

Highway Maintenance Concept Vehicle
Phase Three

A Regional Pooled Fund Research Project

Memorandum of Understanding

Between

Federal Highway Administration
Iowa Department of Transportation
Michigan Department of Transportation
Minnesota Department of Transportation
and Other Participating Agencies

Memorandum Of Understanding

Introduction / Background

The departments of transportation of Iowa, Michigan, and Minnesota formed a consortium to define and develop the next generation highway maintenance vehicle. The Center for Transportation Research and Education, a center of Iowa State University, provided staff support to the Concept Highway Maintenance Vehicle project which focused on winter maintenance activities. Phase I of the four-phase project focused on describing the desirable functions of a concept maintenance vehicle and evaluating its feasibility. Phase II was the development, operation, and proof of concept of prototype winter maintenance vehicles. Phase III will take the results of Phase II and provide direction for a second series of prototype maintenance vehicles in each of the participating states. Phase III includes conducting benefit cost analysis, conducting the field evaluation of three (3) prototype vehicles, and investigate method(s) and costs to integrate the data and information generated by the vehicle into the state's snow and ice control management process. In addition, Phase III will include Proof of Concept for Additional Technologies and Onboard Intelligence.

Additional onboard technologies will include:

- Pavement Surface Chemical Mix sensor that will be used to develop a local, regional or statewide chemical trace to support chemical mix distribution decisions.

Additional onboard and applications intelligence will include:

- Material Distribution Intelligence that will use pavement surface temperature, chemical trace, and friction data along with weather forecasting data to develop algorithms to support chemical mix distribution.
- Operations, Material, and Asset Management systems that assist managers to improve maintenance operations, reduce costs, increase safety, improve mobility, and reduce the environmental impact of winter weather applications. CTRE will investigate potential software technology applications that can be applied to real-time material management, forecasting requirements, vehicle route optimization, and material inventory.

In addition, communication linkages from the concept vehicle to the maintenance garages, where the vehicles are stationed, will be explored and experimental linkages and data displays developed. This procedure permits real time data transfer from the vehicle to the maintenance garage and provides the potential for quicker, more informed decisions relating to winter maintenance strategies.

Name and Purpose of Study

This research project shall be entitled the “Highway Maintenance Concept Vehicle, Phase III” and will be called Phase III STUDY. The purpose of the Phase III STUDY is to pool financial resources and experiences and to share information and knowledge with the primary goal stated below.

The goal of the Highway Maintenance Concept Vehicle Phase III Pooled Fund Study is to the transportation agency mission level statement to “Provide an acceptable and reasonable level of service for winter driving while managing assets efficiently and effectively.”

The major tasks that will be accomplished to achieve the Phase III Study goal are:

- Describe the vehicle and subsystems to be considered.
- Develop a field evaluation plan for technologies on the three prototype vehicles and conduct the evaluation.
- Conduct proof of concept for redesigned technologies
- Conduct proof of concept for additional on board technologies and applications intelligence.
- Obtain additional state pooled fund partners.
- Obtain additional private sector partners.
- Conduct benefit/cost analysis.
- Develop time to implementation projections.
- Develop data flow maps and suggest methods to integrate the data with existing and planned state systems.
- Develop information flow process maps and suggest methods to integrate the information with existing and planned management decision systems.
- Write final report.

See the attached Phase III Highway Maintenance Concept Vehicle Work Plan for complete detail.

Purpose of Memorandum of Understanding (MOU)

The purpose of this MOU is to formalize administrative, financial, and organizational procedures for implementing the Phase III STUDY and to establish roles and responsibilities for the contracting parties in carrying out the contract requirements.

Lead Agency

The Iowa Department of Transportation (Iowa DOT) shall be the lead agency. Responsibilities of the lead agency shall include the following:

1. Request for the use of 100% State Planning and Research (SPR) funding from FHWA. This responsibility has been completed. The Associate Administrator for the Research and Development sent a letter dated July 14, 1998 to Mr. Author Hamilton, Regional Administrator (HRA-07) Kansas City, Missouri authorizing member states of the pooled fund study SPR -3(060), "Highway Maintenance Concept Vehicle Phase 3" to proceed with the study using 100 percent State Planning and Research (SP&R) funding. The assigned study number is SPR-3(060), "Highway Maintenance Concept Vehicle Phase 3."
2. Solicit participating agencies for funds
3. Request participating agencies to obligate funds
4. Develop with participating agencies any agreements for conducting the Phase III STUDY
5. Develop and negotiate any contracts for conducting the Phase III STUDY
6. Administer the contracts for the Phase III STUDY and the MOU
7. Obtain written or verbal agreement from participating states regarding changes in Phase III Study scope or revisions to the schedule
8. Provide periodic status reports to the participating states that will include work accomplished, percent work completed and money spent, planned progress versus actual progress and actions taken to bring the project back on schedule.
9. Review bills from the university and submit to the FHWA Iowa Division Office for payment where SPR funding is involved (or bill participating agencies if other funds are involved)
10. Provide Phase III STUDY results to participating states and the FHWA
11. Notify the Iowa FHWA Division Office coordinator of the Phase III STUDY completion
12. Notify participating states of closure of the Phase III STUDY

Participating Agencies

Iowa Department of Transportation
Michigan Department of Transportation
Minnesota Department of Transportation
Federal Highway Administration

Study Team

A Study Team has been established and includes membership as follows:

1. At least one person from each of the DOT's who is knowledgeable about winter maintenance activities and the functions of the concept vehicle and the relative importance of the impact of the Phase III STUDY
2. A representative from each FHWA division office from the respective participating states as ex-officio members
3. A representative from FHWA, Office of Technology Applications, as an ex-officio member

The designated chairperson of the Study Team is Leland D. Smithson, Deputy Director - Maintenance Division, from the Iowa DOT. It is his responsibility to work with the FHWA in coordinating the Phase III STUDY and to arrange for meetings, as necessary, between the DOT's and/or the principal investigator (PI) Bill McCall.

The duties of the Phase III Study Team shall be as follows:

1. Select a chairperson and secretary for the Phase III Study Team
2. Work with the PI in developing the Phase III STUDY work plan
3. Meet as mutually determined by the Study Team to review the quality and progress of the work performed by the PI
4. Determine the funding level and contributions from each participating agency. Obtain and forward information, as required, to assist the PI in conducting the research within the scope of the contract

Funding of Pooled Fund Study

A detailed budget has been developed and is included in the Phase III STUDY work plan. Each participating agency will sign a participation agreement to formally commit funds for the Phase III STUDY. The execution of the MOU shall constitute that agreement. Each agency will share equally in the costs for the Phase III STUDY, as determined by the Study Team and agreed to by the participating agencies.

FHWA has established project number SPR-3(060), appropriation code 060, for this research Phase III STUDY. Therefore, the participating states agree that funding will be 100% SPR.

Flow of Funds

The flow of funds shall take place annually as follows:

1. 100% SPR funds will be pooled in FHWA headquarters by each participating state. Each state shall advance to FHWA funds under agreement at the start of the project and at the beginning of Federal Fiscal Year 1999 to cover anticipated annual contract obligations. Each state must develop the necessary documentation (PR-2's) and approvals for their SPR Part II Work Program to cover these costs. SPR funds can be carried over to the next fiscal year. The anticipated project funding breakdown by fiscal year is outlined in the following table:

Federal Fiscal Year	Individual State Obligation	Contract Obligation
1999 (10-1-1998 to 9-30-99)	\$90,000	\$270,000

2. An appropriate contract executed between the Iowa DOT and Iowa State University will provide the means for the PI to invoice the lead agency for the work performed. The Iowa DOT will then review the invoice and forward it to the FHWA Iowa Division Office. The FHWA Iowa Division Office will then approve the invoice and ensure that the amount of each invoice is divided equally among the three states.

Procedures for Withdrawing from the Phase III STUDY:

If a signator to this MOU desires to terminate participation in the Phase III STUDY, the appropriate official shall notify the Study Team chairperson at least thirty days in advance of the actual withdrawal date. The signatory requesting termination will retain responsibility for all existing work up to the time of the actual withdrawal date.

Audits:

The Iowa DOT will comply with the Federal Audit requirements and its records will be available for review by the participating agencies and FHWA. All records relating to the performance of any work accomplished under the Phase III STUDY shall be retained by the Iowa DOT for a period not less than three years after final payment.

Execution of Memorandum of Understanding

The _____ and the Federal
(State Highway Agency)

Highway Administration agree to the Memorandum of Understanding and authorize their officers to execute it, thereby obligating appropriate funding for the STUDY.

State Highway Agency

Federal Highway Administration

(Agency Name)

(Division Office)

(Signature)

(Signature)

Name: _____

Name: _____

Title: _____

Title: _____

Date: _____

Date: _____