R&T UPDATE
Concrete Pavement Research & Technology

THE INNOVATIVE PAVEMENT RESEARCH FOUNDATION: WHO WE ARE AND WHAT WE'RE DOING

Why the Innovative Pavement Research Foundation?
The mission of the Innovative Pavement Research Foundation (IPRF) is to provide applied research, technology transfer, and public education of concrete pavements for highways, streets, roads, and airports. Applied research embraces the idea that implementation, the key to the usefulness of any new technology or practice, is incorporated into the research program. As research is undertaken and completed, implementation occurs seamlessly and in a shorter time span. Recognizing this need for applied concrete pavement research, the concrete industries got together in 1997 and created the IPRF. The application of concrete pavement research to current and future construction and technologies is a major goal of the IPRF.

What is the IPRF?
The IPRF is a non-profit organization, chartered in 1997 to provide applied research, technology transfer and implementation, and public education for concrete pavements. The IPRF is jointly owned by the American Concrete Pavement Association (ACPA), the Portland Cement Association (PCA), and the National Ready Mixed Concrete Association (NRMCA).

In the *Transportation Equity Act for the 21st Century* (TEA-21), Congress recognized the need for applied concrete pavement research, designating $30 million to the effort. This unprecedented action provided an excellent opportunity for the public and private sectors to work together to improve our transportation system. In March 1999, the IPRF and the Federal Highway Administration (FHWA) formed a partnership to conduct a total of $25 million of concrete pavement research and technology advancement. **Through this cooperative agreement, the IPRF and FHWA will each conduct $12.5 million of applied concrete pavement research.**

The IPRF/FHWA cooperative agreement marked a major achievement in public-private partnerships and is now considered the model for future research partnerships. The agreement currently calls for 15 key research projects (called "Tasks") to meet immediate research needs. The 15 projects currently underway or planned to start soon are described further in this report.

For more information on these projects, contact any of the Task Leaders, or contact Bob Betsold at IPRF, 703-288-8564 (email: rbetsold@erols.com).

July 2000

acpa
5420 Old Orchard Road
Suite A-100
Skokie, Illinois 60077-1059
Phone: 847-966-2272
Fax: 847-966-9970
www.pavement.com

IPRF
7777 Leesburg Pike
Suite 202-S
Falls Church, VA 22043
Phone: 703-288-8564
Fax: 703-288-8566
www.iprf.org

What is the IPRF Doing?

Fifteen tasks will be undertaken during the first two years of the IPRF/FHWA cooperative agreement. These tasks address some of the most immediate concrete pavement research priorities:

Task 1:
Traffic Management Studies for Reconstructing High Volume Roadways

This project will utilize actual construction projects on urban highways to demonstrate construction processes and traffic management strategies aimed at minimizing traffic and user disruption. Through well-documented case studies, successful techniques will be captured and documented with photos, video, and construction reports. The experiences of the parties involved and the related technologies will then be presented at national conferences or open houses.
Research Agency: Texas Transportation Institute, College Station, Texas
Principal Investigator: Stuart Anderson *Task Leader: Larry Cole, ACPA (847-966-2272)*

Task 2:
Impact of Texturing and Surface Treatment on Reducing Wet-Weather Accidents

This project will collect accident data from pavements of varying surface treatments. The data will be analyzed to determine a relationship between surface type, noise, surface texture, and wet-weather accidents. Guidelines will be developed for optimal surface textures.
Research Agency: Contract in Negotiation Principal Investigator: Contract in Negotiation
Task Leader: Lon Hawbaker, ACPA (847-966-2272)

Task 3:
Performance and Design of Whitetopping Overlays for Heavily-Trafficked Pavements

Whitetopping overlays are concrete overlays of existing asphalt pavement. Task 3 will develop a mechanistically-based design procedure for the three broad classes of whitetopping overlays: Ultra-Thin (less than 4 inches), Thin (4 to 8 inches), and Conventional (greater than 8 inches). Construction and quality control guidelines will be developed to ensure that quality whitetopping pavements are built, and potential rehabilitation alternatives will be identified.
Research Agency: Transtec Consultants, Austin, Texas
Principal Investigator: Robert Rasmussen Task Leader: Jim Mack, ACPA (847-966-2272)

Task 4:
Tests or Standards to Identify Compatible Combinations of Individually Acceptable Concrete Materials

This project will evaluate a variety of materials commonly used in concrete pavements (such as aggregates, cements, additives, and admixtures) to determine potential problems with certain combinations. Tests will then be developed to predict problems with specific combinations of materials.
Research Agency: Construction Technology Laboratories, Skokie, Illinois
Principal Investigator: Shiraz Tayabji *Task Leader: Colin Lobo, NRMCA (301-587-1400)*

Task 5:
Accelerated Loading Tests of Ultra-Thin Whitetopping (UTW)

This task involves testing the ultra-thin overlay projects at FHWA's Turner-Fairbanks Accelerated Loading Facility. Existing UTW design procedures will be verified and/or calibrated using the testing data, and the results will be distributed in professional publications.
Research Agencies: FHWA (testing); Transtec Consultants, Austin, Texas (data analysis)
Principal Investigator: Robert Rasmussen (data analysis)
Task Leader: Larry Cole, ACPA (847-966-2272)

