

Guide for Participation

In the

2012

ASCE-LTPP International Contest on
LTPP Data Analysis

Prepared for

Task Committee on the LTPP Contest
The Transportation and Development Institute of
ASCE

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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 17 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. FHWA will reserve the right to publish the winning papers in an LTPP research document, which will be available for free to anyone who desires a copy.

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; and
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, subgrade soil, and maintenance practices. The specific objectives for the LTPP program are to:

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 a 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.fhwa.dot.gov/pavement/ltp/> or contact Antonio Nieves Torres (FHWA) at 202-366-4597 email: Antonio.Nieves@fhwa.dot.gov, Andrea Baker at (ASCE/T&DI) 703-295-6124 email: abaker@asce.org.

2.2 DataPave Online, LTPP Reference Library and the Standard Data Release

Because of the size of the LTPP database, which is evolving continuously to accommodate data collected over 20 years, 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. The database is updated periodically; each update is numbered and called a Standard Data Release (SDR) i.e. SDR 25 was released in January 2011, and SDR 26 was released in January 2012.

To address the need for a structured and user-friendly LTPP data source accessible from a desktop computer, a tool was created called "DataPave." An updated form of DataPave is now provided online at <http://www.ltpm-products.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. This site also provides access to the complete LTPP Reference Library, an extensive set of supporting documents, including the **Data User Guide** (LTPP IMS Pavement Performance Database User Reference Guide, Nov 2010 update to FHWA-RD-03-088).

*NOTE 1: Students are encouraged to use **DataPave Online** but the **LTPP Standard Data Release (SDR)** is also available on DVD. Groups working on the Challenge Theme or other topics requiring large data downloads are encouraged to use the latest SDR from LTPP that is available through LTPP Customer Service at ltpinfo@dot.gov.*

The first step in using DataPave is to select the LTPP test sections of interest to the user. There are several ways of accomplishing this. One of the most popular ways to extract data is by using the Data Extraction Tools. Under Data Extraction Tools, Export by Topic, the LTPP IMS A-Z, Table/Field Navigator and Data Dictionary are useful tools for becoming familiar with the database and extracting the needed data. Guidance is provided here for the Export by Topic tool. To begin, from the DataPave main screen (below), select Data Extraction Tools.

The screenshot shows the LTPP DataPave Online interface. At the top, there are navigation tabs for Home, Products, and Help. Below the tabs is a banner for LTPP DataPave Online, dated Thursday, January 19, 2012. The banner text reads: "LTPP DataPave Online Your Access to the World's Largest Pavement Performance Database Release 25 - January 2011". Below the banner is a breadcrumb trail: Home > LTPP Products > DataPave. The main content area is divided into two sections: "Available Data" and "Data Extraction Tools". The "Available Data" section includes a globe icon and the text: "The first objective is to provide middle- and upper-level managers and other users with quick, easy-to-use presentations to illustrate the value and potential of LTPP data." Below this text is an "Enter" button. The "Data Extraction Tools" section includes a pie chart icon and the text: "The second objective is to provide a user-friendly format for exploring, extracting, and organizing the extensive LTPP data for data analysis." Below this text is an "Enter" button with a blue arrow pointing to it.

Then, the Export by Topic steps are as follows:

The screenshot shows the LTPP Products Online interface with the "Export by Topic" button highlighted. The breadcrumb trail is: Home > LTPP Products > DataPave > Extraction Tools. Below the breadcrumb trail is a grid of buttons: Table/Field Navigator, Data Dictionary, Data Codes, ERD File Builder, ESAL Calculator, LTPP IMS A - Z, Table Export, SQL Export, Export By Topic, and Export History. A blue arrow points to the "Export By Topic" button.

1. Click Export by Topic Tap.
2. Select the Region and State
3. Select the LTPP Experiment Section(s).
4. Then select additional Experiment data
5. Then Click Show Available data.
6. This will refresh the screen and provide an updated view to your selection on the right hand side of the screen.

LTPP DataPave Online
 Your Access to the World's Largest Pavement Performance Database
 Release 25 - January 2011

Home > LTPP Products > DataPave > Extraction Tools

Table/Field Navigator | Data Dictionary | Data Codes | ERD File Builder | ESAL Calculator
 LTPP IMS A - Z | Table Export | SQL Export | Export By Topic | Export History

Select Section
 Choose Region, State and Experiment Type to select LTPP sections.

