

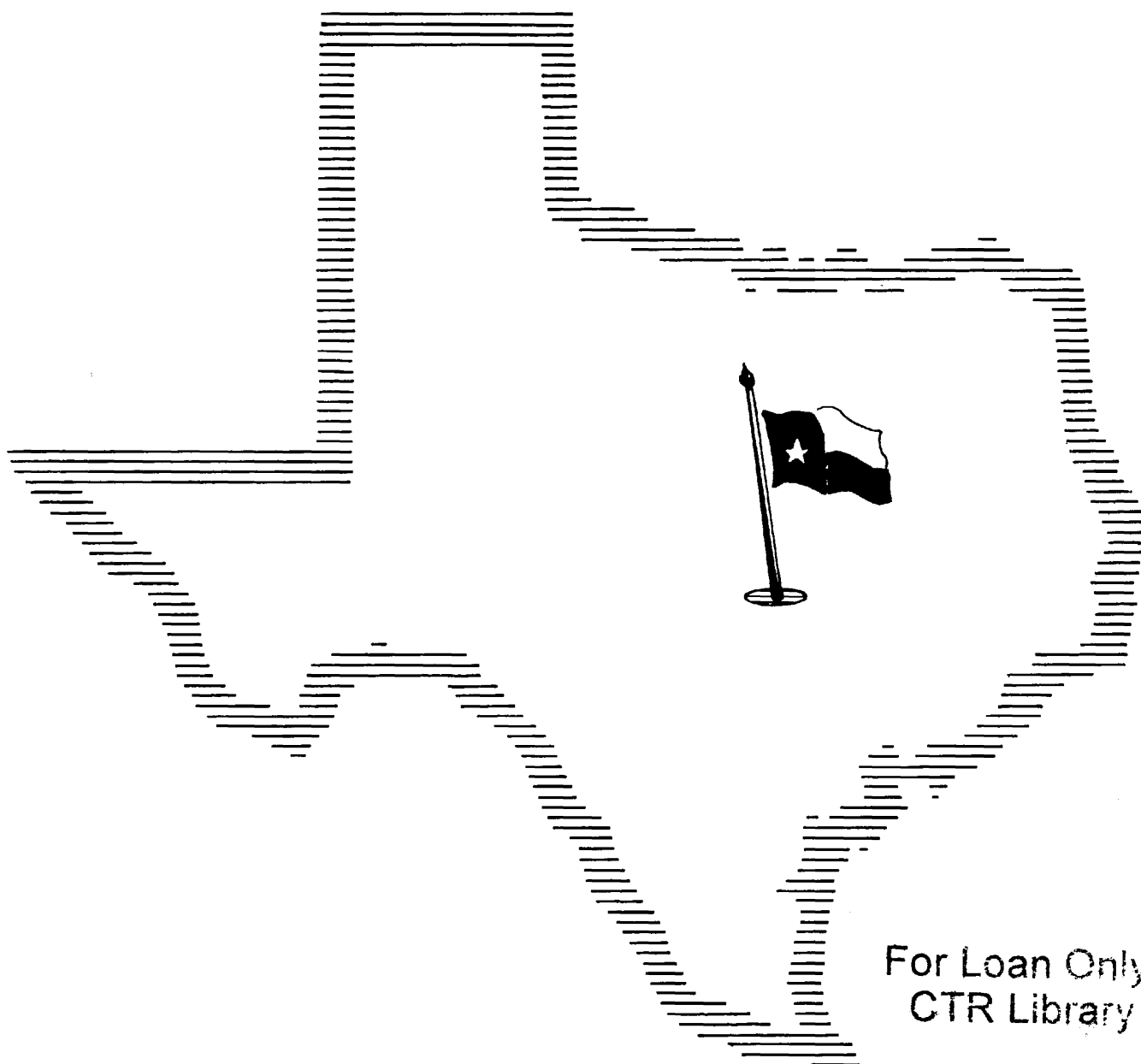
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**STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION
1985**

TRANSPORTATION PLANNING DIVISION
RESEARCH AND DEVELOPMENT SECTION

MANUAL OF PROCEDURES FOR
RESEARCH STUDIES

Research and Technical Studies Conducted for
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
in cooperation with
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
and
URBAN MASS TRANSPORTATION ADMINISTRATION

January 1, 1985

AUG 31 2012

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I. INTRODUCTION AND DEFINITIONS

A. Purpose of Manual

The purpose of this manual is to provide guidance for the administration and operation of the Cooperative Highway Research Program conducted between the Texas State Department of Highways and Public Transportation, various universities, and the Federal Highway Administration.

B. Authority for Research

1. 23 U.S.C. 307(c)

"Not to exceed 1 1/2 per centum of the sums apportioned for each fiscal year beginning with fiscal year 1974 to any State under section 104 of this title shall be available for expenditure upon request of the State Highway Department with the approval of the Secretary, with or without State funds, for engineering and economic surveys and investigations; for the planning of future highway programs and local public transportation systems and for planning for the financing thereof; for studies of the economy, safety, and convenience of highway usage and the desirable regulation and equitable taxation thereof; and for research and development, necessary in connection with the planning, design, construction and maintenance of highways and highway systems, and the regulation and taxation of their use."

2. V.T.C.S. Article 6671 "Laboratories"

"The laboratories maintained at the Agricultural and Mechanical College of Texas and at the University of Texas shall be at the disposal and direction of the Highway Engineer for the purpose of testing and analyzing road and bridge material, and those in charge of said laboratories shall co-operate with and assist said Engineer to that end"

3. V.T.C.S. Article 85.29 "Research and Experimentation for Highway Department"

"The State comptroller of public accounts may draw proper warrants in favor of any part of the university system....for services rendered by the staff of the system to the State Highway Department and for equipment and materials necessary for research and experimentation in all phases of highway activity....."

4. Minute Order 25396

"...Resolved, that the proposal of the Texas Agricultural and Mechanical College system is hereby accepted and said system with its component parts is hereby designated as the State agency to do highway research for and on behalf of the State of Texas and the State Highway Department as hereinafter provided....."

5. V.T.C.S. Article 67.24 "Research and Experimentation for Highway Department"
"The State comptroller of public accounts may draw proper warrants in favor of the University....for services rendered by members of the staff of the university system to the State Highway Department and for equipment and materials necessary for research and experimentation in all phases of highway activity....."
6. Minute Order 52742
"Be it resolved that the State Highway Engineer be authorized to enter into agreement with such other qualified Texas schools and Universities under the general terms as outlined in Minute Order No. 25396 for such research studies as determined to be in the best interest of the Texas Highway Department."

C. Terms and Definitions

1. Annual Cooperative Highway Research Program Agreement.
An annual contract between the Research Agency and the Department which activates the approved studies under the terms of the Cooperative Research Agreement.
2. Area Advisory Committee.
The advisory committee for matters pertaining to the specific Cooperative Highway Research studies assigned in a program area. The committee is composed of representatives from throughout the Department with expertise in the appropriate research program area.
3. Area Advisory Council.
A Council composed of the Chairmen of the Area Advisory Committees who function to advise the Research & Development Committee as to research priorities and provide suggestions for guidance of ongoing research studies.
4. Area Coordinator.
The assistant to the Area Chairman who coordinates Area activities.
5. Cooperative Research Agreement
The basic contract under which studies are conducted on a cooperative basis between the Department and the Research Agency.
6. Demonstration Study.
A study designed to apply research study results on an actual demonstration basis to show their value and applicability to familiarize field personnel concerned.

7. Department.
The State Department of Highways and Public Transportation.
(Formerly the Texas Highway Department)
8. Departmental Research Program.
A program consisting of individual studies performed within the Department and activated by the approval of the Engineer-Director on a fiscal year basis.
9. Direct Cost.
Expenses which include, but are not limited to, salaries, wages, travel, supplies, services, reproduction, equipment, and equipment rental.
10. Engineer of Research and Development.
The individual who carries out the directives of the State Transportation Planning Engineer. He is a staff member of D-10 and serves as the Secretary to the Research and Development Committee.
11. Fiscal Year.
A twelve-month period beginning September 1 and ending August 31.
12. Indirect Cost.
Cost covering clerical, accounting, bookkeeping, ordering and other similar services rendered to the study for which no charge is made elsewhere in the agreement. The charges cannot be in excess of 10% of all reimbursable expenses incurred, and are not applicable for the services of consulting personnel.
13. Records.
The official papers or evidence that describe the study findings, data taken, work-time spent, monies expended, etc.
14. Research Agency
Any agency that has entered into a signed agreement with the Department to do planning, research, development, demonstration, or technical studies.
15. Research and Development Committee.
The Committee appointed by the Engineer-Director to recommend policy and the annual program to the Research Administrative Review committee and direct the Cooperative Research Program of the Department.
16. Research Administrative Review Committee.
The committee, appointed by the Engineer-Director and composed of the Deputy Directors, which recommends the annual research program, and research policy, to the Engineer-Director.

17. Research Study.
An individual investigation having the limited aim of confirming a specific theory, supplying the design or data needed to complete a task, or researching a study objective.
18. State Transportation Planning Engineer.
The Engineer appointed by the Engineer-Director to administer the Cooperative Research Program of the Department
19. Study Agreement.
The executed Study Proposal/Modification/Continuation (upon execution by the Research Agency and the Department) for each individual study under the Cooperative Research Agreement. The Study Agreement shall become a part of the Annual Cooperative Research Program Agreement.
20. Study Budget.
The total money required for the accomplishment of a specific study for a specified period of time.
21. Study Contact Individual.
The Departmental representative charged with guiding and monitoring a research study.
22. Study Proposal/Modification/Continuation.
A document submitted by the Research Agency or by the Department outlining the initiation, modification or continuation of a study.
23. Study Supervisor.
The principal investigator in charge of a study.
24. Work Plan.
The section of the Study Proposal/Modification/Continuation which contains the detailed description of methods and/or procedures which will be used to conduct the study.

II. ORGANIZATION AND RESPONSIBILITIES

This chapter explains the organization and responsibilities of the various committees and individuals that are required to administer and operate the Cooperative Highway Research Program. The responsibilities of each individual or committee within the organization are spelled out with the understanding that additional duties may be assigned when necessary by the Engineer-Director.

A. Research Administrative Review Committee

1. This committee is composed of the Deputy Directors.
2. The committee reviews the annual research program, or research policies, recommended by the Research and Development Committee and recommends action to the Engineer-Director.

B. Research and Development Committee

1. The members of the Research and Development Committee are appointed by the Engineer-Director.
2. Responsibilities
 - a. To provide policy and direction to the Department's Research Program.
 - b. To recommend the final Research & Development Program for approval by the Research Administrative Review Committee and the Engineer-Director each fiscal year, taking into consideration recommendations received from the Area Advisory Council.

C. State Transportation Planning Engineer, Transportation Planning Division

1. The Engineer appointed by the Engineer-Director to direct the Cooperative Research Program of the Department and function as the chairman of the Research & Development Committee.
2. Responsibilities
 - a. To conduct the research, funding, reporting and development of the recommended annual Research Program for approval by the Research & Development Committee.
 - b. To secure and disseminate information, monitor all research activities and promote implementation of research results to the optimum extent.

D. Engineer of Research and Development

1. The Engineer of Research and Development functions as

secretary of the Research and Development Committee, as an ex-officio member of each Area Advisory Committee and is responsible to State Transportation Planning Engineer for overall supervision and management of the Research and Development Section.

2. Responsibilities

- a. To carry out the functions as directed by the State Transportation Planning Engineer.
- b. To coordinate the Research and Development Program with the Federal Highway Administration, other agencies, and the Department.
- c. To review, approve and distribute study reports.
- d. To recommend implementation of research study results.
- e. To recommend demonstration studies.
- f. In conjunction with the Area Committee Chairmen and the Area Coordinators, to call meetings of the Area Advisory Committees when the need arises.
- g. To direct the Technology Transfer program for the Department.
- h. To direct the administration and operation of the Research and Development Section.

E. Area Advisory Committee

1. Organization

Each of the five Area Advisory Committees is composed of Department personnel and consists of a chairman, appointed by the Engineer-Director, an area coordinator, and members. The number of members will vary in accordance with the needs of the study area concerned. They will be selected from those Districts and Divisions having expertise in the appropriate Research Program Area.

2. Responsibilities

- a. To function as an advisory committee for the studies assigned to the area.
- b. To anticipate and recommend research needs in the assigned area of responsibility.
- c. To assist in the dissemination and application of study findings.

F. Area Advisory Council

1. The Area Advisory Council is composed of the chairmen of the five Area Advisory Committees.

2. Responsibilities

To function in an advisory capacity to the Research & Development Committee in recommending research program needs, providing suggestions for guidance of on-going research studies, and encouraging implementation of research results.

