

1. Report No. 192-77-1	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Technology Transfer and Implementation		5. Report Date August 31, 1977	
		6. Performing Organization Code	
7. Author(s) Temple R. Kennedy		8. Performing Organization Report No. 192-77-1 192-1	
9. Performing Organization Name and Address State Department of Highways and Public Transportation P. O. Box 5051 Austin, Texas 78763		10. Work Unit No.	
		11. Contract or Grant No.	
12. Sponsoring Agency Name and Address Federal Highway Administration Department of Transportation		13. Type of Report and Period Covered Annual September 1, 1976- August 31, 1977	
		14. Sponsoring Agency Code	
15. Supplementary Notes			
16. Abstract <p>Putting the results of research studies into practice in planning, design, construction and maintenance of our transportation system is of paramount importance. To accomplish this an aggressive technology transfer and implementation effort are essential. In a decentralized management organization as practiced by SDH&PT this becomes increasingly important as the administration does not actively direct implementation of research findings.</p> <p>This study is the vehicle by which the day to day efforts of those involved in technology transfer, implementation and special experimental projects are directed, budgeted and financed.</p>			
17. Key Words Technology Transfer, Implementation Experimental Projects		18. Distribution Statement	
19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price

TECHNOLOGY TRANSFER AND IMPLEMENTATION

by

Temple R. Kennedy

Research Report Number 192-77-1

Implementation and Special Experimental Projects

Research Project 1-10-77-192

conducted by

State Department of Highways and Public Transportation

Austin, Texas

in cooperation with the

U.S. Department of Transportation
Federal Highway Administration
Austin, Texas

August 1977

The contents of this report reflect the views of the author, who is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views nor policies of the Federal Highway Administration. This report does not constitute a standard, a specification nor a regulation.

PREFACE

This report represents the first on the activities and efforts of research section personnel to transfer technology, implement research results and report on special experimental projects. The author is indebted to Implementation Subsection personnel and to division and district personnel statewide for their cooperation and contribution in putting research results into practice and experimenting with new equipment, methods, concepts and designs.

August 1977

Temple R. Kennedy

ABSTRACT

Putting the results of research studies into practice in planning, design, construction and maintenance of our transportation system is of paramount importance. To accomplish this an aggressive technology transfer and implementation effort are essential. In a decentralized management organization as practiced by SDH&PT this becomes increasingly important as the administration does not actively direct implementation of research findings.

This study is the vehicle by which the day to day efforts of those involved in technology transfer, implementation and special experimental projects are directed, budgeted and financed.

KEY WORDS: Technology transfer, Implementation, Experimental projects

SUMMARY

In a decentralized management system as employed by SHD&PT continuous activities are needed in technology transfer to inform the field district of research results. A thorough, low-key program designed to advise the using, doing elements of SDH&PT of research findings can encourage and accomplish implementation of desirable results. More rapid implementation could be achieved by use of administrative directives.

Occasionally subjects for which special studies or reports would be desirable are detected. This study provides, with prior approval by FHWA, the mechanics for making the studies or preparing the report. Two of those studies were performed during the report period. Special Study reports are being prepared for those two projects at this time and will be published soon. A moving picture presentation and slide-tape presentation are being prepared for one of the studies.

Principally this project provides the finance and budgeting for all overhead, salary, travel, etc., of the implementation subsection activities which are not directly paid for by another on-going project. This group is presently composed of three engineers and one technician.

TABLE OF CONTENTS

Chapter		Page
I	INTRODUCTION	1
II	TECHNOLOGY TRANSFER	2
III	IMPLEMENTATION	7
IV	SPECIAL STUDIES	9
V	MISCELLANEOUS	11
APPENDIX		13

CHAPTER I
INTRODUCTION

In previous years the Research Section's financing, budget, and other overhead expenses were all provided under one project, unless a particular activity was directly chargeable to another on-going research study. That scheme of operation did not provide flexibility of transfer of funds from one project to another nor to initiation of special study projects without Research and Development Committee action. Internal study record keeping would be required to categorize the various charges or accounts. A decision was made to divide the one project into three projects composed of:

Study 1-10-63-50, "Research Management and Administration"

Study 1-10-77-187, "Demonstration and Field Test Support"

Study 1-10-77-192, "Implementation and Special Experimental
Projects"

Upon this decision, research study 192 was created.

The Implementation Subsection organization, i.e. study 192 personnel, as it appeared from September 1, 1976 to July 31, 1977 and as reorganized August 1, 1977 may be found in the APPENDIX.

CHAPTER II
TECHNOLOGY TRANSFER

2.1 Research Reporter

In March 1974 a newsletter entitled "The Research Reporter" was initiated by the Research Section. The requirement for subject matter of "Reporters" was that it be proven items that are ready for implementation. The article would be short, preferably with photographs and usually deal with only one subject. The task of locating subjects, preparing, publishing and distributing the "Reporters" was delegated to project 192 when it began. During the report period eleven official Reporters were published and one special Christmas season's greetings. Following is a listing of those eleven official Reporters.

