Guide for the Participation

In the

6th Year, 2005-2006

ASCE-LTPP International Contest on LTPP Data Analysis

Prepared by

ASCE-LTPP Task Committee

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1. INTRODUCTION

1.1 Background

The "International Contest on LTPP Data Analysis" is a joint effort between the Federal Highway Administration (FHWA), the Long-Term Pavement Performance (LTPP) Program, and the Task Committee on Long-Term Pavement Performance Contest, a subcommittee of the Highway Pavement Committee of the Transportation and Development Institute (T&DI) of the American Society of Civil Engineers (ASCE). The contest was initiated in August 1998 and is designed to encourage students, professors, State Highway Officials, and consultants from around the world to get involved in using the LTPP data compiled by the FHWA over the past 13 years. The database offers a unique opportunity for everyone to work individually or in teams, in the development of papers, which will benefit transportation engineers and which will be considered for awards. All participants receive letters of recognition. Winners receive cash prizes, plaques, and certificates as per the recognition awards described in this guide.

1.2 Scope

This guide provides the information that contestants will need in order to participate in the international contest. It includes the following:

1. Background of the LTPP program.
2. An introduction to the DataPave online web tool that contains the most recent LTPP data;
3. Critical dates for the contest - paper submission, review period, and recognition;
4. Guidelines for paper submission and evaluation criteria;
5. Contest Awards and recognition for the contest winners;
6. Expected benefits of the contest.

2. LONG-TERM PAVEMENT PERFORMANCE (LTPP) PROGRAM

2.1 Background

During the early 1980s in the United States of America, the Transportation Research Board (TRB) of the National Research Council, under the sponsorship of the Federal Highway Administration (FHWA) and with the cooperation of the American Association of State Highway and Transportation Officials (AASHTO) undertook a thorough study of the deterioration of the nation's highway and bridge infrastructure system. The study recommended that a "Strategic Highway Research Program (SHRP)" be initiated to focus research and development activities that would make major contributions to improving highway transportation. The study report, published as *TRB Special Report 202* during 1984, emphasized six research areas, with the Long-Term Pavement Performance (LTPP) program as one of the key research areas. During 1985 and 1986, independent contractors developed details of the research programs for SHRP. The detailed programs were published in May 1986 as a TRB Report entitled "Strategic Highway Research Program - Research Plans."

The SHRP program, now finished, was passed on to the FHWA in 1992 and is currently called the Long-Term Pavement Performance (LTPP) program. It continues the work started by its predecessor, the SHRP program until it is concluded. The LTPP program continues the research study of in-service pavements as it was envisioned by SHRP, as a comprehensive program to satisfy a total range of pavement information needs. It draws on technical knowledge of pavements presently available and seeks to develop better models to explain how pavements perform. It also seeks to gain knowledge of the specific effects on pavement performance due to various design variables, such as traffic, environment, materials, construction quality, and maintenance practices. As sufficient data becomes available with time, analysis is conducted to provide better performance prediction models for use in design and pavement management.

The overall objective of the LTPP program is to increase pavement life by investigation of various designs and rehabilitated pavement structures, using different materials and under different loads, environments, sub-grade soil, and maintenance practices. The specific objectives for the LTPP program are:

1. Evaluate existing design methods.

2. Develop improved design methodologies and strategies for the rehabilitation of existing pavements.
3. Develop improved design equations for new and reconstructed pavements.
4. Determine the effects of (a) loading, (b) environment, (c) material properties and variability, (d) construction quality, and (e) maintenance levels on pavement distress and performance.
5. Determine the effects of specific design features on pavement performance.
6. Establish a national long-term pavement database to support the programs objectives and future needs.

The LTPP program comprises a matrix of several types of studies. These include General Pavement Studies (GPS) and Specific Pavement Studies (SPS). The GPS involve a very large experiment consisting of in-service pavement test sections throughout the U.S. and Canada embracing an array of site selection factors that provide information for a national database to meet the objectives of the LTPP program. The SPS have their own set of limited goals, construction needs, and experimental approaches that cannot be achieved by the GPS. The SPS are intensive studies of few specific variables. In addition to the GPS and SPS test sections, a separate program was established to study the effects of environment on the long-term performance of in-service pavements, the Seasonal Monitoring Program (SMP). About 65 GPS sections were designated as SMP test sections. For the SMP sites, continuous or more frequent data collection is performed to capture the effect of environmental variation on pavement performance.