G. Area Coordinator

1. The Area Coordinator is a member of the Area Advisory Committee.
2. Responsibilities
 - a. To function as secretary to the Area Advisory Committee.
 - b. To express the wishes of the Area Advisory Committee in regard to Area studies within the scope of the committee.
 - c. To recommend appropriate application of Area research results to Departmental specifications, standards, techniques, etc.
 - d. To coordinate with the Area Committee members, contact individuals, study supervisors, and the Engineer of Research and Development.
 - e. In conjunction with the committee chairman, to call meetings of the Area Advisory Committee.

H. Study Contact Individual

1. The Study Contact Individual is appointed by the Division sponsoring a specific study.
2. Responsibilities
 - a. Represents the Division's interest in the project.
 - b. In coordination with the Assistant Contact Individual(s), reviews and recommends (to D-10 via the Division Head) appropriate action (approval, revision, disapproval) on project agreements.
 - c. In coordination with the assistant contact individual(s), reviews and recommends (to D-10 via Division Head) appropriate action (approval, revision, disapproval) on draft research reports.
 - d. Maintains a close monitoring of the project to insure that it is proceeding according to the work plan, and meets with the project supervisor when appropriate. The meeting time and place shall be reported in advance to D-10 and to the assistant contact individuals. D-10 will advise FHWA of the meeting.
 - e. Provides to D-10 a Contact Individuals' Quarterly Report in accordance with the following schedule:

<u>Report Due Date</u>	<u>For Period of</u>
January 15th	September 1 - November 30
April 15th	December 1 - February 29
July 15th	March 1 - May 31
October 15th	June 1 - August 31

- f. Reports to D-10, through Division Head, any changes in the project plan, funding, recommending approval or disapproval. D-10 will coordinate the necessary modification of the agreement with the Research Agency, FHWA, and the Contact Division.

- g. Insures that the project results are implemented to the maximum extent, and prepares the required FHWA implementation report at designated intervals.

I. Assistant Contact Individual

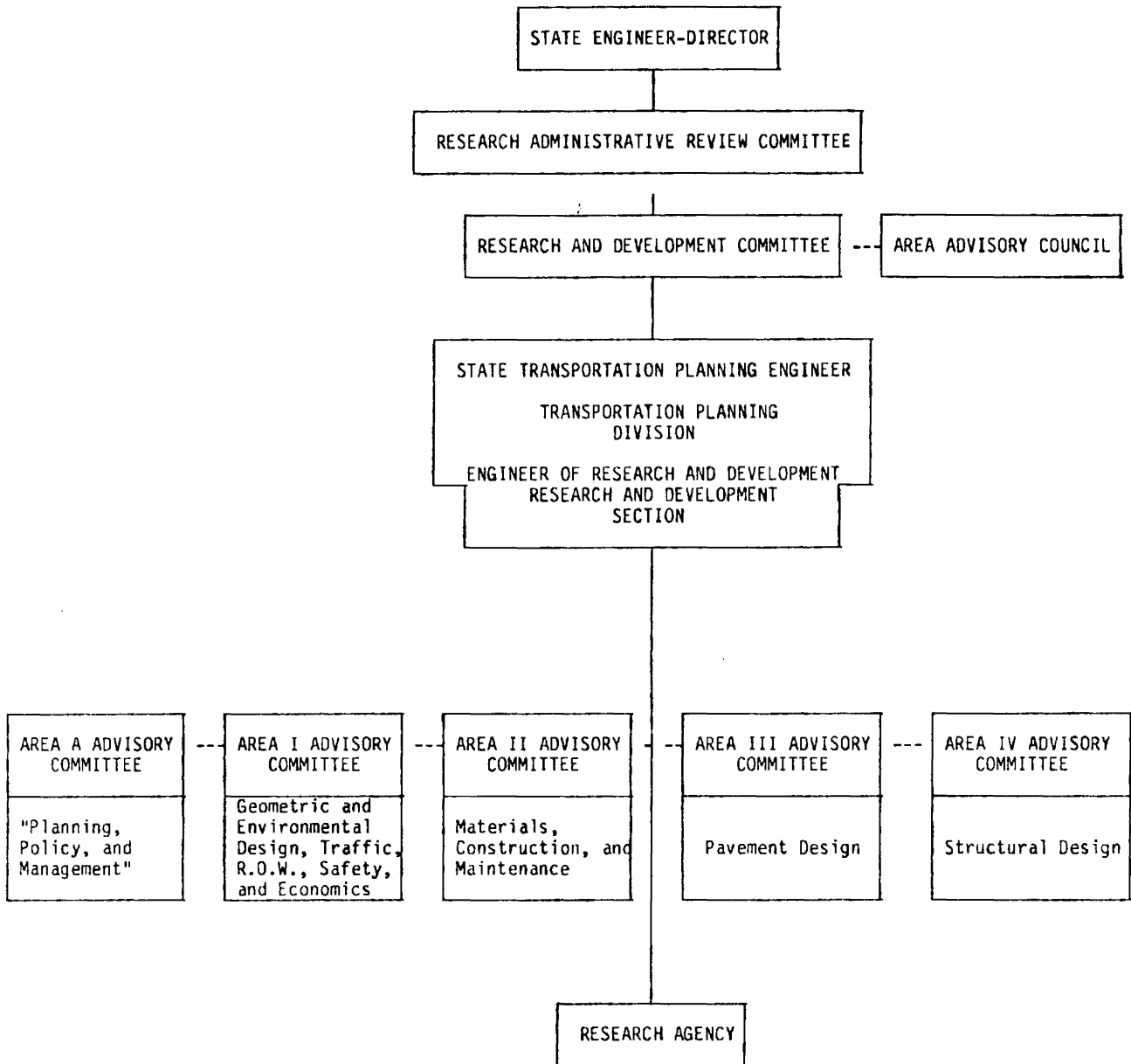
- 1. The Assistant Contact Individual is appointed by his Division Head.
- 2. Responsibilities
 - a. Represents the Division's interests in the research project.
 - b. Assists and advises the Contact Individual on research report review. Provides review comments to the study contact individual for consolidation and submission to D-10.

J. Study Supervisor

- 1. The Study Supervisor is responsible for the conduct of the study under the direction of the Research Agency.
- 2. Responsibilities
 - a. To conduct the study in accordance with the approved study agreement.
 - b. To direct the personnel working on the study and to conduct the work in accordance with the approved plan of research.
 - c. To maintain a close liaison with the study contact individual.
 - d. To document the study and render required reports.
 - e. To assist as required in the implementation and demonstration of study results.
 - f. To render a quarterly report on research progress in accordance with the following schedule:

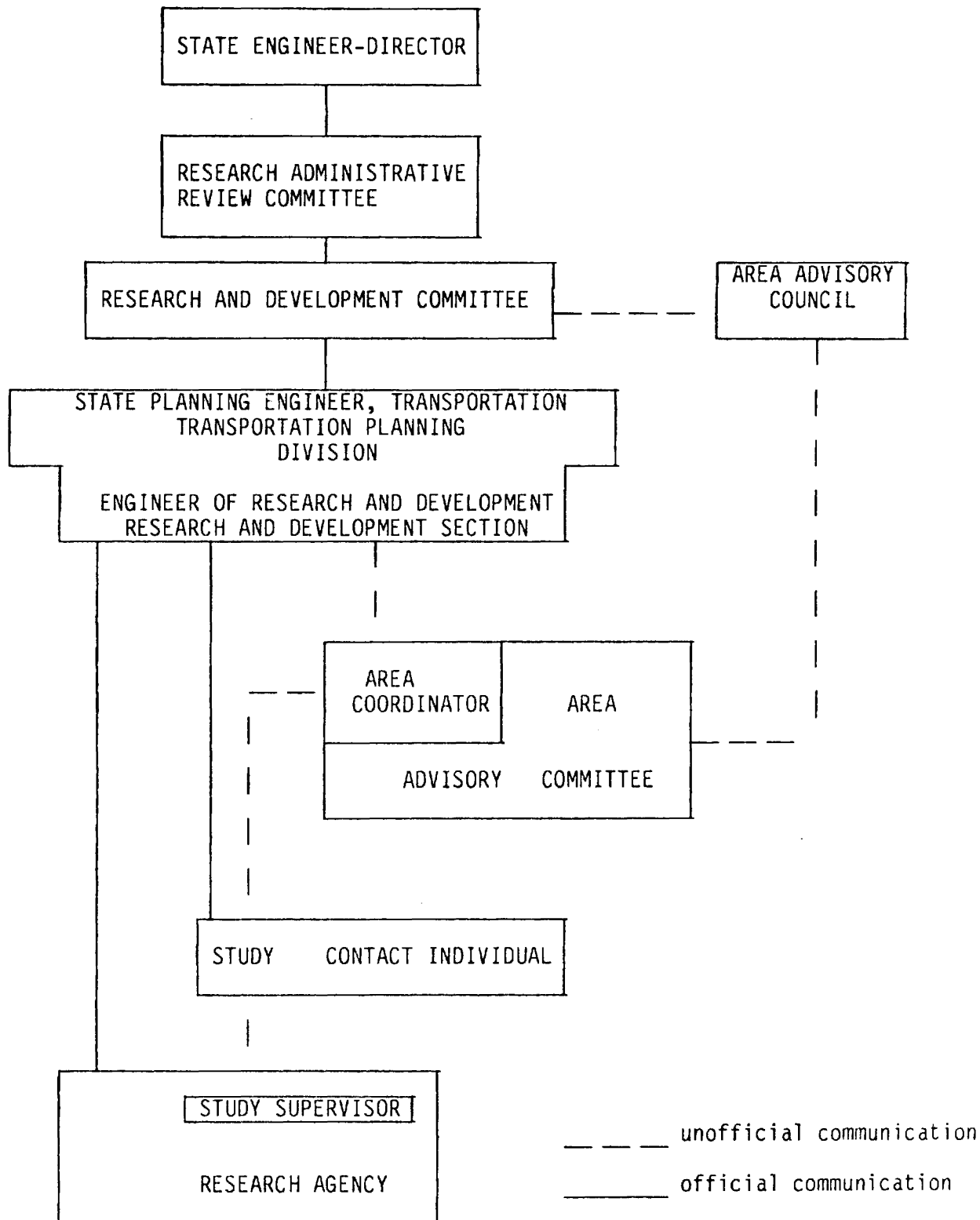
<u>Report Due Date</u>	<u>For Period of</u>
December 10	September 1 - November 30
March 10	December 1 - February 29
June 10	March 1 - May 31
September 10	June 1 - August 31

- g. To report problems, needed work plan changes, or funding needs to the study Contact Individual.