Regions

- North Atlantic (Amherst, NY, USA)
- North Central (Champaign, IL, USA)
- Southern (Austin, TX, USA)
- Western (Reno, NV, USA)

States/Provinces

- Connecticut
- Delaware
- District of Columbia
- Maine
- Maryland
- Massachusetts
- New Brunswick
- New Hampshire
- New Jersey
- New York

Experiment Type

- GPS-1: Asphalt Concrete on Un-bound Granular Base

Selected Sections

- Number of Selected Regions: 1
- Number of Selected States/Provinces: 2
- Number of Selected Experiment Types: 1
- Number of selected Sections: 1

Selected Data

<input type="checkbox"/> Table Name	Result Count
Inventory	
<input type="checkbox"/> INV_PMA ?	2
<input type="checkbox"/> INV_PMA_ASPHALT ?	2
<input type="checkbox"/> INV_PMA_CONSTRUCTION ?	2
<input type="checkbox"/> INV_PMA_ORIG_MIX ?	2



7. Do additional selections of the Selected Data available

Selected Data

<input type="checkbox"/> Table Name	Result Count
Inventory	
<input checked="" type="checkbox"/> INV_PMA ?	2
<input checked="" type="checkbox"/> INV_PMA_ASPHALT ?	2
<input checked="" type="checkbox"/> INV_PMA_CONSTRUCTION ?	2
<input type="checkbox"/> INV_PMA_ORIG_MIX ?	2



8. Then click select at the bottom of the page and it will provide you with the data export of the table that had been selected in a MS Access zip file. The site will also provide with access to three optional downloads, LTPP Data Disclaimer, LTPP Data Dictionary, and LTPP Data Codes.

Download File

Select the Download button to download your exported data file. You can also download your exported data file at the following URL:

Download File URL: http://www.ltp-products.com/DataPave/ExportByTopic/AccessFiles/Antonio_Nieves_Torres_1_19_2012_4_21_07_PM.zip

Additional Resources:

LTPP Data Disclaimer URL: <http://www.ltp-products.com/DataPave/AdditionalResourcesFiles/dsclaimer.pdf>

LTPP Data Dictionary URL: <http://www.ltp-products.com/DataPave/AdditionalResourcesFiles/LTPPDD.mdb>

LTPP Data Codes URL: <http://www.ltp-products.com/DataPave/AdditionalResourcesFiles/CODES.mdb>

Back **Download**

9. Click Download and start your download.

Another popular way to visualize LTPP data is by selecting the “Available Data” option. The steps are as follows:

LTPP Products Online Antonio Nieves Torres | My Account | Logout

Home | Products | Help

Thursday, January 19, 2012

LTPP DataPave Online
Your Access to the World's Largest Pavement Performance Database
Release 25 - January 2011

Home > LTPP Products > DataPave

Available Data

The first objective is to provide middle and upper-level managers and other users with quick, easy-to-use presentations to illustrate the value and potential of LTPP data.