Task 6:
Costs and Benefits of Various Components of Concrete Pavements

Task 6 will determine the costs of various concrete pavement components on a state, regional, and nationwide basis. The cost/benefit of each material will be analyzed, and specific recommendations will be made on how each state might revise its design standards to optimize the cost/benefit ratio.
Research Agency: Applied Pavement Technology, Oakbrook Terrace, Illinois
Principal Investigator: John Naughton
Task Leader: Jerry Voigt, ACPA (847-966-2272)

Task 7:
Field Trials of Concrete Pavement Product and Process Technology

In many cases implementing new technology into the highway industry presents a major challenge: A contractor cannot use technology unless it is specified, but a state cannot specify or allow a new technology until it is tried and proven. Task 7 seeks to encourage state agencies to partner with their local contractor and material/equipment supplier constituents to implement new or improve existing technology. Through open solicitation, public and private agencies can seek funding to try new or improved concrete pavement technologies in field conditions. Reports, photos, video, and written reports will capture each effort for education and technology transfer.
Program Administrator: Peak Management Consultants, St. Charles, Illinois
Principal Investigator: Theodore Neff
Task Leader: Larry Cole, ACPA (847-966-2272)

Task 8:
Performance and Design of Separated (Unbonded) Concrete Overlays

Currently, separated concrete overlays are designed without considering the effect of interaction between the overlay and the underlying pavement. This conservative assumption leads to unnecessary overlay thickness. This project will develop analytical models and mechanistic design procedures that accurately predict the response of separated overlays to wheel and environmental loads. The design procedure will be calibrated to actual field data and consistent with the AASHTO 2002 Pavement Design Guide.
Research Agency: To be determined
Principal Investigator: To be determined
Task Leader: Jim Mack, ACPA (847-966-2272)

Task 9:
Influence of Sealing Transverse Contraction Joints on the Overall Performance of Concrete Pavement

This project will involve field surveys of existing concrete pavement studies and test sections to evaluate the impact of sealing transverse joints. The effect of different joint sealing methods will be examined regarding the long-term performance of concrete pavements and cost effectiveness of each method. A research plan for constructing new test sections to evaluate the effect of transverse joint sealing will also be drafted to allow for additional experiments solely devoted to this issue.
Research Agency: To be determined
Principal Investigator: To be determined
Task Leader: Larry Cole, ACPA (847-966-2272)

Task 10:
Revision of I-Slab 2000 for Subbase/Pavement Interaction

This task will undertake the revision of ISLAB-2000 analysis program to account for the interaction between the concrete slab and the underlying layer. Trial runs and sensitivity studies will be performed to ensure that the program is functioning correctly. ISLAB-2000 is a key part of the new 2002 AASHTO Pavement Design Guide, now in development.
Research Agency: ERES Consultants, Champaign, Illinois
Principal Investigator: Lev Khazanovich *Task Leader: Larry Cole, ACPA (847-966-2272)*

Task 11:
Workshops on Concrete Pavement Technology for State DOT Pavement Engineers

This project involves conducting two-day workshops on concrete pavement technology for state DOT pavement engineers. Researchers and authorities on concrete pavement technology will present new technology and lead classroom-style discussions on new or improved concrete pavement technology. Many results from other IPRF projects will be presented.
Conducting Agency: ACPA, Skokie, Illinois
Task Leader: Larry Cole, ACPA (847-966-2272)

Task 12:
Develop a Plan to Investigate the Impacts of Pavement Cracking on Long-Term Performance

This task will convene an Expert Task Group (ETG) to explore the impacts of cracking on long-term performance. The ETG, combined with a literature search, will assist in preparing a research plan to address the impacts of pavement cracking on long-term concrete pavement performance.
Research Agency: To be determined
Principal Investigator: To be determined *Task Leader: Jerry Voigt, ACPA (847-966-2272)*

Task 13:
Determine Actual Life Cycle Costs

This project will select and perform a comprehensive life cycle cost analysis (LCCA) for three specific highway sections. Based on historical records, the actual life cycle costs of these roadways will be determined. The results will be assembled into appropriate reports.
Research Agency: ERES Consultants, Columbia, Maryland
Principal Investigator: Toby Crow *Task Leader: Larry Cole, ACPA (847-966-2272)*

Task 14:
Aurora 2000 Pavement System Analysis Tools

Task 14 involves the development of Aurora2000, a comprehensive pavement analysis computer program. Using mechanistic/empirical principles, Aurora2000 will analyze pavement sections to predict pavement performance and life-cycle costs.
Research Agency: Transtec Consultants, Austin, Texas
Principal Investigator: Frank McCullough *Task Leader: Gerry Krozel, Prairie Materials*

Task 15:
Long Term Technology Plan for Concrete Pavements

While most of the first 14 IPRF tasks concentrate on immediate research needs, we recognize the need for a longer-term comprehensive plan to meet our future work in partnership with public and private agencies. Task 15 will undertake this effort.
Research Agency: To be determined
Principal Investigator: To be determined *Task Leader: Larry Cole, ACPA (847-966-2272)*