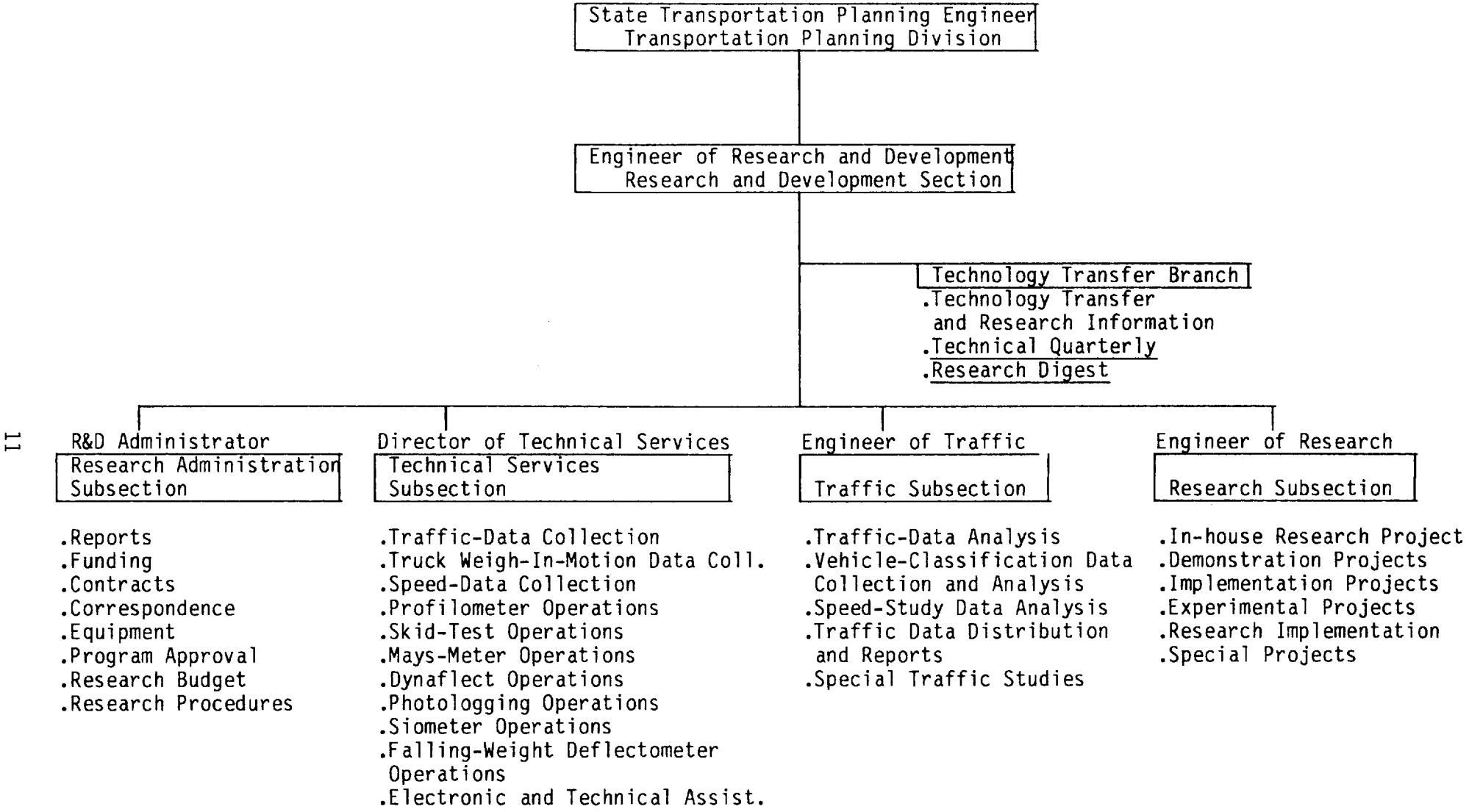
ORGANIZATION AND FLOW CHART
FOR
COOPERATIVE RESEARCH PROGRAM

Figure No. 1



ORGANIZATION AND COMMUNICATION
FLOW CHART FOR RESEARCH PERSONNEL

Figure No. 2



ORGANIZATION CHART

D-10 Research and Development Section

Figure 3

III. ANNUAL RESEARCH PROGRAM FORMULATION

A. General

The Cooperative Highway Research Program of the State Department of Highways and Public Transportation is initiated on an annual basis. Study work plans are approved for one year at a time, and funding does not overlap from one fiscal year to the next. The Department's fiscal year begins on September 1st each year and terminates on August 31st of the next year. Studies approved for activation on September 1st are products of almost a year's preparation, which involves problem statement review and prioritization, review of the resulting proposals which address the higher priority problems, and acceptance of the best proposals for our highest priority research needs.

The following schedule details the annual cycle of research program formulation.

B. Annual Research Program Formulation Schedule

SEPTEMBER 1

- New Fiscal Year (FY) Begins
- All interim and final reports from studies which terminated August 31 are due to D-10R
- Funds are issued on approved studies
- D-10R issues requests for problem statements to all Districts, Divisions, and to the Research Agencies. The request is accompanied by blank 1st-stage statement forms, (see figure 4). The 1st-stage problem statement(s) should be submitted to D-10R by November 15th. Further, projects anticipated at this time to be modified beyond their termination date shall be represented by a 1st-stage problem statement, which describes the project by number and the reasons for the needed extension.

SEPTEMBER 10

- Researchers' quarterly reports for last FY period of June 1 through August 31, are due to D-10R

SEPTEMBER 10 - SEPTEMBER 30

- Area I meeting for reports on terminations and continuations
- Area II meeting for District reports and review of continuations

FIRST-STAGE
RESEARCH PROBLEM STATEMENT

FOR D-10R USE ONLY		
Area No.	Program Year	Statement Number

I. PROBLEM TITLE:

II. PROBLEM STATEMENT:

III. RESEARCH PROPOSED:

IV. POTENTIAL IMPLEMENTATION:

V. SUBMITTED BY:

(Use additional pages if necessary)

Figure 4

OCTOBER

- Area III meeting to report on current projects
- Area A meeting to review continuations
- Area IV meeting to discuss current projects (held with Short Course)

OCTOBER 15

- Contact Individual Quarterly Reports, for last FY period of June 1 through August 31, due to D-10R.

NOVEMBER 1

- Deadline for first round of Area meetings
- A call for continuations is made to research agencies and to the DHT by D-10R.

NOVEMBER 15

- Deadline for submission of 1st-stage problem statements to D-10R

NOVEMBER 15 - FEBRUARY 1

- D-10R receives problem statements and meets with area coordinators to determine appropriate Area Committee to rate each statement. The statements are then given a number which indicates the area, the year, and a specific statement number.
- After the meeting, D-10R sends each Area Chairman a copy of all problem statements. A list of each Area's statements is made available to the other Areas for information and coordination.
- Area Committees receive and prioritize problem statements
 1. The Areas will combine redundant or similar problems to the extent feasible for easier rating by the Area Committees.
 2. Those problem statements of highest priority, which are to be presented to the R&D Committee by the Area Chairmen, shall be expanded by the Area to the

extent necessary to enable the R&D Committee to have adequate knowledge of the research proposed and its anticipated implementation. This "second-stage" problem statement development shall be coordinated with the original submitter of the 1st-stage statement(s) involved and the appropriate Austin office Division.

- Copies of all 2nd-stage problem statements (see Figure 5) are provided by the Areas to D-10R no later than 10 days prior to the February joint R & D committee/Area Council meeting. D-10R assigns each 2nd-stage statement a number for reference purposes, and advises the Areas of reference numbers assigned.
- Area committees develop recommendations for project modifications and terminations. Area coordinators should canvass the Area's Study Contact Individuals to insure that all projects known to need modification for extension are identified. Each of those projects found in need of modification are represented by a 1st-stage statement which is submitted through the Area Committee priority process, and if selected in the top 20, is transformed into a 2nd-stage statement.

Those identified too late for the Area process should be submitted via the Study Contact Individual's Division Head for endorsement.

NOVEMBER 30

- Researcher's and study contact individuals should begin work on first study quarterly reports due December 10th and January 15th respectively.

DECEMBER 10

- Researcher's quarterly reports for the period September 1 through November 30 are due to D-10R.

JANUARY

- Area II meeting to discuss study implementation and to prioritize problem statements

JANUARY 15

- Study contact individuals' quarterly reports for the period September 1 through November 30 are due to D-10R.

SECOND-STAGE
RESEARCH PROBLEM STATEMENT

FOR D-10R USE ONLY			
Area No.	Program Year	2nd-Stage	2nd-Stage Statement No.
		S	

I. PROBLEM TITLE:

II. PROBLEM STATEMENT:

III. RESEARCH PROPOSED:

IV. POTENTIAL IMPLEMENTATION:

V. SUBMITTED BY:

1st-stage statements incorporated into this 2nd-stage statement								
Area No.	Program Year	1st Stage Statement No.	Area No.	Program Year	1st Stage Statement No.	Area No.	Program Year	1st Stage Statement No.

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Figure 5

FEBRUARY 1

- Deadline for receipt of continuations in D-10R

FEBRUARY 5 (or 10 days prior to February R D meeting date)

- The Area's second-stage priorities are due, to D-10R, from the Area Chairmen. The area recommendation shall consist of a listing of the highest priority problem statements (not to exceed 20) divided into the categories: "essential", "desirable", and "informational", (see Figure 6). Also, copies of all second-stage problem statements not previously provided, and recommendations for modifications and terminations, shall accompany the Area's priority submission.
- D-10R sends continuations, prioritized second-stage problem statements, and modification and termination recommendations to the R & D Committee and respective Area chairmen.
- Research agencies are provided copies of the priority problem statements from the Areas for informational purposes only.

FEBRUARY 1 - FEBRUARY 15

- Area A meeting to review new projects and modifications

FEBRUARY 15 - Joint R&D Committee/Area Council Meeting:

1. Problem statements are reviewed and priority research needs are identified for submission to the research agencies. A time limit for the study is recommended on each priority statement as appropriate. Further, a Departmental contact individual is appointed for each priority statement to coordinate proposal development with the researcher.
 2. Continuations are reviewed. Continuations needing minor revisions are identified and returned to the research agency for appropriate action. Decisions are made concerning the changing of continuations into modifications to include new objectives from problem statements just submitted. These "modifications" are identified for later submission with proposals.
 3. Studies to terminate are identified.
 4. On-going studies, recommended for modification (to be extended for another year, etc.) by the Contact Division, are identified.
- A call for proposals and modifications is made by D-10R.

PROBLEM STATEMENT

PRIORITY SUBMISSION GUIDE

Area _____ FY _____

The Area priority submission to the RD committee should follow this format. It is recommended that each Area submit no more than twenty (20) statements for RD Committee review:

	PRIORITY	TITLE
ESSENTIAL		
DESIRABLE		
INFORMATIONAL		

Figure 6

FEBRUARY 15 - APRIL 1

- Research agencies make required minor revisions to continuations and return them to D-10R as soon as possible.
- Research agencies prepare proposals and modifications maintaining close liaison with the identified Study Contact Individual. The person or persons submitting the problem statement should be consulted in this endeavor by the Study Contact Individual.
- Continuations are sent to FHWA, by D-10R, for review and approval.

FEBRUARY 29

- Researchers and Study Contact Individuals should begin work on second quarterly reports due March 10th and April 15th respectively.

MARCH

- Area I meeting to report on new projects.

MARCH 10

- Researchers' quarterly reports for the period December 1 through February 29 are due to D-10R.

APRIL 1

- Deadline for receipt of proposals/modifications from project supervisors.

APRIL 1 - MAY 15

- D-10R assures tie-in between proposal/modification and problem statement(s)
- Proposals/modifications are sent to the contact division for review. After contact division approval, proposals/modifications are sent to the remainder of the R&D Committee for approval.
- Revisions to proposals/modifications are made based upon review comments. An attempt is made to resolve most problems prior to the R&D Committee meeting.
- Information on tentatively approved proposals and modifications is made available to the research agencies for planning purposes with the understanding that neither Departmental nor FHWA final approval is guaranteed.

APRIL 15

- Study Contact Individuals' Quarterly Reports for the period December 1 through February 29 are due to D-10R.

APRIL

- Meeting between Research Agencies and RD Committee/Area Council to discuss improvements/problems/successes in research program.

MAY 15 - R&D Committee Meeting

1. Proposals/modifications are reviewed.
2. Research program for next fiscal year is recommended for Administration approval. Funds are included for urgent problems which arise during the year, and for "quick-action" projects requested by R&D Committee.
3. Program policies and procedures are reviewed on a need basis, especially regarding previous April meeting with Research Agencies and Area chairmen.

MAY 15 - JUNE 1

- Approved proposals/modifications sent to FHWA for review.
- Remaining problems with proposals/modifications resolved.

May 31

- Researchers and Study Contact Individuals should begin work on third quarterly reports due June 10th and July 15th respectively.

JUNE 1

- Deadline for finalization of program and submission to FHWA

JUNE

- Area IV meeting to discuss on-going research (emphasis on new projects)

JUNE 1 - AUGUST 31

- FHWA reviews program. FHWA review comments are provided to contact division and research agency for information and action.

- Annual Cooperative Highway Research Program Agreements between the Department and the research agencies are signed.
- Signed study proposals/modifications/continuations are sent to the research agency and the Study Contact and Assistant Contact personnel for their reference during the year.
- Contact personnel are advised by tech memo of their responsibilities on their projects.

JUNE 10

- Researchers quarterly reports for the period March 1 through May 31 are due to D-10R.

JULY 15

- Study Contact Individuals' quarterly reports for the period March 1 through May 31 are due to D-10R.

AUGUST 31

- Researchers and Study Contact Individuals should begin work on fourth quarterly reports due on September 10th and October 15th respectively.

SEPTEMBER 1

- New fiscal year begins.
- Funds are issued on approved studies.
- All interim and final reports from studies terminating August 31 are due to D-10R
- D-10R issues requests for problem statements.

C. Procedure for Handling and Funding Projects from Research Contingency Funds

1. Definition: Research Contingency Funds - monies set aside at the beginning of a fiscal year by D-10 to fund projects which are deemed necessary for immediate commencement but were not anticipated during the program approval process. The funds may be used, however, for any legitimate research purpose, as approved by the R&D Committee, such as:

- a. Funding of projects, deemed desirable by the R&D Committee, for which funding is not available in the basic research budget.
- b. Funding of individual project overruns or funding increases subject to the required R&D Committee and FHWA approval.