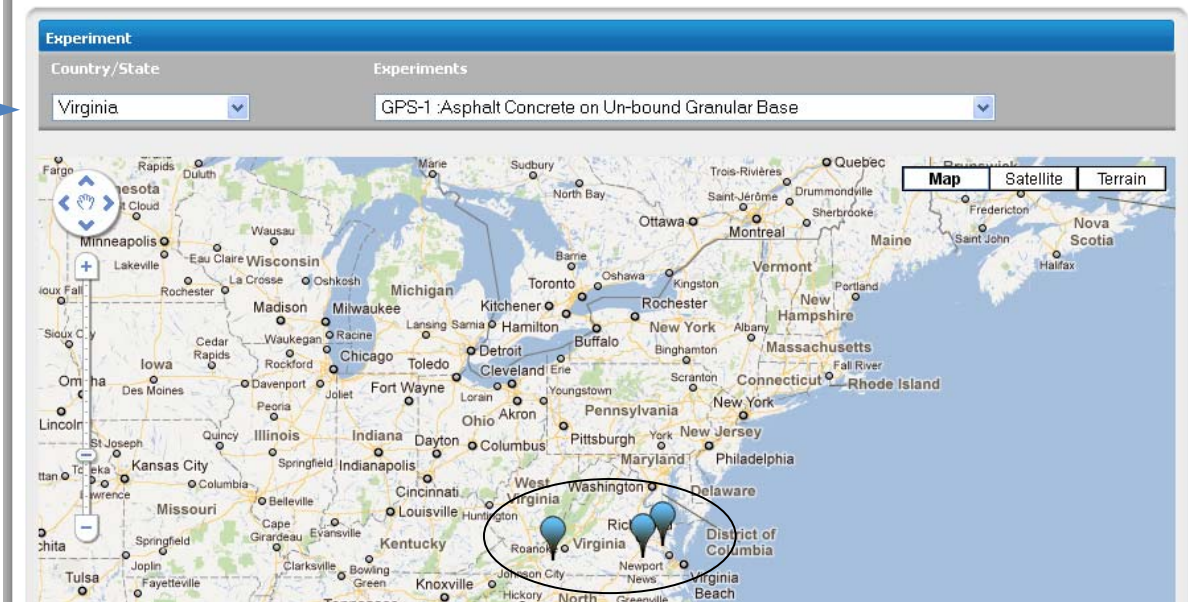
Enter

Data Extraction Tools

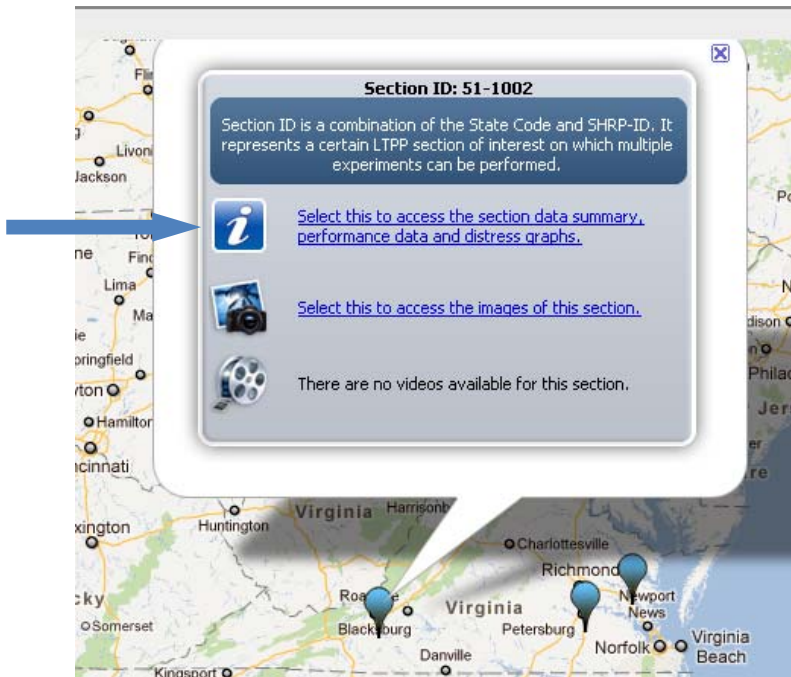
The second objective is to provide a user-friendly format for exploring, extracting, and organizing the extensive LTPP data for data analysis.

Enter

1. Select Enter.
2. Select Country/State
3. Select your Experiment type (i.e. GPS, SPS, SMP). The map automatically updates for the state or states and for the experiment(s) selected and gives you a display of all available LTPP test sections using your selection criteria.



4. Select experiment and an additional pop-up menu is displayed



5. Select the data summary link and the site will display in tabular form some of the data available.

NOTE 2: Please note that while this option is ONLY available to present the available data, it is advised to use option 1 to extract data using the Export by topic, Export table, or SQL Export.

If you are planning to export all the information available from any particular table for all the LTPP test sections, the only way to do this is by using the “SQL Export” feature. You must build the SQL query in order for the web site to handle the amount of data that might potentially be downloaded. The site has a size limitation of 10 mb (compressed), and that multiple downloads may be needed to retrieve all the data needed for a particular analysis.

DataPave Online is an excellent tool for all students for exploring the database, becoming familiar with the data types, and examining the availability of suitable sections and data. For data extraction, students are also encouraged to use DataPave Online, but the LTPP Standard Data Release (SDR) is also available on DVD, containing all of the data as well as the LTPP Reference Library. Groups working on the Challenge Theme or other topics requiring large downloads are encouraged to use the latest SDR from LTPP that is available through LTPP Customer Service at ltppinfo@dot.gov or call 202-493-3035.

3. THEME, CATEGORIES and AWARDS

3.1 *THEME*

The LTPP International Data Analysis Contest will now have an annual theme selected to be relevant to the highway community. The theme for this year's contest is:

Maintenance and Rehabilitation—Effective Investments in Pavement Infrastructure.

Undergraduate and graduate student teams are encouraged to focus on paper topics relevant to this theme. Papers in the partnership category may focus on the annual theme, but may also be on other topics of interest to a partner.

3.2 *CATEGORIES AND AWARDS*

LTPP International Data Analysis will now feature four categories. A new category has been established called the challenge theme. The challenge theme will focus on components of ongoing LTPP research. Papers should make a potential contribution to future research in the challenge topic area.

The Challenge Theme for 2012 is:

Quantify the use of profile measurements for estimating rutting, faulting, and/or other surface characteristics for rigid and flexible pavements

Submissions in all categories will now have a student or students as the principal authors. However, in the Partnership and Challenge categories, additional authors may also be included. The additional authors may include practicing engineers from state highway agencies, other agencies, industry, or faculty members.

Table 3.1 describes the categories and the awards.