Several broad classes of data are contained in the LTPP database including:

1. General information
2. Inventory data
3. Climatic data
4. Materials test data
5. Maintenance data
6. Rehabilitation data
7. Traffic data
8. Pavement monitoring data

The LTPP data being collected are housed in an Information Management System (IMS). It is the world's largest pavement performance database ever created, with enormous potential for the development of products to

improve pavement technologies in the future. The document "Introduction to LTPP Data" (April 1999) presents a discussion of the uses of and limitations of LTPP data in pavement performance analyses, general data availability, and data update schedule.

For further details on the LTPP program, please visit on the INTERNET: http://www.tfhrc.gov/pavement/ltpp/ltpp.htm or contact the LTPP Customer Support Services at (865) 481-2967, or e-mail ltppinfo@fhwa.dot.gov.

2.2 DataPave Tool

Because of the size of the LTPP database, which is evolving continuously to accommodate data collected over a period of 13 years, the IMS is designed to optimize storage space. The data are stored using a relational database design that involves over 6,000 data elements in over 400 tables. This approach greatly enhances the system's ability to store massive amounts of data in a very organized fashion. However, the storage scheme makes data accessibility somewhat difficult, since it requires extensive knowledge of the information and format of the LTPP database, which includes knowledge about the database structure, data codes, data collection, testing protocols, and relationships between data tables. To address the need for a structured and user-friendly LTPP data source accessible from a desktop computer, a tool was created called "DataPave". DataPave was first created in software form and now provided online at www.datapave.com. The primary objective of this tool is to provide the LTPP database users with a user-friendly front-end application that can be used to explore, extract, and organize the LTPP data along with having the most recent data release of the LTPP database available to users.

The first step in using DataPave is to select the LTPP test sections of interest to the user. There are two ways of accomplishing this, either by using the Visualization by location or Criteria method.

- By Location (using online map)

  Steps:

  1. Select the appropriate experiment type GPS, SPS, or SMP.
  2. Then select which specific experiment GPS-1, SPS-5 or SMP.

3. Then select the site-specific experiment and its state location.

NOTE: This selection will provide performance data for the selected LTPP section(s).

- By Criteria

Steps:

1. Select first the state(s), or LTPP region.
2. Select Experiment type.
3. Select Parameters for climatic region, subgrade type, and other filter criteria.

NOTE: This selection will provide performance data for the selected LTPP section(s).

When using either method performance trends and detailed information can be obtained.

Data extraction is possible by conducting the following steps:

- Table Export

1. Select from the menu items Tools | Table Export
2. Select the IMS Module and Table that you want to extract data from.
3. Select the test site(s) (multiple selections are allowed by using standard windows keystrokes) that you want data from.
4. Click on Export.
5. Click on download.

NOTE: A summary of the requested information is displayed in the following screen. Three additional documents can be downloaded at this time as well.

- LTPP Data Disclaimer
- LTPP Data Dictionary
- LTPP Data Codes

3. CATEGORIES and AWARDS

3.1 CATEGORIES

Table 3.1 below describes the four categories and the awards.

Table 3.1 Categories, Team Composition, and Awards

Category	Team	Awards
(1) Undergraduate Students	This category is for undergraduate students only. Teams will consist of up to three undergraduate students. The analysis is restricted to using data available on the DataPave online. The principal author shall be the student who primarily conducted the analysis.	**Best Undergraduate Paper Award**. First Place: $1,500 Second Place: $1,000 Third Place: $500
(2) Graduate Students	This category is for graduate students. Teams will consist of up to three students, which may include undergraduate students. The principal author shall be the graduate student who primarily conducted the analysis.	**Best Graduate Paper Award**. First Place: $1,500 Second Place: $1,000 Third Place: $500
(3) Partnership	This category is for undergraduate or graduate students working in partnership with a state highway agency and/or private organization/ industry. Teams will consist of up to three students not including partners. The principal author must be the student who primarily conducted the analysis.	**Best Partnership Paper Award**. First Place: $1,500 Second Place: $1,000 Third Place: $500
(4) Curriculum	This category is designed to encourage college/university professors to develop an appropriate curriculum using the LTPP database.	**Best Curriculum Paper Award**. First Place: $1,000 Second Place: Plaque Third Place: Certificate