2. Procedure

- a. A ledger shall be prepared by D-10, entitled "Research Contingency Funds", which shall indicate available research contingency funds in D-10's budget. This ledger shall be made available to the R&D Committee at the annual program approval meeting in May.
- b. At the May meeting, after the available research funds are allocated, the R&D Committee shall determine if any projects which are unfunded are of sufficient importance to fund from contingency funds. The contingency account will be debited accordingly. The R&D Committee will then determine which projects are worthy of funding should additional funds become available. D-10 will prepare a list of these projects entitled "Projects Pending Availability of Funding".
- c. After the program is finalized, any late projects seeking funding shall be submitted to the contact division by D-10 for recommendation. The contact division shall be provided a copy of the latest "Research Contingency Funds" ledger, and the latest "Projects Pending Availability of Funding".
- d. The contact division shall consider the late project in view of available contingency funding and those projects already approved but pending additional funds. The contact Division shall prepare a memo to D-10, outlining in sufficient detail the need for the project, funding requirements, and:
 - (1) Recommending that the project be approved, and commenced, utilizing contingency funds
 - (2) Recommending that the project be added to the list of projects approved pending available funding

- (3) Recommending that the project be considered the following year as high priority
 - (4) Recommending that the project be submitted through the normal Area review process the next year, or
 - (5) Recommending disapproval.
- e. If the contact division response is (1 above) D-10 will send the agreement, with the contact division's recommendation, to the remainder of the R&D Committee for approval. The project shall be debited to the "Research Contingency Funds" ledger and the ledger shall accompany the submission of the project to the R&D Committee. Should the project be disapproved by the R&D Committee, the funds shall be credited back to the ledger.
 - f. If the contact division response is (2), D-10 will send the agreement to the R & D Committee for approval. If approved, the project will be added to the list of projects pending funding.
 - g. If the contact division response, is (3), D-10 will consider the project as a submission for the following year's program. The appropriate Area will be advised of the project, but the project will not be prioritized by the Area committee.
 - h. If the contact division response is (4), the contact division will be responsible for submitting the required 1st-stage problem statement for the next fiscal year.
 - i. If the contact division response is (5), there will be no further consideration of the project.
 - j. When a funded project is cancelled, these funds shall be credited to the "Research Contingency Funds" ledger. The ledger shall then be circulated to the R&D Committee with the list of "Projects Pending Availability of Funding". R&D Committee members may then recommend commencement of one or more of these projects utilizing the available funding. The recommendations will be compiled and submitted to the entire R&D Committee for approval.

IV. THE STUDY PROPOSAL/MODIFICATION/CONTINUATION

A. General

Each study accepted into the Department's yearly program must be represented by a study proposal, modification or continuation agreement.

Study proposals may be submitted by the Research Agency or the Department to the State Transportation Planning Engineer, any time during the year as a need arises. Normally, proposals are generated in answer to problem statements which have been accepted as high priority by the Department; therefore, it is recommended that proposals be submitted in accordance with the annual research program formulation schedule. (See Chapter III). The cost of preparing the proposal will be borne by the submitting agency.

Following is a discussion of the various parts of the proposal. (The modification and continuation are discussed in sections C and D respectively). It should be remembered that certain study proposals may require information which has not been anticipated in the following discussion.

B. Discussion of the Parts of the Proposal

1. The Signature Page (see Figure 7)

- a. Heading - The heading should indicate "Proposal".
- b. Fiscal Year - The Department's fiscal year runs from September 1st through August 31st.
- c. Study Type - A study is designated as either Type A or B.
 - (1) Type A Study - The total cost exceeds \$75,000, or more than two years are required for completion. This is a large-scale study which is regional or national in scope.
 - (2) Type B Study - The total cost is \$75,000 or less, or it requires two years or less to complete. This is a small-scale study involving local or regional problems. It can also be an exploratory, survey or feasibility study; an experimental construction study; or an implementation effort.
- d. Study Title - The study title should be a short but descriptive statement of the specific objective of the study. General titles omitting important key words are discouraged and are subject to Departmental change. For example, the title "A Study of Pavement

STUDY PROPOSAL/MODIFICATION/CONTINUATION
AGREEMENT

BETWEEN
STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

AND

(Agency)

For Fiscal Year: 198__-198__ Study Type_____

Study Title: _____

Study Number _____ Federal No. _____
Agency Div.No. Beg.Yr. No.

This is the _____ year of a _____ year study.

Estimated Total Study Cost: \$_____

Expenditures through August 31, 19____ \$_____

Estimated Cost for: September 1, 19____ to August 31, 19____ \$_____

Estimated Additional Cost to Completion of Study: \$_____

Agreement Prepared by: _____ Date: _____

Study Supervisor: _____ Title: _____

Recommended for Approval:

(Official Title-Agency Head) Date: _____

State Transportation Planning Engineer
Transportation Planning Division Date: _____

Date Approved by FHWA

Figure 7

Proposal/Modification/Continuation Agreement Signature Page

Page 1 of ____

Characteristics" is poor because it does not define the type of pavement studied nor the characteristics. A better title may be "A Study of Fatigue Characteristics of Selected Asphalt Pavements".

- e. Study Number - The study number will be supplied by the Department. Study numbers consist of four parts. In this number, 1-10-63-50, the first number from the left (the "1") indicates the agency performing the study, in accordance with an established code.
- 1 = The Department
 - 2 = Texas Transportation Institute
 - 3 = Center for Transportation Research

The second number is the Departmental division responsible for monitoring the study progress, in this case D-10, the Transportation Planning Division. The third number is the year the study began. The fourth number is the definitive study number, assigned on a consecutive basis as the new studies are approved. Once assigned, the definitive study number is never used for another study. This study is referred to as "study 50".

- f. Federal Number - The federal number indicates the FHWA's HPR (Highway Planning and Research) year of funding. This number is supplied by D-10R.
- g. This is the _____ year of a _____-year Study - The first space indicates how many years the study has been active, including the present year being proposed. In the case of a proposal this number will be "one". The second space indicates the researcher's forecast of the total number of years the study will be active. The second number should not be changed, even if the study is modified to extend beyond the originally prescribed time. Thus it is possible for a subsequent modification or continuation to show "5th year of a 3-year study".
- h. Estimated Total Study Cost - The projected total cost for all years the study is to be active.
- i. Expenditures through August 31, 19-- - The total estimated study expenditures from the beginning of the study through the last approved year of activity. (This will be zero on proposals).
- j. Estimated Cost for September 1, 19-- to August 31, 19-- - The total estimated study budget for the fiscal year's work being proposed.
- k. Estimated Additional Cost to Completion of Study - This figure represents the difference between the estimated total study cost, and the total of the amounts indicated in i and j above.

1. Proposal/Renewal Prepared by -----and Date - The name of the person(s) preparing the proposal and the date prepared. If the proposal is revised prior to approval, the date shall represent the latest revision, accompanied by the word "Revised". The original date, and previous revision dates shall be maintained on the cover page.
- m. Study Supervisor and Title - The name and title of the individual responsible for conducting the study and the title of the academic or other position held by the supervisor at the research agency. The study supervisor must provide a biographical data sheet with each study proposal submitted. This should be concise, preferably one page, and relevant to the study concerned. Data sheets are not required on modifications and continuations unless there has been a change of supervisory personnel(See Figure 8).
- n. Signature Space for Agency Head and Date of Signature Below the space provided should appear the signatory's official title and agency affiliation.
- o. Signature Space for the State Transportation Planning Engineer, and Date - This signature is required on all proposals funded from D-10 Funds.
- p. Date approved by FHWA or UMTA - This date is supplied by the Department when FHWA program approval is received.
- q. Page Number - The signature page is always the first page of the agreement. The page numbering will be designated with the specific number of the page followed by the total number of pages in the agreement. If the agreement has ten pages, then the signature page would be designated as "Page 1 of 10"; the next page would be "Page 2 of 10" and so on.

If a page is a revised version of an earlier submission, the word "Revised" and the date revised shall appear next to the page number.
- r. Project Number - It is recommended that the project number be written at the bottom of each page of the proposal.

2. The Itemized Budget Page - (See Figure 9)

Careful consideration should be given to making the individual item cost estimates in order that the total estimates will be as accurate as possible. This procedure will make it possible for money available to be programmed to the best advantage in establishing an overall research program.

RESEARCHER'S BIOGRAPHICAL DATA

NAME :

AGE :

DATE PREPARED :

TITLE :

EDUCATION :

AREA OF SPECIALIZATION :

EXPERIENCE :

PROFESSIONAL LICENSES :

PUBLICATIONS :

OTHER INFORMATION: (i.e., society memberships, honors, patents, etc.)

Researcher's Biographical Data

Figure 8

(F-2-17)

Study Number and Title:

A. Direct Costs

Salaries and Wages

Professional Services (man-yr) _____

Subprofessional and
Technical Services (man-yr) _____

Clerical Services (man-yr) _____

Total Salaries and Wages _____

Expendable Supplies and Misc. Expenses

Goods and Supplies _____

Postage _____

Total Supplies _____

Operating Expenses

Travel _____

Other Operating Costs _____

Total Operating Expenses _____

Equipment Rental (List equipment) _____

Equipment Purchase
(List nonexpendable equipment) _____

Total Equipment Expense _____

Total Direct Cost _____

B. Indirect Costs _____

C. Services and equipment to be provided by the Department

District or Division Testing _____

Equipment Purchase (List equipment) _____

Other (specify) _____

Total Departmental Services _____

Total Study Cost _____

Figure 9

Proposal/Modification/Continuation Itemized Budget Page

- a. Direct Costs - This category includes costs directly attributable to attainment of the study objective. These costs include salaries, travel, supplies, equipment, etc.
- (1) Salaries and Wages - All salaries and wages as well as full or fractional man-year equivalents are required for the following three categories:
 - (a) Professional services
 - (b) Subprofessional and Technical services
 - (c) Clerical services
 - (2) Expendable Supplies and Miscellaneous Expenses - The following items should be included, if applicable:
 - (a) Goods and Supplies - These include office supplies; minor parts and materials; minor equipment; electrical, plumbing and building supplies; computer cards; laboratory supplies; stationary; photographic film; paper and reproduction supplies.
 - (b) Postage
 - (3) Operating Expenses
 - (a) Travel - This includes private car mileage, per diem, public transit fare, etc. - Out-of-State travel must have prior Departmental approval.
 - (b) Other Operating Costs - Includes reference materials and books, registration fees, photographic developing; maintenance and repair of study equipment; freight, etc.
 - (4) Equipment Rental - List items to be rented and estimated cost.
 - (5) Equipment Purchase - Indicate each item of nonexpendable equipment to be purchased by the agency under the project. Equipment so purchased is the property of the Department. Nonexpendable equipment is defined in Chapter VII.
- b. Indirect Costs - These are clerical, accounting, bookkeeping, ordering and other similar services rendered to the study for which no charge is otherwise made.
- *c. Services and/or Equipment to be provided by the Department - If the Department's aid is to be

enlisted in any phase of the study, funds must be budgeted in order to issue the appropriate fund authorization at a later date. Possible items for budgeting are:

- (1) District or Division Testing - Materials testing, dynaflect, Mays Meter, Benkleman Beam, core drilling, skid testing, profilometer, etc. Prior contact with Departmental personnel for cost estimates is recommended.
- (2) Equipment Purchase - List items of equipment to be purchased by the Department for the project.
- (3) District Service - For assistance needed by the researcher for traffic control, data collection, etc.

*Note - for in-house (Departmental) research projects, item c may be subtitled "Services and/or Equipment to be provided by other Districts, Divisions, Agencies". Possible line items for budgeting are "Texas Transportation Institute" or "District X". The purpose of budget item c is to separate the activities of assisting agencies from the budgeted activities of the agency performing the study.

3. The Body of the Proposal

- a. Study Problem Statement - This should be a clear and concise statement of the problem to be addressed by the proposed research. The problem statement provided by the Department shall be attached to the back of each proposal.
- b. Background and Significance of Work - This should include:
 - (1) A description of the findings of a literature search, or other indication of existing technology on the subject. A computer information search will be made utilizing the TRIS data base for any new study. These searches will be requested for all high-priority problem statements after the annual Research Advisory Council meeting. However, the researchers are responsible for making their information needs known to the Department as soon as possible. These searches will be made available to the researcher for reference during development of the proposal. The TRIS computer search should accompany the submission of the proposal to the Department.

- (2) An indication of the researcher's understanding of the underlying principles involved.
 - (3) A discussion of the researcher's approach to the problem.
- c. Objective of the Study - Each study has a clearly defined objective or objectives supported by the tasks which mark specific phases of the research. The objective should be phrased in positive terms (i.e. "to develop", "to determine", or "to measure" rather than "to investigate" or "to study"). The objective statement should be supported by a concise description of the results being sought. The description should include anticipated formal reports (interim and final) as they relate to specific study tasks or objectives, if there is more than one study objective.

Scheduling of tasks to accomplish the objective will be shown on the Time Phase Chart (the Schedule of Research Activities). (See Figure 10)

Where some latitude exists in the selection of the scope of a study, maximum and minimum objectives should be stated, indicating the range the study may have and remain a profitable endeavor. In this case, the maximum and minimum applications, benefits, costs and study duration should also be stated.

