Research Project Statement

Fiscal Year: 2005
Project Statement Date: December 18, 2003
Project Number: 0-4893
Title: Performance of Old Concrete under Thin Overlays

RMC Number: 1
Developed By: Andrew Wimsatt (FTW), J. A. (Tony) Yrigoyen (HOU), Magdy Mikhail (CST), Revised by Dr Claros RTI

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Duration (# of years): 2 yrs

Total Budget:
First Year FY $ 
Second Year FY $ 
Additional FYs FY $ 

Project Description: Thin Bonded Concrete Overlays (BCO) and thin Asphalt Concrete Pavement (ACP) overlays have been regularly applied as rehabilitation strategies on old Portland cement concrete pavements. These overlays are usually two inches thick. It is not clear how such overlays protect and extend the life of such pavements. An evaluation of the performance of BCOs is needed to see if this treatment is cost effective. In addition, thin ACP overlays usually are much less expensive than thin bonded concrete overlays, so if such ACP overlays provide the same benefit and performance as BCO in certain situations, the ACP overlays may be the preferred strategy. Finally, thin BCO can be comparable in cost to total reconstruction of the pavement, so if BCOs are found to provide limited benefit in certain situations, then total reconstruction may be the preferred strategy.

This proposed research project will involve the following tasks:

1. Investigate the properties of existing sections of BCOs that have been in service over extended period of time using a combination of laboratory and field tests. The Houston District has also placed thin bonded concrete overlays on several projects, some of which involved milling up to two inches of the old concrete pavement before the overlay was placed. In particular the quality and integrity of the old concrete (below the BCO) should be assessed to evaluate strength and durability and the absence of alkali-silica-reactions (ASR). The field data collection should include distress surveys of selected sites and sampling for more detailed laboratory investigation. Using the data collected the researchers should develop performance curves and LCCA if possible for BCOs.

2. TxDOT has been using in the past some special materials. For example, the Houston District plans to place Novachip and a Porous Friction Course on an old concrete pavement. Also, the Fort Worth District has placed two inch thick ACP overlays on several old concrete pavement sections. A complete evaluation of these sections is needed to see how these sections are performing. This evaluation should include field and laboratory data. LCCA should also be included if possible. The old concrete would need to be investigated for physical and micro-structural deterioration to evaluate if the overlay is a good rehabilitation solution. This evaluation should also be used for the pavement thickness determination.

3. Using the information collected, develop criteria and guidelines for the selection of projects that can be rehabilitated with thin overlays (BCO or others). A guideline for pavement design should also be included. A methodology for life cycle cost analysis for overlays over old pavements is also needed to compare with other alternatives such as complete replacement of the concrete pavement.

Deliverable Products And Reports:
1. Products and reports should include as a minimum:
   - Guidelines for the selection of BCOs or other thin overlays.
   - Guidelines for the design of BCOs and thin overlays
   - Methodology to compare different type of thin overlay using B/C ratio or LCCA.
2. Research reports that fully document the research performed, findings and recommendations including test
results and analysis, cost analysis and relevant guidelines for using thin bonded concrete overlay in repairing concrete pavements.

3. Project Summary Report (PSR) of a maximum of 4 pages to summarize work accomplished, findings and conclusions.

**Implementation:**
Research results will be implemented primarily through distribution of report to TxDOT designers. Researchers will also make presentations to TxDOT personnel concerning their work.

**Pre-proposal Meeting:**  ☒ Yes  ☐ No  
Tuesday, February 10, 2004, 2:30 p.m. to 4:30 p.m. at 4000 Jackson Avenue, Bldg. 1, Austin, TX in the San Jacinto Conference Room, 3rd floor. 
Teleconferencing is available.

**Sole Source Justification, if applicable:**

**Additional Information:**

**Proposal Submission:**
- Proposals are required to be submitted in both hard copy (4 copies) and PDF format (1 PDF file per proposal). Both formats are used within TxDOT for evaluating the proposals and **must** contain identical information.
- The “Background and Significance” portion of the proposal should be limited to 10 pages.
- All proposals from researchers should be sent directly to your university’s Research Liaison for submission to RTI. The Research Liaison is TxDOT’s official contact with the university.

**Deadlines (for RTI use only):**

1. All individuals interested in proposing are encouraged to contact the PC/PD by February 6, 2004.
2. Proposals are due to RTI by 4:00 p.m. CST on Wednesday, March 24, 2004.