



Camminos

Newsletter of the Pan American Institute of Highways

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Benefits of Pavement Management

The Pavement Management Systems (PMS) Division of ERES provides cost-effective network-level services to manage airport, road and highway, and parking lot pavements. During a PMS project, ERES works with the client to define the existing pavement network, evaluate existing pavement conditions, determine feasible management strategies, and develop realistic budget requirements. This often involves the use of advanced data collection and analysis techniques, as well as sophisticated PMS software packages. PMS implementation projects will typically:

- Review records and define and section network.
- Collect on-site condition data.
- Analyze data, perform modeling, and customize.
- Implement database, training, and technical support.

The purpose of this article is to review the benefits an agency can realize by using a pavement management system.

Tracking and Improving Network Conditions

Successful pavement management, as with many endeavors, begins with understanding where you are before you can know where you want to go. Only by recognizing the current extent and condition of the pavement network is it possible to develop a plan for maintaining it in the future. A PMS database provides a place to store a wide variety of pavement information, including inventory and condition data. The PMS also allows the user to define appropriate and feasible rehabilitation options, as well as identify the conditions that trigger the need for rehabilitation. A good PMS will also allow input of a variety of *what-if* scenarios so that the user can see how changing different parameters (such as minimum acceptable condition, budget, affects backlog) affects the pavement network.

A well-maintained PMS can help establish:

- Condition of the pavement network.

- Agency network priorities.
- Feasible repair alternatives.
- Recommended or most cost-effective repair.
- Best time to apply the repair.
- Budget required to improve or maintain the network at a certain level.

Pavement Performance Modeling

Over time, a PMS database will include a vast quantity of historical pavement condition data about a pavement network. This information can be used to develop pavement performance curves—models that predict how a certain type of pavement will perform based on how it has performed in the past. For example, ERES' Decision Support System for Pavements™ (DSS) divides pavements into categories called *families*, which are based on factors such as pavement construction history, use, location, and traffic levels. DSS then develops performance curves for each pavement family. It then uses the curves to predict the future condition of each pavement section and to help identify when a treatment should be applied.

The Bottom Line

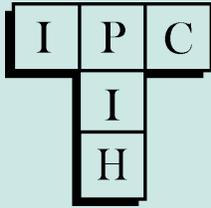
All decisions reflect the bottom line—cost. At any level, from the Federal highway system to individual parking lots, a pavement network represents

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U.S. Department of Transportation
Federal Highway Administration

Message from the President of the PIH Executive Committee to the PIH Network Center Directors

As President of the PIH Executive Committee, it is my pleasure to report to you the results of the Committee's last full session held July 1998, in Miami, Florida, U.S.A.

As part of that session, all Directors participated in a 4-day Seminar-Workshop. Our objective was to study, understand, and prepare a Strategic Plan for the PIH network to be implemented over the next few years. You will soon receive a copy of this plan.

It is both my duty and my pleasure to advise you that we have initiated a new stage supported by a fundamentally new structure with which to think and plan.

The Executive Committee will use this new planning tool first. It will be presented later to each Center so that

each will be able to use it and benefit from its results. We anticipate that this tool will allow each Center to achieve a higher level of organization, receive and study all the suggestions that we can carry out, and enable all Centers to share results achieved. Clearly, this strategic initiative will bring PIH to another level of Total Quality and Excellence.

Based on the Strategic Plan, the Executive Committee has divided Plan tasks into six tasks. Six groups composed of directors and members will work as teams to accomplish each task assignment. The following chart outlines groups and their responsibilities:

Group 1: Establish a system for planning.

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PIH Strategic Planning Meeting Miami, Florida, July 28-31

Back row from left to right: Enrique Dahlhaus (Mexico); Otoniel Fernandez (Colombia); Julio Cesar Caballero (Argentina); Mario Arce (Costa Rica); Carlos Ossa Moreno (Colombia); Edgardo Masciarelli (Argentina); Greg Speier (U.S.A.); Enrique Ordonez (U.S.A.); King W. Gee (U.S.A.); Adolfo Sanz Martinez (Spain); Raul Castro (Colombia); Jay Spaid (U.S.A.)