<u>Reporter No.</u>	<u>Title</u>	<u>Date</u>
9-76	"POLYMER IMPREGNATION OF EXISTING BRIDGE DECKS"	September 1976
10-76	"TURN-DOWN END GUARD FENCE DESIGN TESTS"	September 1976
11-76	"PLASTIC ATTENUATOR FATIGUE TESTS"	September 1976
12-76	"THIN POLYMER CONCRETE REPAIR"	November 1976
13-76	"AN OPERATIONS GUIDE FOR SIGNALIZED INTERSECTIONS"	November 1976
1-77	"HIGHWAY NOISE ATTENUATION"	January 1977

<u>Reporter No.</u>	<u>Title</u>	<u>Date</u>
2-77	"TEMPORARY FLEXBEAM BARRICADES FOR USE AT CONSTRUCTION SITES"	March 1977
3-77	"FLY ASH AS A CONSTRUCTION MATERIAL FOR HIGHWAYS"	April 1977
4-77	"SPRINKLE TREATMENT"	May 1977
5-77	"WATER IN PAVEMENTS - A SEVERE STRUCTURAL PROBLEM RESULTING IN DIFFICULT MAINTENANCE PROCEDURES"	June 1977
6-77	"INFORMATION SOURCE FOR ASSISTANCE WITH TECHNICAL PROBLEMS"	July 1977

A Reporter is prepared and published as suitable subjects are located. No set time schedule is established. A typical Research Reporter is in the APPENDIX.

2.2 Experimental Project Reports

Administrative Order 11-75, Product Evaluation and Experimental Projects, May 15, 1975, and later supplementing correspondence of May 27, 1975 placed the requirement for publishing experimental projects reports prepared by the districts with the Transportation Planning Division. During the reporting period, four reports have been published and two are currently at the printers. Following is a listing of those reports.

<u>Report No.</u>	<u>Title</u>	<u>Date</u>
622-1	✓ "AMORPHOUS POLYPROPYLENE AS AN ASPHALT ADDITIVE"	September 1976
623-1	✓ "EXPERIMENTAL TRANSVERSE TINE FINISH ON CONTINUOUSLY REINFORCED CONCRETE PAVEMENT"	November 1976

<u>Report No.</u>	<u>Title</u>	<u>Date</u>
602-3	✓ "OPEN GRADED ASPHALT FRICTION COURSE"	December 1976
602-4	✓ "PLANT MIX SEAL IN DISTRICT 3"	January 1977
624-1	✓ "AN EXPERIMENTAL SEAL OF POROUS PAVEMENT ON IH 35 USING NOCOR 690"	Pending
606-2	✓ " A SURVEY OF REFLECTIVE CRACK RETARDATION BY FABRIC MATERIALS IN TEXAS"	Pending

Experimental project reports are prepared by the district who performed the experiment. The Implementation Subsection furnishes assistance as desired during the conduct of the experiment and preparation of the report. These reports are usually not technical. Later evaluations of the work are published to update the original report.

2.3 Report Review

In the conduct of study 192 every research report received by the Research Section is reviewed by study personnel. This review is oriented toward locating implementable material and subjects which appear to be of interest to others within SDH&PT. A prepared form which appears in the APPENDIX is used in this review of departmental research reports. When such items are located, they are called to the attention of and the reports made available to the interested persons. A review form was designed and is used for this purpose. These referrals are in most cases done informally with buck slips and no accurate record kept; however, they

would be too numerous to list as they are an almost daily occurrence.

Study personnel have also designed a form to be completed by other reviewers who request reports from SDH&PT Research Section. Over 5200 reports were sent out on request this year. The completed form gives us information as to why the report was requested, if it satisfied his requirements, whether the material would be implemented, deficiencies in the report and who else might be interested in the material. Copies are then made available to those deemed interested. Copy of the form may be viewed in the APPENDIX.

2.4 Field Liaison

Each division and district has appointed a research liaison person. Study personnel contact that representative regarding research matters. Research distribution is normally sent through that person. Study personnel periodically telephone each of the contact men and discuss research findings, problem areas the district may have and coordination of research activities. Study personnel make field visits to experimental projects. During the study period numerous visits and field inspections have been made by study personnel to all districts except Districts 1, 3, 6, 10, 18, 19 and 22. Contacts with those districts have been via telephone or in connection with conferences held at other locations.

2.5 Information Search

Periodically requests for information on research subjects are received from divisions, districts and other agencies. Requests are both verbal and by letter. Project personnel search reports and available literature for material to assist the inquirer. Assistance is given to materials, specifications and design. Attenuator design and installation, median barrier and guardfence items and other related safety devices are areas in which project personnel have been quite active.

CHAPTER III

IMPLEMENTATION

Implementation is a slow process. It often takes many years for favorable research results to achieve wide acceptance and use. The usual pattern is that one or possibly a few more districts will try the results. The other districts will wait and possibly observe the experimenters' activities and see what long term field evaluation produces. Where the findings are obviously cheaper, simpler and readily usable, they are more likely to be put into practice more quickly. Where the initial cost is greater, construction difficult or complicated and the potential for savings is from reduced maintenance over a long period the field is less likely to rush to embrace it. Economics has been a formidable factor this past year.

