

Continuing Project to Synthesize Information on Highway Problems

A staff digest of the progress and status of NCHRP Project 20-5, "Synthesis of Information Related to Highway Problems," for which the Transportation Research Board is the agency conducting the research. The Principal Investigators responsible for the project are Thomas L. Copas and Herbert A. Pennock, serving under the Special Technical Activities Division of the Board.

INTRODUCTION

Administrators, practicing engineers, and researchers continually face highway problems on which much information already exists, either in documented form or in terms of undocumented experience and practice. Unfortunately, this information is often fragmented, scattered, and undervalued. Often it is unknown to the person normally responsible for making decisions related to the topic. As a consequence, full knowledge of what has been learned about a problem is frequently not brought to bear on its solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem.

There exists a vast storehouse of information relating to nearly every subject of concern to highway administrators and engineers. Much of it resulted from research and much from successful application of the ideas of practitioners faced with problems in their day-to-day work. Because there has been no systematic means for bringing such useful information together and making it available to the entire highway community, the American Association of State Highway and Transportation Officials has, through the mechanism of the National Cooperative Highway Research Program, authorized the Transportation Research Board to undertake a continuing study, NCHRP Project 20-5, "Synthesis of Information Related to Highway Problems," which is intended to search out and synthesize useful knowledge from all possible sources and to prepare documented reports on current practices in the subject areas of concern. Reports from this endeavor constitute an NCHRP report series, *Synthesis of Highway Practice*, which collects and

assembles the various forms of information into single concise documents pertaining to specific highway problems or sets of closely related problems.

THE SYNTHESIS PROGRAM

This synthesis series attempts to report on the various practices, making specific recommendations where appropriate but without the detailed directions usually found in handbooks or design manuals. Nonetheless, these documents can serve similar purposes, for each is a compendium of the best knowledge available on those measures found to be the most successful in resolving specific problems. The extent to which they are utilized in this fashion will be tempered by the breadth of the user's knowledge in the particular problem area.

To develop these syntheses in a comprehensive manner and to ensure inclusion of significant knowledge, the Transportation Research Board analyzes available information assembled from numerous sources, including state highway and transportation departments. A panel of experts in the subject area is established to guide the researchers in organizing and evaluating the data collected on each topic and to review the synthesis report.

For each topic the project objectives are: (1) to locate and assemble documented information; (2) to learn what practice has been used for solving or alleviating the problems; (3) to identify all ongoing research; (4) to learn what problems remain largely unsolved; (5) to organize, evaluate, and document the useful information that is acquired; (6) to evaluate the effectiveness of the synthesis after it has been in the hands of its users for a period of time.

Each synthesis is an immediately useful document that records practices that were acceptable within the limitations of the knowledge available at the time of its preparation. As the processes of advancement continue, new knowledge can be expected to be added to that which is now at hand.

Available Publications and Studies in Progress

The 107 published Syntheses of Highway Practice that have been prepared under this project to date are listed in Table 1. Two Research Results Digests on topics studied under the project are also listed. Copies of these Syntheses and Digests can be obtained from the Publications Office, Transportation Research Board, 2101 Constitution Avenue N.W., Washington, D.C. 20418. A check or money order must accompany orders totaling \$20.00 or less.

Work is currently under way on the 26 topics listed in Table 2. Questions on these topics should be addressed to the project investigators, Thomas L. Copas and Herbert A. Pennock, who can be reached at (202) 334-3242.

Submission and Selection of Topics

One part of project procedures that is not widely understood is the process for submission and selection of topics. NCHRP Project Committee SP20-5 meets each Fall to select topics for study using funds from the upcoming fiscal year. The membership of this committee is given in Table 3. Current funding allows for initiation of about 10 or 11 syntheses per year. This number plus some alternative topics are selected by the committee at the Fall meeting. Topics selected for the FY '84 program are listed in Table 4. It is unlikely that those near the bottom of the list will be studied at this time.

The following factors are considered in the selection process for synthesis topics:

- The problem should be widespread enough to generate broad interest in the synthesis.
- The problem should be timely and critical with respect to economic impact, safety, or social impact.
- The problem is appropriate if current practice is nonuniform or inconsistent from agency to agency, or if the validity of some practices appears to be questionable.
- The quality and quantity of useful available information should indicate a need to organize and compress that which has already been learned and written on the topic.
- The topic should not be one where ongoing research or other activities in progress might be expected to render the synthesis obsolete shortly after completion.

Each year many more topics are suggested for the committee's consideration than can be programmed for study in Project 20-5. Nevertheless, the continued success of this project depends on a constant supply of worthy synthesis topics. The interest of those who have recommended topics is sincerely appreciated, and they are urged to continue. Candidate topics are suggested by members of the committee and from a variety of other sources. State highway and transportation department personnel may submit suggestions for synthesis topics directly to the NCHRP Program Director or, if desired, through their State TRB Representative. Topics suggested must be accompanied by a brief scope statement or discussion of the problem.

