ANALYSIS OF LOW MODULUS INTERLAYERS IN EXISTING PAVEMENTS

HPR-1-23(183)

FINAL REPORT

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Introduction

Project HPR-1-23(183) was originally designed to investigate the mechanistic behavior of Stress Absorbing Membrane Interlayers (SAMI) in the overall pavement overlay system. The objective of the study was to optimize the use of this stress absorbing concept in different applications with a view toward establishing criteria for overlay design. Laboratory testing, field verification, and an analytical study of SAMIs was to be performed.

This project was submitted as a research propsal for a 24-month study in January, 1981. Approval was given by the FHWA and ADOT and the project began on May 1, 1981.

This report discusses the proposed workplan, those parts of the workplan that have been completed, and the mitigating circumstances for the incomplete portions.

Proposed Workplan

The project was originally organized into three separate phases:

a) Laboratory Studies: This phase was divided into three components. First, the modification and/or fabrication of testing equipment was to be completed; second, samples of five different asphalt-rubber formulations were to be prepared for testing; and third, creep and relaxation testing of the asphalt-rubber samples was to be performed under varying temperatures and rates of loading.

b) Field Studies: This involved the testing of pavement cores taken from several roadways around the state where SAMIs had been used.

c) Analytical Studies: After the testing of the lab and field samples to obtain the properties of SAMI, finite element analysis was to be utilized to investigate SAMI behavior and determine optimum use.

Completed Portions of the Workplan

All the necessary equipment for laboratory testing has been received. This includes the test apparatus, temperature control chamber, digital readout, printer, and LVDT. The calibration curves for the LVDT have been completed and the temperature chamber has been partially calibrated. Two hundred and fifty asphalt plugs, designed as bases for holding the asphalt-rubber interlayer samples during testing, have been made. However, none of the asphalt-rubber formulations have been fabricated and no testing has been performed.

One hundred and forty five pavement cores for the field studies have been received; however, 47 of these are broken, leaving 98 cores intact. The cores were broken during removal, transit and storage. It is possible that some of the broken cores may be suitable for testing. Some preliminary testing has been performed on these cores, but no usable data has been recorded.

No analytical study has been performed.

Mitigating Factors

In the initial stages of this project, problems were experienced in obtaining all of the required equipment. Considerable delays due to the purchasing process were involved in obtaining the digital readout, recorder, and LVDT. Much effort was also expended in obtaining the use of an environmental chamber. ASU eventually purchased equipment for this purpose.

Equipment failures also posed problems. The asphalt concrete compaction machine broke down and additional molds had to be fabricated.

In May, 1982, the Principal Investigator on this project left state service. In September of 1982, ASU submitted a proposal to complete the project. ATRC requested minor modification in the proposal (mainly to reduce costs and shorten time to completion). Several meetings between ATRC and ASU were held but ASU did not submit a revised proposal.

Project Costs

The following is a cost breakdown for this project:

Travel	$ 1758.60
Equipment Services	2550.29
ATRC Labor Charges	22473.13
ATRC Lab Charges	2142.50
Professional and Outside Services (ETL)	9367.03
Material & Test Equipment	5638.82
	$ 43930.17

The major expenditures are for ATRC personnel to evaluate the various testing methods, develop equipment, prepare specimens, and calibrate the test procedure. The work done by the outside consultant was in the same areas.

Conclusion

This project was initiated in May, 1981 and was to be completed in April, 1983. However, due to a variety of problems, with equipment and personnel, the project remains in the preliminary stage of completion.

This report closes out project HPR-1-23(183). A new project HPR-1-25(203) is in preparation stages. This new project will carry on the work of HPR-1-23(183) and include new ideas generated during HPR-1-23(183) and (177).

The following sheet contains a list of the items purchased, their price, and our estimated residual value. We anticipate assigning these items to project HPR-1-25(203).

PURCHASED ITEMS

	Cost	Residual Value
Micrometer	$ 30.00	$ 20.00
Calibration Frame	35.00	20.00
Direct Shear Apparatus*		
Parts	466.00	-
Parts	1,488.00	-
Modification	885.00	-
Printer	815.00	700.00
LVDT	500.00	400.00
Digital Readout	1,100.00	900.00
Miscelleneous		
Printer Pens	50.00	-
Printer Paper Cable	50.00	-
Lead Shot (5 bags)	65.00	-
Printer Paper	80.00	-

* Equipment has been returned to ADOT Materials Section for production work.