During the report period concentration for implementation by study personnel has centered on these features.

1. Polymer impregnation of new bridge decks.
2. Polymer concrete repair of damaged concrete structures and concrete pavement.
3. Sprinkle treatment of hot-mix asphaltic concrete pavement.
4. Median barriers and turned-down-end guard fence.
5. Sand tire, steel barrel and plastic attenuators.

6. Transverse tine finish of concrete pavement.
7. Use of rubber in asphalt for both sealing and prevention of cracks and stress relieving inner layer with asphaltic concrete pavement.
8. Use of fabric materials as reinforcement for ACP overlays to reduce reflective cracking and provide a better water barrier seal.
9. All types of asphaltic mixture recycling has been promoted from cold-inplace, to hot through a hot-mix plant to surface recycling.

Generally, research involving structures and traffic management and control are readily implemented by the Bridge Division and Maintenance Division respectively without involvement of project 192 personnel. Even though SDH&PT functions basically under the decentralized concept, the Bridge Engineer and the Traffic Engineer provide rather firm directives for the field to comply with in bridge design and construction and in traffic handling and control matters. This leaves the field of pavements, bases, subbases, embankments, geometrics, maintenance, safety devices, etc., of more direct concern in Study 192.

CHAPTER IV
SPECIAL EXPERIMENTAL STUDIES

Two special studies were undertaken this year. The studies are complete and reports which will be published in the coming year are being prepared.

4.1 An Analysis of Various Work Time Scheduling

A study of 4-day workweek, fixed time, staggered working hours, variable work time and flexitime was initiated in December 1976. The study was basically a literature search with personal interviews with persons or firms operating under one of these concepts. This study has been performed entirely by the study technician as a part-time activity in conjunction with his other duties.

The draft report of this study is approximately seventy-five percent complete as of this writing and will be published early in the coming fiscal year.

From the study results, it appears that the department could benefit by increased productivity, less lost time from personnel absences, better personnel relations or more satisfied personnel, energy conservation and reduced traffic congestion by implementing a ten-hour, four-day workweek.

4.2 Partial-Depth Bridge Deck Replacement

District 14, Austin, Texas, maintenance forces performed a partial-depth bridge deck replacement of the U.S. 281, Pedernales River Bridge

near Johnson City. This bridge is 28' X 681' and the partial-depth deck replacement was a major undertaking requiring round-the-clock traffic control over a 5-6 week construction period. The repair included a full-depth polymer concrete repair 7' X 10' and the remainder of the bridge deck was removed to below the top mat of steel and replaced with low-slump, high early strength, dense Portland cement concrete. The Maintenance Engineer stated, "We believe the material and method of construction are unique, at least for our State, and are worthy of record and distribution to other districts and possibly other states."

Study engineers have prepared a slide-tape presentation, a movie with sound script and are preparing a comprehensive report of this important repair procedure. These will be published and distributed early in the coming fiscal year.

CHAPTER V
MISCELLANEOUS

5.1 Research Section Correspondence

Study 192 engineers handle much or most of the Research Section's correspondence relative to technical or engineering matters. A brief check of the files reveals 56 letters, memorandums or documents prepared for the brief period from May 1, 1977 to July 31, 1977. This is a typical volume of this activity. Often this correspondence involved considerable search of files for information, data or reports to competently prepare the required paper.

5.2 NCHRP Quarterly Reports and Ballots

One function of Study 192 is to review NCHRP quarterly reports, distribute them to interested or affected divisions, gather their comments and prepare correspondence to NCHRP for the SDH&PT Engineer-Director relative to the various studies' progresses. This is done four times annually. There are currently twenty NCHRP studies being conducted and three alternate studies are programmed.

During the report year ballots for the FY '79 NCHRP Program were processed. In the initial review there were 14 continuing problem statements and 64 new problem statements or a total of 78 to be considered. The processing entails having the interested division review, rate by priority and provide a short position statement supporting the ratings and returning to NCHRP.

5.3 Field Tests

Project personnel attend field tests when held in the State field districts, TTI, Southwest Research Center or Center for Highway Research.

5.4 FHWA Demonstrations

Demonstrations are arranged for by project 192 personnel. During the past year the following demonstrations were held:

Demonstration Project No. 42, "Seminar on Highway Quality Assurance, Process Control and Acceptance Plans"

Demonstration Project No. 17, "Prestressed Concrete Pavement Construction"

Demonstration Project No. 39, "Recycling Asphalt Pavements"

5.5 Other

Members of project 192 attend and participate in meetings and seminars as the annual SDH&PT Regional Maintenance Conferences, Laboratory Conferences, Highway Short Course, and Area Research Meetings. They often are on the program agenda, presenting formal papers. They act as departmental contact representatives on several other projects of the Cooperative Research Program. As experimental project coordinators, they monitor and maintain forms for Category II experimental projects.

A P P E N D I X