Front row from left to right: Liana Montero (U.S.A.); Lourdes Massara (Brazil); Maria Lorena Lopez (Costa Rica); Thais Helena Monteiro Penteado (Brazil); Julia Rafael (Venezuela); Yolanda Pinto (Colombia); Myriam Vargas de Morgado (Venezuela) and Tere Franceschi (U.S.A.)

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It is the hope of the PIH Executive Committee that—through your initiatives—you and your Center will perpetuate and integrate this new action. Please forward your comments and studies to the Working Groups, with a copy to the Coordination Committee. Or, send it directly to the Coordination Committee, which will redistribute it.

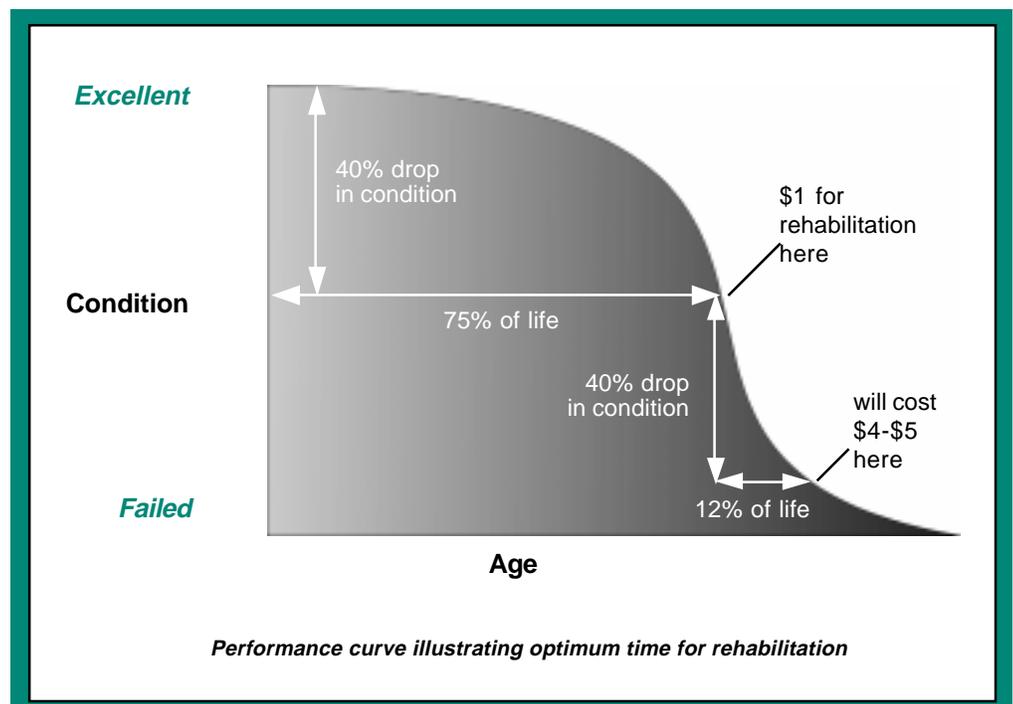
We welcome your news, and we wish your Center every success in using this new tool to achieve its objectives.

JULIO CESAR CABALLERO
President, Executive Committee
Pan American Institute of Highways

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Benefits of Pavement Management

a major investment. Agencies simply do not have the funds available to maintain all pavements in their network in perfect condition. They can, however, protect their investment and optimize the condition of the entire pavement network by collecting and analyzing relevant information in a timely manner. A computerized PMS can perform these activities efficiently and effectively.



Source: ERES' Consultants, Inc., Toby Crow, Manager of ERES' PMS Division
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The Centers Corner

Uruguayan Road Association (AUC)

The Uruguayan Road Association (AUC is the Spanish acronym) was created on July 7, 1987, as the outgrowth of an idea to initiate an association that would link all agents tied to the highway community. The purpose was to create an environment where ideas of common interest could be shared, developed, and discussed.

The AUC began as one of the PIH pioneer centers, and during 1992, it received certification as a technology transfer center within the PIH Network. In 1996, AUC was certified as permanent by the PIH Advisory Committee. Its current membership of 180 represents construction and traffic sign companies, consultants, civil engineers, and providers of highway products.