- d. Implementation (Application of Research Results) - The proposal should include the researcher's assessment of potential areas for application of the research findings, such as changes in specifications or standards, policy statements and other Departmental practices. For theoretical studies the researcher should indicate the potential of the new knowledge in the ultimate solution of problems. Preparation of this portion of the proposal may be facilitated if the researcher discusses the subject with Departmental personnel concerned with operations in the area to be studied. For studies which are expected to provide results which may be utilized either during the progress of a study or shortly after completion, the proposal should include the researcher's assessment of:

SCHEDULE OF RESEARCH ACTIVITIES FOR RESEARCH PROJECT

— Original Schedule
 - - - Revised Schedule
 ##### Work Completed

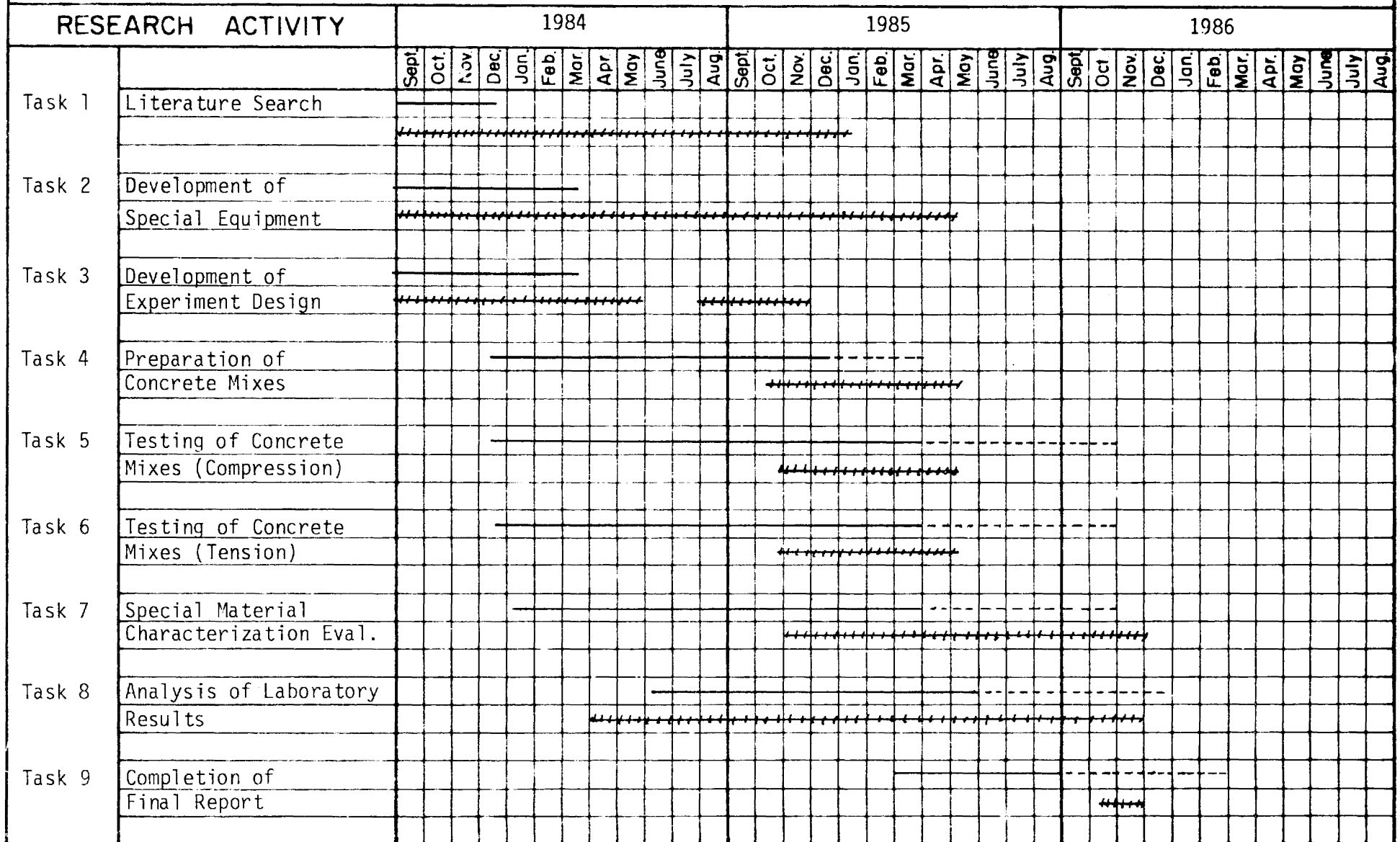


Figure 10 - Time Phase Chart

33

- (1) The form in which the findings might be reported (mathematical model or formula, laboratory test procedure, design techniques etc.)
 - (2) The organization logically responsible for application of the results. (i.e., American Association of State Highway and Transportation Officials, Federal Highway Administration, State Department of Highways and Public Transportation, etc.)
 - (3) The specific medium of practice that would be changed by the findings. (i.e., AASHTO Standard Specifications, State Department of Highways and Public Transportation Standard Specifications, etc.)
 - (4) The means by which the research findings might best be conveyed to operational people for utilization or application (circulation of written report resume, personal contact between Departmental research and operating engineers, demonstration, movie, slide-tape presentation, etc.)
- e. Benefits - Benefits anticipated from the study findings should be indicated. These may be discussed in terms of savings in time, money, energy, increased safety, better service or improved aesthetic quality. Reduction in the initial cost of a product or an improvement in its durability are also possible benefits.
- f. The Work Plan - The work plan should be outlined in considerable detail as a guide to the study supervisor during the course of the study. Not only will this work plan be of value to the study supervisor, but to all connected with the program. It should fully describe the plan or approach that the supervisor intends to use and specify how the study will be structured and performed, showing how and when each element of the objective will be accomplished. The elements of the activity required to accomplish the objectives, with estimated timing, should be summarized on a chart as shown in Figure 10.
- (1) The work plan of a research study should contain the following information:
 - (a) Principles or theories to be used

- (b) Possible solutions to the problem
 - (c) Critical experiments to test the applicability of the theory
 - (d) The kind and range of variables to be tested
 - (e) Facilities available
 - (f) Data analysis and statistical procedures
- (2) If the study is a development study, the following items should be included in the work plan:
- (a) The device, process, material or system to be developed
 - (b) The research upon which the development is to be based
 - (c) The method to be used to solve the problem
 - (d) The kind and range of variables considered in the development
 - (e) Facilities available
 - (f) Data analysis procedures to be used, including statistical methods
- g. Time/Phase Chart - A time phase chart will be included with each proposal/renewal/continuation. The chart will show the objectives and tasks, and anticipated interim and final reports as they relate to the completed tasks. The chart shall be maintained throughout the duration of the study, updated versions being included with each study modification and continuation.
- h. Level of Effort - This is an estimate of the percentage of the total effort and manpower the attainment of each objective or task represents. The presentation of this information in terms of each study year is desirable.
- i. Facilities Available - The general facilities at the disposal of the researcher for the conduct of the work should be discussed.
- j. Staffing Plan - This should indicate the capabilities and staff organization and functions of the study personnel, with information on their availability and necessary augmentation to properly conduct the study.
- k. Computer Programs - Computer programs to be developed as a task under the project must be programmed utilizing a language compatible with, and available on, the Department's computers. The program specifications (i.e. language, storage requirements, etc.) must be detailed in the proposal for Departmental review and approval. Sufficient information must also be provided concerning the function the computer program performs so that the Department can

determine if programs may already be available that provide all or part of the needs, or if the program will require an interface with existing or planned capabilities.

It is further required that, prior to acceptance of the project, any computer program deemed part of the project must be executed on computer equipment with an architecture and configuration similar to that used by the Department. Programs requiring a compiler must compile without manufacturer's extensions. If deemed appropriate by the Department, listings of the computer program and sample problems used in the project report must be run on the Department's computer.

The computer program must also be documented in the project report. The researcher must submit an outline of the proposed documentation for Departmental review and approval before preparing the report. (see also page 61)

1. Revisions - pages revised shall carry the date revised with the word "Revised". Previous revision dates shall be maintained on the page.

C. Discussions of the Parts of the Modification

A modification is a basic agreement for a study which replaces the proposal, or previous modification, when a study is: (1) extended beyond its original termination date; (2) changed significantly in funding (to be determined by the Department on a case-by-case basis); (3) changed in scope or objective. Following is a discussion of those elements of a modification which are different from a proposal.

The detailed discussion of the elements of the proposal, in B. above, should be consulted while reviewing the discussion of the modification. Except as indicated below, the modification should be composed of the entire proposal or previous modification, with changes highlighted in italics, or underlined.

1. The Signature Page (only those items different from the proposal are noted below)
 - a. Heading - the heading should indicate that this is a "Modification".
 - c. Study Type - if the modification increases in time or funding, a Type-B study may need to be redesignated as Type A.
 - d. Study Title - should never change

- e. Study Number - only the contact division number is subject to change
 - g. The second number should not change from that indicated on the original proposal.
 - h,i,j,k. These totals should be changed as modified.
2. The Itemized Budget Page - should indicate the budget for the new year of research.
 3. The Body of the Modification - all changes or additions from previous proposal or modification should be highlighted in italics or underlined. Otherwise, the body should be identical to the proposal or previous modification.
 - a. Study Problem Statement - if a new problem statement was prepared by the Department to be incorporated into the project, it should be attached to the modification and discussed in this section.
 - g. Time/Phase Chart - the time/phase chart shall be revised, if appropriate, to indicate additional tasks and/or extended time.

Note: It is important to understand that a modification is comprised of the entire original proposal (or previous modification) with the changes highlighted for easy review. The proposal, or modification, is the basic guiding document for the life of a project. A continuation document (discussed below) is a brief agreement and addendum to the basic proposal or modification; it simply establishes funding for another year of an approved, on-going project.

D. Discussion of the Parts of the Continuation

The continuation is a brief study agreement which provides for a study's "continuation" into another year's effort, as originally proposed in the basic study document (the proposal or modification). Refer to the note in paragraph C above.

The continuation should contain:

1. The Signature Page - exactly as described in B.1 above, except the heading should indicate "continuation".
2. Itemized Budget Page - exactly as described in B.2 above.

3. A 1- to 2-page description of work accomplished and work planned for the year being proposed. The discussion should refer back to the basic proposal/modification without needless duplication.
4. An updated time/phase chart.

V. REPORTS

A. Purpose of Reports

Reporting procedures are designed to:

1. Assure establishment and maintenance of an adequately documented official record of all research and development studies;
2. Insure that work progress on a study is proceeding in accordance with the terms of a contract or agreement;
3. Provide for final documentation and dissemination of technical findings; and,
4. Promote the implementation of study results.

B. Types of Reports

1. Interim and Final Reports

a. Submission and Publication Requirements

- (1) Interim Reports - Interim Reports are to be submitted when major tasks or objectives of a study are completed as stipulated in the approved work plan, or when significant scientific breakthroughs are realized. All published reports will be provided to the Department as soon as possible after approval and in no case later than 90 days after acceptance. If the 90-day deadline cannot be met, the Department should be notified as to the approximate date the report will be published. Further, all "interim" reports (as well as the final report) are due at the time of study completion (usually August 31).
- (2) Final Reports - A final report is required upon completion of each research study. It shall completely document all data gathered, analyses performed, and the results achieved. Also, it should list all inventions identified or certify that there were no inventions. For studies where a number of interim reports have been published, the final report may be a summary of all prior work, provided that adequate detailed documentation of the work completed has been published previously. All terminated study reports shall be submitted for review and approval at the time of study termination (usually August 31st). If additional time to prepare the report is needed, a formal written request should be submitted to the Department prior to the August 31st deadline. In special cases a time extension is allowed. However, timely submission of reports is a requisite for federal participation in the study funding.

b. Uniform Provisions for Interim and Final Reports

- (1) The report will include a completed Report Standard Title page. This page will be the first page following the cover. If the report has its own title page, it shall appear after the Report Standard Title Page. (See Figure 11).
- (2) A summary (preferably one page) will be included in the report, consisting of a clear, concise, popular statement of any significant developments, discoveries, breakthroughs, or other events, together with their meaning, potential application, and subsequent benefit to the Department. This summary should be prepared in popular language so that persons in other disciplines can understand the research presented.
- (3) Each report should contain a summary statement on research implementation. This statement should point out practical applications of the research findings, recommend procedures for implementation of expected benefits and/or recommend additional work needed to achieve implementation. The statement should be prepared as a cooperative effort between the researcher and the study contact individual.
 - (a) The implementation statement should answer such questions as:
 - [1] Do the findings warrant
 - [a] the application of new procedures?
 - [b] the issue of new specifications, standards, or designs?
 - [c] the use of new materials?
 - [d] the development of new equipment?
 - [2] Do the findings indicate
 - [a] the rejection of proposed new procedures?
 - [b] a determination that no problem existed?
 - [c] an implementation for other positive benefits?
 - [d] a justification of other research needed?
 - (b) The report should indicate the proposed means and mechanisms for translating the research product into applicable form for use by operating personnel.

