

Wisconsin Highway Research Program
Rigid Pavements Technical Oversight Committee

RESEARCH PROJECT PROPOSAL

I. PROBLEM TITLE

Effects of heavy loading on Wisconsin's Concrete Pavements

II. BACKGROUND AND PROBLEM STATEMENT

A Report on Early Distress for a 6.5-mile stretch of USH 8 and an 8-mile stretch of USH 51 near Rhineland was received from the District 7 Soils Engineer in July of 2001. The pavements in question were constructed as a part of new alignment in 1991 and 1992 and within two to four years of construction were exhibiting significant early distress in the form of longitudinal cracking. These are 9-inch, doweled PCC pavements with randomly spaced and skewed joints (unsealed), and centerline parting strips. The base was a six-inch dense graded base course.

As a result, a team was assembled to respond to and investigate the possible reasons and causes for the early distress. In addition, field and lab testing were performed on both pavements. Results of the tests and analysis showed that the subgrade support is not an influential factor in pavement failure in this case; the primary cause of the premature failure was determined to be primarily attributed to overloaded trucks. The report recommended that the Department implement construction specification for PCC pavement flexural strength. Also implement the mechanistic design process as it becomes available, which is based on actual and projected vehicle loading to determine the width and thickness of the designed pavement.

The Department proposes to fund a research study that will gather concrete pavement design procedures from other cold weather states and Canadian Provinces that have procedures in place to design concrete pavements to handle heavier than normal loads along historical heavy loading corridors, such as the routes between forested areas that are conducting logging operations and the mills that receive the logging product.

III. SCOPE

The scope of this project includes a single phase. The phase will consist of the successful bidder meeting with the Rigid Pavement Technical Oversight Committee in order to develop a work plan for the solicitation of concrete pavements design criteria for heavy loading conditions, from other State Departments of Transportation, the Canadian Provinces, as well as a thorough search of the literature in order to identify design criteria and procedures that may not be

currently in place by other state departments of transportation. This data will be reported back to the Rigid Pavement Technical Oversight Committee in the form of a formal report, with recommendations, as to the most economical and efficient design procedure to follow. The design procedure should include a selection process that is based on actual load data from particular heavy loading routes.

IV. SPECIFIC RESULTS, FINDINGS, TOOLS, ETC.

The design procedures discovered under this proposal will include demonstrated benefits to the pavement owner as shown by a detailed life cycle cost analysis.

V. LENGTH OF RESEARCH PROJECT AND APPROXIMATE COST

The required length of time to complete this project is anticipated to be 6 months from the date of the execution of the contract. However, the Rigid Pavement Technical Oversight Committee will evaluate all proposals for length of time against the quality of the final product as a key part of the selection criteria. A cost estimate of approximately \$15,000 is estimated by the TOC. The estimated costs will be supplied by the research team in their proposal. This information will be evaluated by the TOC as part of the selection criteria. A final report documenting all work will be required.

VI. URGENCY AND POTENTIAL BENEFITS

The potential benefits of this project are large, in those areas of the state that are experiencing premature distress of the expected long life of their concrete pavement, due to heavy truck loading.

VII. ADDITIONAL REQUIREMENTS FOR IMPLEMENTAION

The results of this study may impact WisDOT policies and specifications. Additional work may be necessary to incorporate the study results into WisDOT policy manuals and the Standard Specifications. Such work is beyond the scope of this research effort.