AUC Mission and Activities

The AUC mission is to serve the highway community. Its goal is to link all the people and companies to the sector and enable them to use the

services to advance professional development. AUC conducts enabling activities for the members through classes, conferences, and meetings. Every two years, the AUC holds the *Congreso de la Vialidad Uruguaya* (Uruguayan Highway Congress), which is an opportunity for Uruguayan professionals to share their experiences and professional accomplishments and to learn from invited foreign transportation professionals.

Activities

The current program consists of the 1999 Conference Cycle. These are 14 conferences at the international level that will begin in April, with approximately two conferences hosted each month. Topics addressed at these gatherings include such areas as design, construction, and maintenance of the highway infrastructure; asphalt materials; concrete pavements; highway construction materials; transport; security and markings;

environmental impact; and bridges and structures.

Information Bulletin

The AUC currently edits a triannual magazine that includes information of interest for the highway community. The Association will soon print the third edition of *Situación de la Vialidad Uruguaya* (State of the Uruguayan Highway System), which AUC authors.

AUC Executive Board

The following individuals serve on the AUC Executive Board:

Guillermo Cat, **President**
Jorge Pazos, **Vice President**
Alberto Cassinelli, **Secretary**
Alejandro García Terra, **Treasurer**

Members

María del Huerto Sarasúa
Arturo Forteza
Carlos Bilinski

New Technology for Measuring Nighttime Visibility of Pavement Markings

Roadway delineation is essential for safe and efficient highway operation. To be effective, pavement markings must be visible from a sufficient distance day *and* night. Modern delineation materials work by redirecting a high percentage of light received from a vehicle's headlights back in the direction of its source. With the incorporation of new materials, delineation pavement markings appear to shine when illuminated, thus improving their visibility. This *retroreflectivity* is essential for nighttime driving comfort and highway safety.

To enhance the ability of highway agencies to measure the amount of retroreflectivity, the Federal Highway Administration sponsored the development of a Mobile Pavement Marking Retroreflectometer. This instrument can measure retroreflectivity in daylight, while moving at highway flow speeds. This equipment is a powerful tool for collecting retroreflectivity information, providing more than 300 readings per kilometer.

The value of the coefficient of retroreflected luminance, R_L , of

pavement markings varies with the angle formed by the incident light beam and the retroreflector axis—known as the *entrance* angle—and with the *observation* angle, which is determined by the direction of the beam and the motorist viewing angle. Standard measures have been defined to allow for comparable results. In the draft specifications *prEN 1436*, the European Committee of Normalization (CEN) established an entrance angle of 88.76° and an observation angle of 1.05°. These correspond to an observation distance of 30 m, a headlight height of 0.65 m,

and a driver's eye height of 1.2 m. The mobile retroreflector is set to the same observation distance, but with different angles—the entrance angle is 88.5°, and the observation angle is 1.0°.

A series of static and dynamic test runs with three retroreflector units was conducted in the vicinity of Minneapolis, Minnesota, in September 1996. The objective was to assess the relationship between retroreflective values measured under the CEN and the mobile retroreflector geometries, the repeatability and reproducibility of the measurements, and the influence

of the roadway segment length on the precision of the determinations.

Static measurements were made on an array of different pavement marking materials. Average differences between determinations under the two geometries were less than 5 percent.

The dynamic test consisted of repeated measurements of pavement marking lines in two different highway segments alternating the three retroreflector units. The results show that good levels of repeatability can be achieved with the mobile retroreflector when operational procedures are set and

strictly applied. Measurement precision increased with segment length. Measurement lengths of 0.8 km for solid lines and 1.6 km for skip lines were found to maintain measurement tolerances within acceptable limits.

A report on these tests is published as FHWA-SA-97-016. Copies of the report are available upon request from the FHWA Office of International Programs.

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Ministry of Public Works,
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PAN AMERICAN INSTITUTE
OF HIGHWAYS

*Technology Transfer
for Better Roads*

1999 Scheduled PROVIAL Events

Chile, Rancagua

(April 26-30)

Mexico, Monterrey

(May 12-15)

Brazil, Sao Paulo

(1999)

Peru, Lima

(1999)

Venezuela, Caracas

(1999)

Guatemala, Guatemala

(1999)

PROVIAL Seminars & Expovial

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- **Make Contacts**
- **Create Business Opportunities**

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