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle		5. Report Date	
		6. Performing Organization Code	
7. Author(s)		8. Performing Organization Report No.	
9. Performing Organization Name and Address		10. Work Unit No.	
		11. Contract or Grant No.	
		13. Type of Report and Period Covered	
12. Sponsoring Agency Name and Address		14. Sponsoring Agency Code	
		15. Supplementary Notes	
16. Abstract			
17. Key Words		18. Distribution Statement	
19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price

GUIDELINES FOR FILLING OUT THE TECHNICAL REPORT DOCUMENTATION PAGE

Item 1. Report No. - The standard title page for each report should have a unique alphanumeric designation. As an example, research report 209-2F, published in 1979, will be presented as:

<u>Operating Administration</u> FHWA	<u>State</u> TX	<u>Year of Issue</u> 79	<u>Consecutive Report No.</u> 01*	<u>Serial No.</u> 209-2F
---	--------------------	--------------------------------	--	---------------------------------

The number should be written: FHWA/TX-79/01+209-2F

Item 2. Government Accessing No. - Leave blank.

Item 3. Recipient's Catalog No. - Leave blank.

Item 4. Title and Subtitle - The title should be the same as the report. Use all capital letters for the title. When a report is prepared in more than one volume, this block should show the main title plus the volume number and the subtitle for the volume being reported.

Item 5. Report Date - Indicate at least the month and year of the date shown on the report.

Item 6. Performing Organization Code - Leave blank.

Item 7. Author(s) - Give name(s) in conventional order (John R. Doe) and list the author's affiliation if it differs from the performing organization (Item 9)

Item 8. Performing Organization Report No. - Write the report number. (such as 209-2F)

Item 9. Performing Organization Name and Address - Give Research Agency's name, city, state and zip code. List no more than two levels of the organization.

Item 10. Work Unit (TR AIS) - Leave blank.

Item 11. Contract or Grant No. - Insert the complete study number. If this space is left blank, the report will not be accepted by NTIS.

Item 12. Sponsoring Agency Name and Address - Insert: Texas State Department of Highways and Public Transportation; Transportation Planning Division; P.O. Box 5051, Austin, Texas 78763.

Item 13. Type of Report and Period Covered - Indicate either interim report, final report, etc. For interim reports, indicate the time period covered - if applicable.

Item 14. Sponsoring Agency Code - Leave blank.

Item 15. Supplementary Notes - Indicate that the study was conducted in cooperation with the U.S. Department of Transportation, Federal Highway Administration. In addition, insert the study title if it is different from the report title.

Item 16. ****Abstract** - Include a brief (not to exceed 200 words) factual summary of the most significant information contained in the report. This should include advice on how the results of the research can be used or applied, when applicable. If the report contains a significant bibliography or literature review, it should be noted.

Item 17. *****Key Words** - Select terms or short phrases that identify the principal subject in the report, and that are sufficiently specific and precise to be used as index entries for cataloging. The authorized term index in the TRIS publication "Highway Research in Progress" may be helpful in this regard.

Item 18. Distribution Statement - If applicable, insert the words "No Restrictions". This document is available to the public through the National Technical Information Service, Springfield, Virginia 22161". Otherwise, leave blank and describe the situation in the accompanying correspondence.

Item 19. Security Classification (of this report) - Insert the word "Unclassified".

Item 20. Security Classification (of this page) - Insert the word "Unclassified".

Item 21. No. of Pages - Insert the total number, including title page and other front-matter pages.

Item 22. Price - Leave blank.

*This number will be provided on a consecutive basis by D-10 as reports are approved for publication.

**This Abstract may replace the one required previously in the front of the report.

***These key words may replace these previously required at the bottom of the abstract.

- (c) The potential benefits to be derived from implementing the research findings should be in terms of savings in time, money, lives and energy, increased safety, better service, improved esthetics, enhanced capability of solving transportation problems that may accrue in the highway engineering profession, and other user and nonuser benefits. Where dollars are involved, an effort should be made to estimate the first-year savings and the expected subsequent average annual savings anticipated from application of the research results.
 - (d) If the findings were positive, but not suitable for immediate application, the report should indicate the extent of additional work needed to produce results suitable for implementation; i.e. additional research, development or field testing.
- (4) A credit reference to the FHWA, such as the following, will be given (except when the study has been designated as State funded):
- "Prepared in cooperation with the U.S. Department of Transportation, Federal Highway Administration."
- (5) A disclaimer statement similar to the following will be included:
- "The contents of this report reflect the views of the author(s) who is (are) responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration or the State Department of Highways and Public Transportation. This report does not constitute a standard, specification, or regulation."
- (6) A final report will also include the following statement, if applicable:
- "There was no invention or discovery conceived or first actually reduced to practice in the course of or under this contract, including any art, method, process, machine, manufacture, design or composition of matter, or any new and useful improvement thereof, or any variety of plant which is or may be patentable under the patent laws of the United States of America or any foreign country."

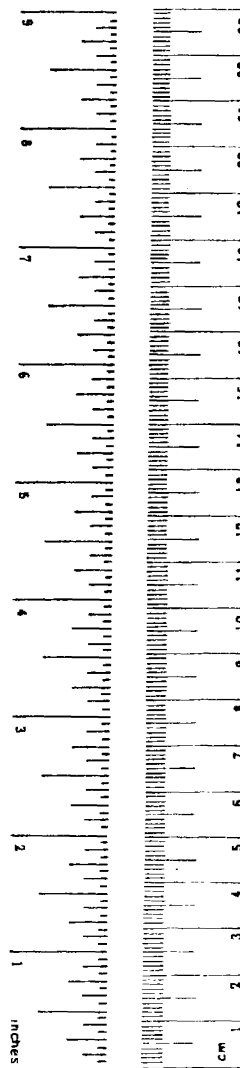
A further discussion of patent requirements may be found in paragraph VIII.L.

- (7) After a report has been accepted and published, the material contained therein is to be regarded as information in the public domain, and its further use (both oral and written) does not require approval. However, appropriate credit to FHWA as specified above, and to the Department, is required.
- (8) Unless otherwise instructed, the agency should submit ten (10) draft copies of the report to the State Transportation Planning Engineer, for approval. The draft copies of the report will be distributed by the State Transportation Planning Engineer, as follows:
 - (a) 4 draft copies of a Final Report to FHWA
 - (b) 3 draft copies of an Interim Report to FHWA
 - (c) 1 copy to File D-10
 - (d) 1 copy to each Division concerned (Attn: Contact Individual or Assistant)
- (9) The research agency or researcher shall be free to copyright material or reports with the provision that the Department and FHWA reserve a royalty-free, nonexclusive and irrevocable license to reproduce, publish, or otherwise use, and to authorize others to use, the work for government purposes.
- (10) Research reports should be written in language which can be readily understood by those who will apply the study findings. For example, if additional research is needed, the language should be such that the researchers who will continue the work can readily assimilate and use the findings of the work completed. Reports on studies which are expected to produce an implementable product in the form of a device, procedure or the like must be written in a manner understandable to the user and in sufficient detail to permit the practicing engineer to implement the items.
- (11) All reports shall contain a metric conversion sheet in the front of the report similar to the one presented in Figure 12.
- (12) All report pages shall be numbered consecutively, beginning with page 1 which is the first page of the body of the report. Appendices shall not be numbered differently

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³
TEMPERATURE (exact)				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F

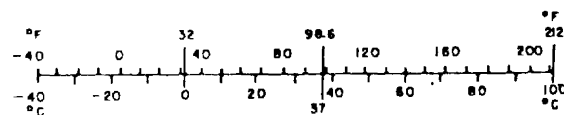


Figure 12
Metric Conversion Factors

than the report. Page numbers will continue uninterrupted through any appendices to the final page of the report.

(13) Reports shall be single-spaced or 1 1/2-spaced. Double or triple spacing needlessly increases the report size, increasing publication and storage costs.

(14) Reports shall be printed on both sides of a page (backed up).

2. Summary Reports

When a summary report is requested by the Department, a draft should accompany the final and interim draft report for approval. This summary is a highly condensed version of an interim or final report and is oriented to the highway administrator responsible for setting policies, procedures, and engineering practices. The summary report should present the study's technical aspects, conclusions, and recommendations clearly and concisely so that the significance of the completed work can be quickly assimilated and can provide a basis for management decision. Concepts should be presented in plain language with study details omitted or briefly summarized. The provisions of paragraphs V.B.1.b.(4) through (9) apply to summary reports. The following format may be used:

- a. Introduction - A brief statement of the problem and study objectives.
- b. Conclusions and Recommendations - A clear statement of study findings and their meaning to the highway administrators.
- c. Implementation Guidelines - A practical statement of the innovations in policies, procedures, and engineering practices which will implement the findings, and the expected benefits of such innovations.
- e. Demonstration Proposals - Objectives for experimentation or demonstration which may be undertaken before the innovations are adopted as standard practice.
- f. References - Other study reports.

3. Film Reports

Where motion pictures, film clips, or sets of slides are produced by a study, a minimum of one reproducible copy is required for the Department. The master copy of any film produced should be available for subsequent use as necessary. The provisions of paragraphs V.B.1.b.(4),(5) (7),(9), and (10) apply to film reports. Motion pictures which cost more than \$500 to produce and are not specified in the approved study agreement, require the prior approval of the Department.

4. Papers or Articles Presented or Published

- a. Papers (articles and bulletins) which contain significant technical findings from a study, previously undisclosed, shall not be presented publicly or published without prior approval by the Department.
- b. Submission of technical papers to professional or technical organizations such as the Transportation Research Board should be concurrent with submission through normal channels to the Department. This will allow sufficient time to satisfy the requirement for prior Departmental review and approval.
- c. All papers should contain the credit reference and disclaimer statement specified in paragraphs V.B.1.b.(4) and (5).
- d. In unusual cases, when the scheduled time for the preparation of a paper containing previously undisclosed findings does not permit time for formal review and acceptance, an abstract of the paper and notification of intent to present the paper should be submitted through normal channels to the Department for approval. To protect the interests of the sponsoring agencies, such presentations should contain (1) a statement that the sponsoring agencies have not reviewed the paper, (2) the disclaimer statement, and the credit reference specified in paragraph V.B.1.b.(4) and (5). Draft copies of these papers should be submitted to the Department for review and acceptance as soon as completed.
- e. Papers containing subject matter and technical findings substantially similar to that covered in a report which has been previously approved for publication do not require any further Departmental review or approval but should include the disclaimer statement and credit reference specified in paragraph V.B.1.b.(4) and (5).

5. Researcher's Quarterly Progress Report

For all studies in the research program, quarterly progress reports shall be submitted to the Department (D-10) by the researcher for each quarter. The quarter periods are September 1st through November 30th, December 1st through February 29th, March 1st through May 31st, and June 1st through August 31st. The first report is due at the end of the first quarter in which a study has been in an approved status for over 60 days, and as shortly after Dec. 1, March 1, June 1 and Sept. 1 as possible, but no later than the 10th of the month. The quarterly report rendered on September 1st is known as the annual report. One copy of the progress report is required.

The Department will make additional copies as needed and will make distribution as follows:

- 4 copies to FHWA
- 1 copy to each Division concerned (Attention - Contact Individual or Asst. Contact Individual)
- 2 copies File D-10
- 1 copy to each area coordinator of studies in respective area

The reports shall contain sufficient information to enable technical coordinators to evaluate the progress and possible future course of a study. The following should be included in each report: (See Figure 13)

- a. Heading - pertinent data to identify the study.
- b. Progress - summarization of work accomplished; specifically, items completed during the quarter ahead of schedule and those tasks behind schedule should be described. An estimate of percentage of the total work accomplished through the quarter should be given. This percentage of work completed is based on a single year's work plan only, not on the entire study.
- c. Finances - figures should be given showing the total estimated cost of the study, total amount of money spent to that date, estimated budget for the current year and expenditures for the current year to date.
- d. Interim or Final Reports - an estimate should be given as to when the Department can expect submission of the next research report. The specific tasks or objectives of the study being incorporated into the report should be identified.
- e. Other Pertinent Information
 - (1) Problems - technical problems, including comments or requests for assistance, should be described. Also, a change in principal investigator or indications of insufficient funds should be reported.
 - (2) Research Implementation - a brief description of the potential application of significant technical information developed during the quarter should be given, as well as a description of steps being planned to implement these findings.
 - (3) Planned Work - a description of work planned for the next quarter will be given.
 - (4) Changes - any planned change to the work plan, changes in work tasks, proposed additional objectives, and in particular, any planned modification of the study will be mentioned in detail. Changes in study personnel will also be noted. (See VIII.E, F, and G).

