transit Facilities.
13. Conversion to One-Person Operation of Rapid-Transit Trains.
14. Improved Service Life of Urban Transit Coach Brakes.
15. Transit Capital Investment To Reduce Operating Deficits—Alternative Bus Replacement Strategies.
16. Estimating Incremental Costs of Bus Route Service Changes.

#### **NCTRP Syntheses of Transit Practice**

1. Cleaning Transit Buses: Equipment and Procedures.
2. Enforcement of Priority Treatment for Buses on Urban Streets.
3. Diesel Fuel Quality and Effects of Fuel Additives.
4. Allocation of Time for Transit Bus Maintenance Functions.
5. Extraboard Management: Procedures and Tools.
6. Transit Bus Fare Collection: Problems with and Alternatives to Paper Currency.
7. Passenger Information Systems for Transit Transfer Facilities.
8. Bus Communication Systems.
9. Use of Part-Time Operators.
10. Bus Inspection Guidelines.
11. Traffic Control and Regulation at Transit Stops.
12. Transit Marketing: Successes and Failures.
13. Use of Incentives to Attain Specified Standards in Collective Bargaining for Mass Transit.

#### **NCTRP Research Results Digests**

1. Review of Literature Related to Bus Operator Stress.
3. Predicting and Dealing with Transit Bus Operator Stress.
4. National Transit Computer Software Directory.
5. Modular Approach to On-Board Automatic Data Collection Systems—A Seminar.
6. Electrolytic Corrosion in DC-Powered Transit Systems.

### **Prospects for New Transit Research Program**

The Transportation Research Board currently manages two cooperative research programs, the National Cooperative Highway Research Program (NCHRP) and the National Cooperative Transit Research and Development Program (NCTRP). Although the NCTRP, sponsored by the Urban Mass Transportation Administration, will expire on September 30, 1991, TRB is expected to be asked by UMTA to manage a new, significantly expanded Transit Cooperative Research Program (TCRP).

It is anticipated that authorization for TCRP will be included in pending surface transportation legislation that could be enacted and effective as early as October 1, 1991. The funding for TCRP is expected to be approximately \$10 million annually and will be derived from a formula-based take-down from federal appropriations for transit.

TCRP will be established on the basis of concepts recommended in TRB *Special Report 213: Research for Public Transit: New Directions*, and will include research projects and other technical activities responding to the transit industry's operating needs. TCRP will focus on practical solutions to everyday problems encountered in the operating environment.

Representatives of UMTA, TRB, and the American Public Transit Association are currently working together to develop a plan that can be used to operate TCRP.