4. Participants

4.1 Student Participants

Graduate and Undergraduate students who graduate anytime during the academic year are eligible to participate. Students who are full-time employees on LTPP-related contracts are **NOT** eligible to participate in the contest. Students that wish to participate in the contest must be sponsored by at least one faculty advisor. The participant must submit a letter of sponsorship from his (her) faculty advisor showing his (her) support and that the paper was neither published nor submitted for publication elsewhere.

4.2 Faculty Participants

Faculty advisors are **NOT** permitted to be co-authors, but their names can be listed as "Faculty Advisors" on the submitted paper manuscript. The cash prize, however, goes to the student team. Faculty members, however, can participate in the curriculum category.

4.3 Other Participants

Non-student or faculty may participate with students under the partnership category. This may include:

1. Highway and Other Agencies
   - Pavement designers
   - Materials engineers
   - Maintenance engineers
   - Traffic forecasters
   - Pavement management engineers

2. Researchers
   - Consultants and research facilities
   - Agency research groups

3. Industry
   - Paving associations (e.g., NAPA, ACPA, AAPT)
   - Manufacturers of paving materials (e.g., TAI, NSA)
   - Automobile and truck associations (e.g., AAA, ATA)
   - Consultants

4. International Organizations
    - International Road Federation (IRF)
    - PIARC
    - World Bank
    - US AID
    - Pan-American Institute of Highways (PIH) (Non-University centers, university centers must participate under graduate and under graduate categories)

5. GUIDELINES FOR PARTICIPATION

5.1 Timeline for Contest

Following is the timeline for the International Contest:

Activity	Date
Initiate Contest	March 15, 2004
Deadline to submit papers	August 16, 2004
Complete Evaluation of Papers	September 30, 2004
Notify Winners	October 15, 2004
Recognition/Awards at TRB Annual Meeting Data Analysis Working Group Meeting (DAWG)	January 2005

5.2 Guidelines for Paper Preparation

The paper preparation guidelines are provided in Appendix A. They can also be viewed at the LTPP web site (http://www.tfhrc.gov/pavement/ltpp/contest.htm)

Each paper must have a cover page including all authors' names, affiliation and addresses. The cover page must also list the category under which the paper is submitted. No name, affiliation or address should appear anywhere else. An example of the cover page format is shown in Appendix B, and can also be downloaded from the LTPP contest web site.

Length of Manuscripts

The length of each paper, including the abstract and references, **may not exceed 7,500 word**s; that is, a paper that is only text should contain no more than 7,500 words. Each figure, photograph, or table accompanying the text counts as 250 words. For example, if two figures and three tables are submitted, the text may be no more than 6,250 words.

Note that 7,500 words is the maximum length; authors are encouraged to keep papers to the minimum length possible, and limit the number of figures and tables, providing only essential information of interest to the reader.

The total number of words in the paper should be noted on the title page. Overlong papers may not be reviewed at the discretion of the Contest Board.

Length and Content of Abstracts

Each paper must have an abstract. The abstract must be no longer than **500** words, it must be self-contained, and it must not require reference to the paper to be understood. In some cases, only the abstract of a paper is read; in other cases an abstract prompts further reading of the entire paper. The abstract should present the primary objectives and scope of the study and the reasons for writing the paper; the techniques or approaches should be described only to the extent necessary for comprehension; and findings and conclusions should be presented concisely and informatively. The abstract should not contain unfamiliar terms that are not defined, undefined acronyms, reference citations, or displayed equations or lists.