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
COOPERATIVE RESEARCH STUDY QUARTERLY PROGRESS REPORT

Research Agency

Date: _____

Study Supervisor

Phone Number

Study No.: _____ Title: _____

Date Study was Approved: _____ Scheduled Termination Date: _____

Total Estimated Study Cost: \$ _____ Study Budget This F.Y.: \$ _____

Study Expenditure for Previous Year(s): \$ _____

CURRENT F.Y.	SEPT. - NOV.	DEC. - FEB.	MAR. - MAY	JUNE - AUG.
Money Spent This Quarter				
Money Spent This F. Y.*				
% Of Budget Used*				
% Of Scheduled Work Accomplished*				

Use the back of this sheet to elaborate on the following items, referring to each by number.

1. Summarize work accomplished this quarter. Specify tasks completed ahead and behind schedule.
2. Do you recommend implementation of any study findings now? If so, explain.
3. Indicate significant events and problems encountered. (Technical problems, insufficient funds, etc.)
4. Do you recommend changes in tasks or objectives, finances, work schedule, principal investigators, etc.? Advise when formal request for approval will be made.
5. Please indicate the estimated submission date of the next report, and the study objectives or tasks to be included therein.
6. Indicate any nonexpendable equipment purchased on the study during the past quarter.
7. Work plan for next quarter.

* Figures shown each quarter are cumulative from the beginning of fiscal year through the quarter reporting.

- (5) Multi-discipline Studies - large studies involving a team effort of several disciplines may require periodic conferences in addition to quarterly reports. A complete record of such meetings shall be made and a copy furnished to the Department.
- (6) Equipment Purchases - a description of all non-expendable equipment purchased on the study during the quarter will be given. Non-expendable equipment is defined in Chapter VII.

- 6. Contact Individual's Quarterly Progress Report
Each contact individual is required to render a progress report on each study assigned. One copy of the report shall be sent to the State Transportation Planning Engineer by January 15th, April 15th, July 15th and October 15th. An example of an acceptable format for the progress report is found in Figure 14 (see also II.G)
- 7. Research Implementation Report
Upon completion of each research study, and for three consecutive years thereafter, a form similar to the example in Figure 15 will be required from the contact individual. D-10R will advise the contact division when each report is required. If a completed study is determined to have no implementation potential, a statement to this effect in the initial Implementation Report will be satisfactory, and no further reporting will be required.

STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

CONTACT REPRESENTATIVE
RESEARCH STUDY QUARTERLY REPORT

- I. RESEARCH STUDY NO. _____
- II. RESEARCH STUDY TITLE _____

- III. DATE OF REPORT _____
- IV. NAMES OF PERSONS INVOLVED _____

- V. Is the study progressing according to the work plan and objectives of the study as stated in the agreement?

- VI. Has any of the research progressed to the point that implementation of the results should be started by the Department?

- VII. Have there been any personnel changes or modification of tasks on the study?

- VIII. Remarks _____

CC: Division Head
Study Supervisor
Engineer of Research & Development
Area Coordinator

Contact Representative

Figure 14

(F-2-1)

RESEARCH IMPLEMENTATION REPORT

1. State	2. Study No.	3. Study Cost	4. Completion Date
5. Reporting Period (Show date of this report in the Blank) _____ study completion _____ 1 year later _____ 2 years later _____ 3 years later			
6. Study Title			
7. Objectives (Brief description)			
8. Findings (Brief description)			
9. Implementation Status			
10. What means, if any, have been used or are proposed to aid in implementing the findings? Describe.			
11. Estimated annual savings and other benefits from use of research			
12. Benefit/Cost Ratio _____			
13. Can other states implement or benefit from this study? How?			
14. Additional Comments:			

Figure 15
Research Implementation Report

VI. GUIDELINES FOR ASSESSING AND IMPLEMENTING RESEARCH RESULTS

A. General

The research performed was designed to meet the needs of the Department and therefore the findings of each study must be carefully assessed for use. Unless this essential step is carried out, the value of the research cannot be realized. The study is assessed for implementation potential several times during its life.

1. In the Study Proposal/Renewal - The researcher offers his assessment of the potential implementability of research results.
2. In the Researcher's Quarterly Progress Report - The researcher presents a brief description of the potential application of significant technical information developed during the quarter.
3. In the Contact Representative's Quarterly Report - The study Contact Individual discusses any results of the study he feels should be implemented by the Department.
4. In the Research Report - The researcher makes a statement of the implementability of the findings presented in the report.
5. In the Research Implementation Report - At the time of study termination, the D-IOR Implementation Branch renders a report assessing the implementability of the research results.

B. Assessing Research Results

In the evaluation of study results, certain considerations are essential. The following points are presented as an aid and should not be considered as all-inclusive:

1. Do the study results have potential application?
2. Are the results practical for application to the highway system?
3. Where in the highway system can the results be applied?
4. Will the use of the results enhance the state-of-the-art?
5. What will be the economic result if the findings are applied to the highway system?
6. Should a demonstration of the results be made to the interested Divisions or Districts?

C. Implementing Research Results

In order for the results of the study to be of value they must be appropriately implemented for use in the highway system. This may be accomplished by use of the following suggested procedures:

1. Apprise responsible individuals of the significance of the findings. (The value of personal contact cannot be overemphasized.)

2. Conduct demonstrations for organizations as appropriate.
3. Recommend that the results be integrated into the highway system by their inclusion into specifications, standards, procedures, methods or techniques.

VII. EQUIPMENT, MATERIALS AND SUPPLIES

Guidelines for the determination of eligibility for participation in the purchase of equipment and instruments are:

1. the item is not of a nature normally used or required in the regular administrative or engineering operations of the contractor.
2. the item is required for, and will be used primarily on, work incident to the contract, and
3. the cost is considered reasonable.

It is required that equipment items costing \$1000 or more charged to direct costs be excluded from the calculation of the indirect costs.

- A. Agency-Owned Equipment - This equipment shall be available for the work of the study without rental or depreciation charges.
- B. Non-Expendable and/or Special Equipment
 1. Definition of Non-expendable equipment: (the property is nonexpendable if it meets any one of the following characteristics).
 - a. Has a value over \$250.
 - b. Has a value of \$250 or less, (provided the property has a useful life of more than 1 year) but is of sufficient value to reasonably warrant the cost of keeping records, including an annual inventory. The cost of keeping records is established at \$50 per year.
 - c. Has an appeal for personal possession or use, regardless of cost. Such items shall include, but not be limited to,
 - (1) Cameras
 - (2) Calculators
 - (3) Power Tools
 - (4) Video Equipment
 - (5) Recording Equipment
 - (6) Radios
 - (7) Test Equipment
 - (8) Computer hardware and peripheral equipment (such as modems, disc drives, RAM cards, etc.)
 - (9) Computer software packages
 2. The acquisition of equipment of this class for a research study may be handled in either of the following ways:

- a. The items may be rented by the research agency from the supplier and charged to the study upon written approval of the rental rate by the Department. This procedure should be used only if the items are not available for use from within the Cooperative Research Program.
- b. Equipment and instruments should be purchased by the University or the Department in accordance with the Cooperative Research Agreements. The following steps should be used in purchasing equipment:
 - (1) If the requested items are not specifically itemized in the proposal, the University shall request permission from the Department prior to purchase. If an emergency situation exists as determined by the University, purchase procedures may be commenced prior to Department approval, with the understanding that such purchase procedures will not proceed so far as to bind the University to purchase the equipment.
 - (2) Request for purchase approval should be made at least ninety (90) days prior to researcher's actual need for the equipment.
 - (3) Upon receipt, if the equipment is found operationally satisfactory, the researcher must acknowledge receipt in writing to the State Transportation Planning Engineer. This letter should contain all information which identifies the equipment:
 - (a) Equipment description - this includes the brand or trade name and model number
 - (b) Serial number - if no serial number is available then a Departmental tag number should be requested.
 - (c) Location of the equipment
 - (d) Date purchased
 - (e) Cost
 - (f) If the item is constructed, major component parts should be listed

3. If included in the approved budget, research and development equipment, devices, or systems may be built by the research agency. (Modification costs required to alter or change available equipment to perform a research function are also included in this category.) Component parts and materials may be purchased either by the research agency or the Department, with costs reimbursable when work order identity and properly supported vouchers are submitted. Component parts costing more than \$250.00, not itemized in the proposal, will require specific approval from the Department. Requisitions for component parts to be purchased by the Department will be handled as indicated above.

Under the above procedures, actual maintenance and repair costs may be charged to the study.

All equipment, purchased or constructed, belongs to the Department and is to be identified accordingly. File D-10 is the Division responsible for maintaining the equipment inventory. Disposition of equipment will be handled through the State Transportation Planning Engineer in coordination with File D-4. Expendable equipment, materials and supplies shall be disposed of by the research agency and credit given to the study as appropriate. The State Transportation Planning Engineer shall be kept informed of the permanent location of research equipment.

It is the responsibility of the research agency (in the case of a Departmental study, the study supervisor), to insure the safekeeping and proper use of research equipment.

4. All nonexpendable research equipment will be inventoried by a Departmental representative once a year. Adequate prior notice of the representative's visit will be given to insure the required full cooperation of the research agency.
5. Upon completion of a study, a complete record of nonexpendable equipment shall be submitted to the Department with the final report. The record should include notes concerning the condition of the equipment and the agency's recommendation for disposition.

- C. Expendable Equipment, Materials and Supplies
The estimated cost of this equipment shall be included in the study budget as a separate category under "Expendable Supplies - and Miscellaneous Expenses". Expendable equipment is that which does not meet any one of the criteria or nonexpendable equipment as defined in paragraph B above.

VIII GENERAL ADMINISTRATION, OPERATING PROCEDURES AND SERVICES

A. Notification Regarding Special Tests

In many studies special tests are required. In such cases, arrangements should be made for appropriate personnel to be present during the testing. Essential information regarding the test should be communicated to the Engineer of Research and Development. In turn, the appropriate people will be notified both in the Department and the Federal Highway Administration.

B. Purpose and Use of Technical Memorandums

It is frequently advantageous for individuals involved in the cooperative research effort to communicate in writing with one another on technical matters. The means for this has been provided through the Department's and Research Agencies' Technical Memorandums. The Technical Memorandum should not be used as a means for official correspondence. Policy, procedures, action items, budget matters or other official commitments are not to be included in Technical Memorandums, nor should a Technical memorandum be referred to in official correspondence or in a report. It is signed by the writer, and as a matter of courtesy the Engineer of Research and Development is provided an information copy to enable him to keep abreast with current developments. An advantage of the Technical Memorandum is that it is the most rapid means of mail communication. It goes directly from the writer to the addressee, by-passing all official channels.

The use of the Technical Memorandum is encouraged within the guidelines covered in the above paragraph. Departmental personnel can obtain the Department's Technical Memorandum form No. 1292 through File D-10, and Research Agency personnel can obtain the form through their respective organizations.

C. Scripts, Photographs, and Publicity

Occasionally, organizations prepare scripts for various purposes regarding matters involving the Cooperative Research Agency. In all cases approval should be obtained through established lines of communication. Permission to use Departmental photographs should be cleared in this same manner.

A file is maintained in the Department regarding Department research publicity. It consists of newspaper articles, magazine articles, etc. Therefore, it is desired that D-10 be provided copies of pertinent publicity for the file.

D. Out-of-State Travel

Out-of-state travel is not authorized unless specifically approved by the Engineer-Director. Requests for out-of-state travel should be submitted for each case through normal administrative channels. If out-of-state travel is foreseen as a necessary task on a research study, this should be addressed in the research proposal/modification.

E. Major Changes in Personnel

A major change in study personnel is to be submitted to the Department for approval. Minor personnel changes involving the study should be noted in the Researcher's Quarterly Report.

F. Change in Objective and Scope

Changes in the objective or scope of a study shall be fully documented and forwarded for approval to the Department in the form of a study modification agreement.

G. Change in Method of Study

When the basic method of study outlined in the agreement is to be changed to a degree which may substantially affect the outcome of the research, such changes shall be outlined in detail and forwarded to the State Transportation Planning Engineer, in the form of a study modification agreement, for approval.

H. Specialized Services

Specialized services required beyond those itemized in a study work plan shall be forwarded to the State Transportation Planning Engineer for approval.

I. Files and Records

All records, which include working files, test data, correspondence, etc., must remain intact for a period of three (3) years after the study has been financially closed out. In certain cases this may mean that the files must remain intact for a period of approximately five (5) years since it may take two years after termination to audit the study and close out all financial matters. Furthermore, files should be considered open for inspection by responsible Department and Federal Highway Administration personnel at any time.

J. Computer Programs

Computer programs developed under a research project are the property of the Department. As products of tax-supported research, copies of programs are available at cost. Computer programs provided to concerns outside of the Department should be accompanied by the following disclaimer statement:

Please be advised that no warranty is made by the Texas State Department of Highways and Public Transportation, the Federal Highway Administration, or (the name of the agency responsible for the program) as to the accuracy, completeness, reliability, usability, or suitability of the computer program and its associated data and documentation. No responsibility is assumed by the above parties for incorrect results or damages resulting from the use of the program.