Table 3.1 Categories, Team Composition, and Awards

Category		Team	Awards
Challenge Topic		This category is for any team willing to tackle this year’s challenge topic. Teams will consist of one to four students at any level, external partners if applicable, and may include the faculty advisor as a contributing author. The principal author must be the student(s) who primarily conducted the research.	Best Challenge Paper Award First Place: \$2000
Partnership		This category is for undergraduate or graduate students working in partnership with a highway agency and/or private organization/ industry. In this category, the LTPP data may be supplemented with additional state agency data, if desired. Teams will consist of one to four students, the external partners, and advising faculty, if appropriate. The principal author must be the student who primarily conducted the analysis.	Best Partnership Paper Award First Place: \$1500 Second Place: \$1000
Annual Contest Theme	Undergraduate Students	This category is for <u>undergraduate students only</u> . Teams will consist of one to four undergraduate students. The analysis is restricted to using only LTPP data. The principal author shall be the student who primarily conducted the analysis.	Best Undergraduate Paper Award First Place: \$1500 Second Place: \$1000
	Graduate Students	This category is for <u>graduate students</u> . Teams will consist of one to four students, which may include undergraduate students. The analysis is restricted to using only LTPP data. The principal author shall be the graduate student who primarily conducted the analysis.	Best Graduate Paper Award First Place: \$1500 Second Place: \$1000

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 participants must submit a letter of sponsorship from the faculty advisor showing his (her) support and that the paper was neither published nor previously submitted for publication elsewhere. However, after submission for the contest, participants may choose to submit their papers for publication elsewhere, either before or after the contest review process is complete.

4.2 *Faculty Participants*

Faculty advisors are **NOT** permitted to be co-authors with students in the undergraduate or the graduate categories, 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 as contributing authors (after the lead student authors and any partners) in the Challenge and Partnership categories.

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	January 31, 2012
Deadline to submit papers	June 29, 2012
Complete Evaluation of Papers	September 28, 2012
Notify Winners	October 19, 2012
Recognition/Awards at TRB Annual Meeting	January 2013

5.2 *Guidelines for Paper Preparation*

The paper preparation guidelines are provided in Appendix A. They can also be viewed at the www.LTPP-Products.com web site. 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. 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 words**; 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 will NOT be considered by 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.

Footers

All pages of the submitted paper must have a footer. This footer must have:

- "year of contest" i.e. 20## LTPP-ASCE International Contest on LTPP Data Analysis
- Name of Author (1)
- Category
- Page number.

I.E.

20## LTPP-ASCE International Contest on LTPP Data Analysis
John Smith
Category 2
Page 1

5.3 Evaluation Process

The following criteria will be used to evaluate all papers.

1. Usefulness of product - potential benefits to multiple end-users

2. Originality of concept (new/fresh technical topic)
- 3*. Demonstrated ample use of LTPP database
4. Organization of paper - completeness, references
5. Presentation - clarity, style, etc.

* Participants must use more than one LTPP site and data for the paper must only be based on LTPP data.

5.4 Review Process

A pool of reviewers consisting of the Transportation & Development Institute's (T&DI) Task Committee on the LTPP contest and representatives from universities, industry, state agencies and the LTPP program staff (herein called "Contest Board") 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. Upon the completion of the review process, authors are encouraged to seek publication for their papers independently in ASCE journals, TRB records, or other appropriate publications. A release form from the ASCE-LTPP Contest Task Committee will be issued to authors for publication purposes. This form can be maintained through the ASCE/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 June 30, 2010. Each paper must have a cover page as described in Appendix B, and be submitted in MS Word format only. Papers submitted in any other format will automatically NOT be considered!

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

ASCE-LTPP Task Committee - LTPP Data Analysis Contest: ltp@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**

The contest board will screen the papers to check eligibilities and duplicate papers. The board will then transfer all files to Adobe Acrobat PDF format prior to sending to reviewers. This is to ensure that contest papers 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.

Faculty Advisor Sponsorship Letter

Following the cover page, a signed letter from the faculty advisor for participants in categories 1 and 2 should be included on the academic institution letterhead. The letter shall state his/her sponsorship of the student or team and that he endorses their participation and that the paper contents were neither published nor submitted for publication elsewhere.

Abstract Page:

Following the cover page/or the faculty advisor sponsorship letter, insert an abstract page. It should include the paper title (authors names must **not** be included). 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.

Footers

Font: times new roman, 10 point. Single-spaced., page centered

References

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

Appendix B
Contest Paper Cover Page

International Contest on LTPP Data Analysis

"20##" Year,

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 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

* Please use an email address where you can be reached if you leave the current university

Consent:

This paper is submitted to the 20## ASCE-LTPP International Contest on LTPP Data Analysis, for Category No.?
The authors certify that the paper contents were neither published nor submitted for publication elsewhere.