5.3 Evaluation Process

The following criteria will be used in the evaluation process:

1. Usefulness of product - potential benefits to end-users
2. Originality of concept
3. Demonstrated use of LTPP database
4. Organization of paper - completeness, references
5. Presentation - clarity, style, etc.

5.4 Review Process

A Contest Board consisting of representatives from the Transportation & Development Institute's (T&DI) Highway Pavement Committee (universities, industry, and user agencies) and the LTPP program will be appointed to evaluate the papers using the criteria outlined above. The winners will be determined for each category in accordance to the classification described in Table 3.1.

5.5 Publication of Papers

Depending on the number of papers and range of scope, the FHWA may print the successful papers in a special report and may also place them on the FHWA web site. Authors are encouraged to seek publication for their papers independently in ASCE journals, TRB records, or other appropriate publications. A release form from the Task Committee on Long-Term Pavement Performance Contest will be issued to authors for publication purposes. This form can be maintained through the T&DI liaison (Andrea Baker, 703-295-6124, abaker@asce.org).

5.6 Paper Submission

Contestants should submit their papers to the Transportation & Development Institute (T&DI) of ASCE in **ELECTRONIC FORMAT ONLY** via e-mail. Diskette or CD can also be submitted, and must be sent to T&DI at the address shown below. In either case, the paper must reach T&DI's office on/or before August 16, 2004. Each paper must have a cover page as described in Appendix B, and be submitted in MS Word format.

E-Mail submission, send the paper file by e-mail to:

ASCE-LTPP Task Committee - LTPP Data Analysis Contest: ltpp@asce.org

Diskette or CD-ROM submission, send to:

American Society of Civil Engineers
Transportation & Development Institute
International Contest on LTPP Data Analysis
Attention: Andrea Baker/ ASCE-LTPP Task Committee
1801 Alexander Bell Drive
Reston, VA 20191-4400

T&DI will transfer all files to Adobe Acrobat PDF format prior to sending to reviewers. This is to ensure that contest paper and their contents are not lost or altered in the process of file copying and/or transfer via the e-mail.

Appendix A
Paper Preparation Guidelines

Paper Preparation Guidelines

Cover page:
Insert a cover page that includes all authors' names, affiliation and addresses. It should also list the contest category (as per table 3.1) for which the paper is submitted (see Appendix B). Papers are reviewed anonymously, and therefore, names and affiliations of authors should appear **only** on the cover page.

Abstract Page:
Following the cover page, insert an abstract page. It should include the paper title. The abstract shall be limited to a maximum of 500 words.

Paper Manuscript (limited to 7,500 words, including figures and tables, see item 5.2):

1. MAIN HEADING – LEVEL 1 CENTERED

(Font: times new roman, 14 point, bold. All caps.)

1.1 Heading Level 2 – Left Justified

Font: times new roman, 14 point, and bold italic. Leave two spaces before and one space after.

1.1.1 Heading Level 3 – Left Justified

Font: times new roman, 12 point, underlined. Leave one space before and after.

Body Text:
Font: times new roman, 12 point. Single-spaced.

References

List references alphabetically by authors last names using the ASCE style.

Appendix B
Contest Paper Cover Page

International Contest on LTPP Data Analysis
"5th" Year, 2004-2005

Contest Entry for Category _____
(insert category number and name as per table 5.1 in the contest operation manual)

Paper Title
(INSERT THE PAPER TITLE USING MAIN HEADING FORMAT)

By:

Author 1 (main) full name
Affiliation
Complete Address, Phone, Fax and E-mail

Example:

Main Author full name
Affiliation
Complete Address, Phone, Fax and E-mail

Author 2 full name
Affiliation
Complete Address, Phone, Fax and E-mail

and

Author 3 full name
Affiliation
Complete Address, Phone, Fax and E-mail

Faculty Advisor (if any)
Full name
Affiliation
Complete Address, Phone, Fax and E-mail

Word Count: Abstract:
Text:
Figures (250 ea)
Tables (250 ea)
Total

Consent:

This paper is submitted to the ASCE-LTPP International Contest on LTPP Data Analysis, 2004-2005, for Category No.? The authors certify that the paper contents were neither published nor submitted for publication elsewhere.