Computer programs planned for development under a research project should be addressed in the proposal or modification. (See page 35) A listing of computer programs developed through the research program is available from the D-10 Research and Development Section.

Computer programs developed under a research study, and deliverable to the Department as a product of the research, must be assessed for impact on the Department's operations through the SPECTRUM process. The responsibility for submitting a program to SPECTRUM for review lies with the sponsoring (contact) Division of the research study.

K. Research Services Available

1. Library Services

Library facilities are available through the Cooperative Research Program located at the Texas Transportation Institute to provide research library service to the State Department of Highways and Public Transportation and Research Agencies. Requests for services should be addressed to the Engineer of Research and Development.

2. Transportation Research Information Service (TRIS)

TRIS is an automated information storage and retrieval system developed by the Transportation Research Board with financial support from state highway departments and the Federal Highway Administration. A TRIS run is a collection of computer print-out sheets, each of which is an abstract of a report, magazine article, or research project dealing with a specific topic. Requests for such runs should be directed to the Technology Transfer Branch of the Research and Development Section, File D-10.

3. Research Digest

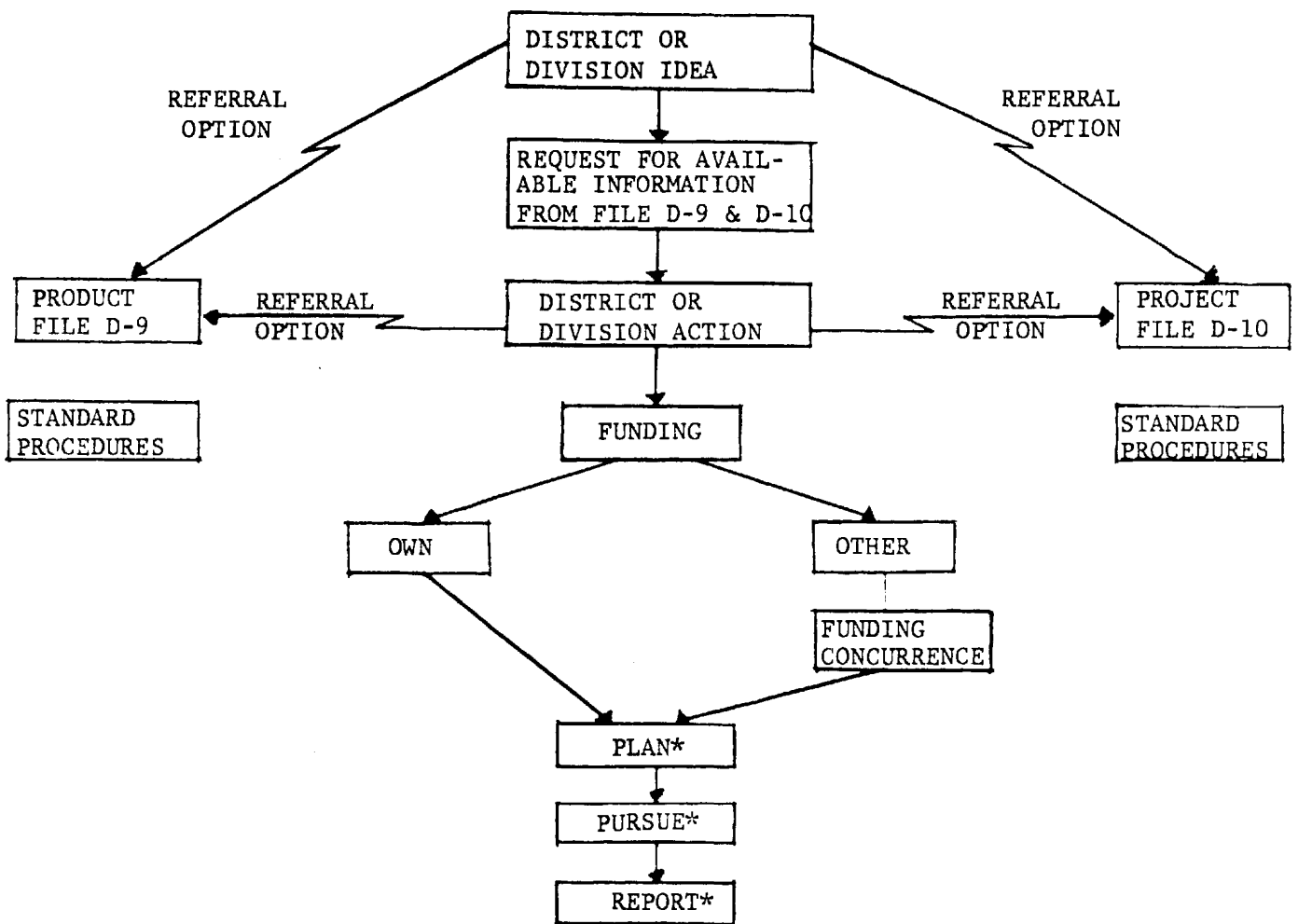
The Research Digest is published weekly by the Technology Transfer group of the D-10 Research and Development Section for the purpose of informing Departmental and Research personnel of new publications and reports. The publications advertised in the Digest are available on a loan basis.

4. Information Exchange

Many new research ideas, techniques, and procedures are developed by Departmental personnel which are of value on a state-wide basis. Those who have developed or discovered such new ideas are encouraged to share them with the Department as a whole. To facilitate dissemination of the information, contact the the Technology Transfer Branch of the D-10 Research and Development Section.

5. Experimental Projects and Product Evaluation

Administrative Order No. 1175 (herein incorporated) established procedures in regard to the evaluation of commercial products and Departmental experimentation with products, designs or other operational practices. In order for the Department to obtain maximum benefits from these efforts, it is essential that duplication be eliminated and the results of such evaluation or experimentation be made known to all interested Districts and Divisions. Accordingly, the purpose of the Order was to assign responsibilities for implementation of procedures to assure these essential elements. The Districts and/or Divisions are encouraged to continue to pursue investigative efforts in accordance with current procedures. In addition, they should adhere to the flow diagram (Figure 16). Both successful and unsuccessful results should be reported since either type is an important indication of the merits of a product or the project tested. The responsibility for coordinating these efforts is assigned jointly to Files D-9 and 10. It is the responsibility of these Divisions to outline procedures, maintain information files and disseminate the findings relative to these efforts. Questions regarding this matter should be directed to the attention of either or both Divisions. In D-10, the Technology Transfer Branch of the Research and Development Section should be contacted regarding publication of the results of an Experimental Project in the form of an Experimental Project Report. Further, the Section renders assistance, when requested, in planning and pursuing investigations and implementing results.



EXPLANATORY NOTES:

1. The "Flow Diagram" intends to reflect flexibility to allow the initiating Districts or Divisions to determine their own degree of participation and assistance desired.
2. Review of available information is essential to eliminate duplication.
3. "Standard Procedures" were not interconnected in flow diagram as the initiating District or Division has the option at any point to refer ideas to File D-9 or File D-10 for handling by Standard Procedures.
- * 4. Assistance is available upon request and to the degree desired for:
 - a. Planning investigations
 - b. Pursuing investigations
 - c. Preparation of reports
 - d. Implementation of results.
5. After completion, the reports will be submitted to File D-9 or File D-10 as applicable for storage and dissemination of the results.

Product Evaluation and Experimental
Project Flow Diagram

Figure 16

6. Technology Transfer

The Technology Transfer Branch functions as a focal point and clearinghouse for the collection, classification, and distribution of technical information from both within the Department and from without. The group is responsible for the publication of Technical Quarterly" (a technical magazine), the Research Digest (a weekly publication), Experimental Projects reports, and Special Studies reports. The group provides information searches of numerous sources for the Department. Sources may include the Research and Development Section's Technical File, TRIS automated data base, university libraries, and others. In addition, the group will continually strive to provide techniques with which the Department can maximize the transfer of technical information. Two noteworthy systems which are currently being developed and/or implemented are: 1) an automated storage and retrieval system for technical data. Much of the information which will be put on the system is either not documented at this time or is not readily available. The data bases will be accessible through any remote terminal which is connected to the Department's mainframe computer. Information may be retrieved by searching on such fields as key words, authors, date, etc. The information will be collected and maintained by the Technology Transfer Branch for use by the Department's personnel. 2) an automated literature search system called DIALOG. DIALOG, a system of some 200 different data bases, will be subscribed to and made accessible to the Technology Transfer Branch, who in turn will be able to conduct computer searches of many technical data bases for Department and Research personnel upon request. Data bases include such topics as chemistry, medicine, law, management, and agriculture, as well as the more traditional transportation-related data bases of TRIS and NTIS. Technical information may be retrieved within minutes if necessary.

7. Research and Development Technical Files

The Research and Development Section maintains a file of technical reports on transportation research. An estimated 10,000 reports are contained in this collection. Complete collections of TRB, NCHRP and Cooperative Research Program reports are available, as are reports from other agencies. A subject card file is maintained to access the collection under thousands of commonly used key words. For information on a specific subject, contact the Technology Transfer Branch of the Research and Development Section.

8. Listing of Research Studies and Reports

A complete listing of all Cooperative Research Program

studies and reports, Special Studies, Experimental Project reports, and UMTA Technical Study reports is available from the Engineer of Research and Development. The document is indexed by subject and author. A special index of computer programs is also included. The listing is updated on an annual basis and published each January.

L. Patent Rights

Patent rights provisions are included in this manual to assure an equitable allocation of rights in inventions resulting from HP&R-sponsored research and development contracts, to promote their expeditious development so that the U.S. public can benefit from early use of the inventions and to assure their continued availability. The following FHWA provisions shall be followed by the research agency and researcher. In case of conflict between FHWA provisions and State law or research agency provisions, the latter will govern. Subject Invention, as used herein, shall mean any art, process, method, machine, manufacture, design or composition of matter, or any new and useful improvement thereof, or any variety of plant which is or may be patentable under the patent laws of the United States of America or any foreign country.

1. Invention Identification and Disclosure

- a. The Research Agency shall establish and maintain effective procedures to assure that Subject Inventions are promptly identified. These procedures should include the maintenance of records that are reasonably necessary to document the conception and/or the first actual reduction to practice of inventions resulting from this contract.
- b. The Research agency should furnish the Department the following:
 - (1) A complete technical disclosure for each Subject Invention, within 6 months after conception or first actual reduction to practice, and prior to any sale, public use, or publication of such invention known to the contractor. The disclosure should identify the contract and the inventor, and be sufficiently complete to convey a clear understanding of the nature, purpose and operation of the invention.
 - (2) A statement with the final report listing all Subject Inventions or certifying that there were no such inventions. (Refer to V.B.1.b(6).)

- (3) Patent agreements to effectuate the provisions of this clause obtained from all persons in the research agency who perform any part of the work under this contract except clerical and manual labor personnel.

2. Disposition of Principal Rights

- a. The Research Agency or researcher agrees to assign to the Department and U.S. Government the entire right, title and interest throughout the world in and to each Subject Invention, except to the extent that rights are obtained by the Research Agency or Researcher under paragraph b. below.
- b. For each Subject Invention upon which the Research Agency or Researcher files a patent application, the Research Agency may reserve a revocable, non-exclusive, paid-up license for the practice of such invention throughout the United States, its territories and possession, Puerto Rico, and the District of Columbia, and in any foreign country where the contractor files a patent application.

3. Filing of Domestic Patent Applications

With respect to each Subject Invention in which the Research Agency or Researcher elects to retain rights pursuant to paragraph L2 above, the Research Agency or researcher shall have a domestic patent filed within 6 months after submission of the invention disclosure.

With respect to Subject Inventions, the Research Agency or researcher shall promptly notify the Department of any decision not to file. For each Subject Invention on which a patent is filed, the Research Agency or researcher shall:

- a. Within two months after each filing, deliver to the Department a copy of the application as filed, including the filing date and serial number.
- b. Include the following statement in the second paragraph of the specification of the application and any patents issued on a Subject Invention:
"The United States Government has rights in this invention pursuant to the contract between (identify the Research Agency or Researcher) and (identify the Department) dated (date)."
- c. Within 6 months after filing the application, deliver to the Department a duly approved, executed and recorded legal instrument in a form specified by FHWA fully confirmatory of all rights to which the United States Government is entitled, and provide FHWA an irrevocable power to inspect and make copies of the patent application.

- d. Provide the Department with copies of the patent within 2 months after a patent is issued on the application.

4. Forfeiture of Rights in Unreported Subject Invention

The Research Agency or researcher shall forfeit to the SDHPT and the United States Government all rights in any Subject Invention which he fails to report at or prior to the time he files a patent application thereon or submits the statement required in the final report as specified in V.B.1.b.(6).

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