Conduct of the Studies

Throughout the year, following the project committee's selection of topics, studies are initiated in the order of priority assigned by the committee. A panel consisting of practitioners and researchers is formed for each topic. At its first meeting, this topic panel thoroughly discusses the topic, refines the scope, suggests sources of information, and identifies and discusses potential topic consultants.

Following this meeting, an agreement is negotiated with a consultant to gather information on the topic, synthesize it, and draft a report. Typically, the agreement covers 30 to 40 man-days over a period of about one year. Information gathering and preparation of the first draft of the synthesis report usually take from 6 to 9 months. This draft is reviewed by the topic panel with the consultant at the second panel meeting. A revised draft is then prepared by the author and reviewed by the topic panel. Subsequent drafts and meetings are scheduled if needed, although this rarely occurs.

After the topic panel is substantially satisfied with the report, a final draft is sent to the members of NCHRP Project Committee SP20-5 for their approval. At the same time, members of the topic panel have their last chance to review the report. Comments from these reviews are incorporated into the final report, which is usually published as an NCHRP Synthesis of Highway Practice.

Index of Topic Subjects

Table 5 contains an index to published syntheses and topics now under study, as well as those expected to be started through 1984.

The NCHRP Projects Engineer responsible for Project 20-5 is Robert J. Reilly, who can be reached at (202) 334-3224.

Table 2

TOPICS BEING STUDIED

No.	Title	No.	Title
9-12	Welding and Inspection Practices in Bridge Fabrication	14-12	Use of Epoxies with Concrete
11-05	Utilization of Information Systems in Construction Engineering Management	14-22	Distribution of Wheel Loads on Highway Bridges
12-11	Bridge Designs to Reduce and Facilitate Maintenance and Repair	15-01	Toll Highway Financing
13-02	Methods of Cost-Effectiveness Analysis for Highway Projects	15-03	Detecting Defects and Deterioration in Highway Structures
13-07	Storm Water Management for Transportation Facilities	15-04	Equipment for Obtaining Pavement Condition and Traffic Loading Data
13-08	Bridge Posting Practices	15-05	Effects of Permit and Illegal Overloads on Pavements
14-02	Maintenance Management of Traffic Signal Equipment and Systems	15-06	Methods for Identifying Hazardous Highway Elements
14-03	Reducing Construction Delays, Damage, and Costs Through Improved Highway-Utility Coordination	15-07	Life-Cycle Cost Analysis of Pavements
14-04	Asphalt Overlay Design Procedures	15-08	Human Resource Management and Forecasting: Planning to Meet Future Needs
14-06	Maintenance Management Systems	15-09	Protective Coatings for Bridge Steel
14-07	Maintenance Activities Accomplished by Contract	15-10	Prefabricated Bridge Elements and Systems
14-09	Energy Conservation in Transportation	15-11	Traffic Data Collection and Analysis: Methods and Procedures
14-11	Research, Development, and Implementation Activities and Organization of State Highway and Transportation Departments	15-19	Hot-Dip Galvanizing for Exposed Structural and Miscellaneous Steel

Table 3

NCHRP PROJECT COMMITTEE SP20-5

Chairman Ray R. Biege, Jr. Consultant	
Verdi Adam Louisiana Dept. of Transp. and Dev.	Thomas H. May Pennsylvania Dept. of Transportation
Robert N. Bothman Oregon Dept. of Transportation	Theodore F. Morf Consultant
Jack Freidenrich New Jersey Dept. of Transportation	Edward A. Mueller Morales and Shumer Engineers
David Gedney DeLeuw, Cather and Company	David K. Phillips Federal Highway Administration
Sanford LaHue American Concrete Pavement Association	Robert J. Betsold Federal Highway Administration
Bryant Mather USAE Waterways Experiment Station	K. B. Johns Transportation Research Board

Table 4

SYNTHESIS TOPICS SELECTED FOR THE FY '84 PROGRAM

No.	Title	No.	Title
16-01	Bridge Inspection Equipment, Staffing, and Safety	16-12	Refinement of Axle-Load Forecasting and Monitoring Methods
16-02	Use of Weigh-In-Motion Systems for Data Collection and Enforcement	16-13	Streamlining Project Planning and Development
16-03	Maintenance Management of Street and Highway Signs	16-14	Strategic Planning in State Transportation Agencies
16-04	Microcomputer Software for Highway and Structural Engineering	16-15	Cracking and Sealing Concrete Pavements
16-05	Durability of Dry-Cast Concrete	16-16	Loop Detectors
16-06	Skid Resistance	16-17	Railroad-Highway Grade-Crossing Surfaces
16-07	Use of Fly Ash in Concrete	16-18	System-Wide Safety Improvements
16-08	Traffic-Safe and Hydraulically Efficient Roadside Drainage Practices	16-19	Effectiveness of Quality Assurance Procedures in Highway Construction and Materials Control
16-09	Scheduling Urban Freeway Maintenance	16-20	Field Testing of Soils
16-10	Bridge Expansion Devices	16-21	Unified Computerized Roadway Information Management Systems (UCRIMS)
16-11	Rehabilitation of D-Cracked Pavements		

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 hyphenated numbers represent studies in progress.

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