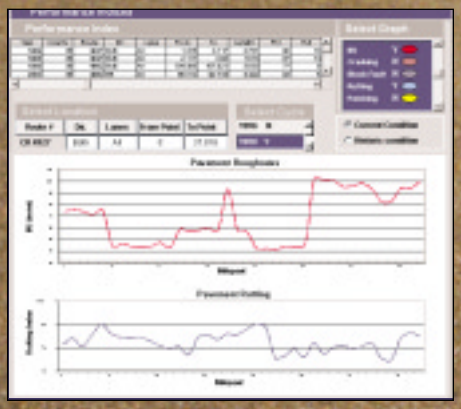
Pavement Management
CATALOG

Pavement Management Software



Data Collection Equipment

U.S. Department of Transportation
Federal Highway Administration

2002 EDITION

Pavement Management

C A T A L O G

Pavement Management Software

Data Collection Equipment

U.S. Department of Transportation
Federal Highway Administration
Office of Asset Management

May 2002

From the Program Manager

Infrastructure Core Business Unit
Federal Highway Administration

This publication is a new edition of the Pavement Management Software Catalog, which was last issued in January 1997. This edition has been expanded to include a wider range of software packages of interest to both States and local jurisdictions. Also included is a new section on state-of-the-art data collection equipment to support pavement management systems.

The development of pavement management software and data collection equipment is maturing rapidly to meet the expanding needs of State and local governments in managing their highway systems. This catalog is intended as a sourcebook of information to assist officials in selecting systems to meet the needs of their communities.

I hope you will find this catalog to be helpful and informative.

King W. Gee
Program Manager, Infrastructure

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AASHTO Provisional Standards

The American Association of State Highway and Transportation Officials (AASHTO) has published Provisional Standards for the measurement of pavement surface properties, i.e., ride, rutting, faulting, and cracking in asphalt pavements.

The format for the Provisional Standards was developed by AASHTO in 1993, with an objective of providing a mechanism for early distribution of materials specifications and test methods resulting from the Strategic Highway Research Program and other research. Provisional Standards are standards that have been adopted by the AASHTO Subcommittee on Materials on a temporary basis for a maximum of 8 years. The time period used to maintain the provisional status is used for the refinement of these standards on the basis of comments from users and other reviewers.

The following Provisional Standards are available from AASHTO:

- Quantifying Roughness of Pavements: AASHTO Designation PP37-00
- Determining Maximum Rut Depth in Asphalt Pavement: AASHTO Designation PP38-00
- Estimating Faulting of Concrete Pavements: AASHTO Designation PP39-00
- Standard Practice for Quantifying Cracking in Asphalt Pavement Surface: AASHTO Designation PP44-01

PP37-00, PP38-00, and PP39-00 are available for purchase through the *AASHTO Provisional Standards.* Reference the following publication:

PS-00, *AASHTO Provisional Standards,* Fourth Edition (April 2000),
Member: $81, Non-Member: $97

American Association of State Highway and
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AASHTO Internet Bookstore available at:

https://transportation.org/publications/bookstore.nsf/

Pavement Management Software

DISCLAIMER

The contents of this report reflect the views of the author, who is responsible for the opinions, findings, and conclusions presented herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration and are not an endorsement of any of the software listed herein. This report does not constitute a standard, specification, or regulation. Additionally, this report is not intended for construction, bidding, or permit purposes. Mr. Thomas J. Freeman, P.E., was the Principal Investigator for the project.

1.0 Pavement Management Software Catalog

1.1 Introduction

This software catalog was developed to assist state, county, and local agencies in learning about various pavement management software. It was originally developed from course materials developed for the FHWA "Pavement Management for Local Agencies" by the Texas Transportation Institute, Texas A&M University, and due to continued interest has been reviewed and updated every two to three years. In the pavement management course, concepts and options are introduced and explained. The items discussed in this catalog are from important items developed in the course.

In order to develop this catalog, a request was sent out to most of the known providers of both public and private domain pavement management software and data collection systems to provide copies of their software, documentation, and a list of users. Not all of the providers submitted their software for review and other providers were not even aware of the request. Therefore, this catalog is not meant to be an exhaustive review of all pavement management software, but is instead intended to illustrate the types of packages available.

The public domain software is provided by public agencies, typically at no or at a nominal cost, to interested agencies and are usually implementable by the requesting agency with little or no additional assistance required. The private software is provided to interested agencies and may be implementable by the requesting agency with little or no additional assistance required or implemented by the software provided. The cost for private domain software is determined by the company.

The criteria for inclusion of a specific software package into this description of PMS software was that they submit their software or manuals by the appropriate date, the software is used by a variety of agencies, uses valid pavement management principles, and meets the needs of providing examples of different levels of complexity.

The following descriptions of each software package follow the discussion presented throughout the class. Each item to be evaluated was previously presented as a topic or an item of discussion because either the data was considered important or because the analysis technique is important to the effective use of pavement management.

The first page has contact information, a listing of interesting or unique features, and contact information for three users. The second page has a column for indicating whether a data item was collected and stored, a column to indicate whether it is used in the analysis, and a column for comments. The third page uses the analyze and comment columns only. This format is used to differentiate between the uses of the data. A "Y" indicates that the software uses or performs the indicated task. A "-" is a negative response. In order to receive a positive response, the software must accomplish the task relatively easily and must be performed within the software program. For

example, if the benefit-cost analysis is performed outside the program and the results used in the analysis, a negative response was recorded. No attempt is made here to rank the software on a best to worst basis. Each software system has instances where it will best meet the needs of the agency. Instead, the software is arranged in alphabetical order by category.

1.2 Example

The format for the evaluation of the software is:

Software Acronym

Contact Person
Company Name
Address
Phone
FAX
E-Mail Address or Other Information

Software Acronym - Name of Software

Public or Private.

In this area, some of the interesting features and capabilities of the software were noted. Particular attention was given to features not included in the detailed list of items considered necessary or desirable.

Typical entries included:

Numerous fields for user entry including ROW width, shoulder widths, traffic signals, sidewalks, curbing, drainage, parking, speed, ,etc.

English or Metric.

On-line Help using F1 key.

Software Acronym Suggested User Contacts:

The software provider was asked to provide no more than three contacts of people or agencies using this version of their software.

Name	Name	Name
Title	Title	Title
Address	Address	Address
Agency	Agency	Agency
Phone or FAX	Phone or FAX	Phone or FAX

Software Acronym

INVENTORY AND PROJECT HISTORY	Does the software store and use:
ID	ID for each section?
L, W, A	Length, Width, and Area?
Functional Class (FC) /Priority	Road classification or other criteria?
# Traffic Lanes	Number of lanes used by traffic, separate from parking?
Traffic Hist	Traffic history?
Projected Traffic	Future traffic?
Construction History	Dates and type of work?
Maint & Rehab Hist	Historical maintenance or rehabilitation?
Layer Types	Information on individual layers (thickness, type, etc.)?
Programmed Work	Future plans for maintenance or rehabilitation?
Work in Progress	Maintenance or rehabilitation currently in progress?
GIS Interface	Is there a built-in link to a Geographic Information System or Automated mapping?

CONDITION	Questions to be answered
Type	What condition measure is used?
Num AC	Number of types of AC distresses?
Num PCC	Number of types of PCC distresses?
Structural Capacity	Is structural capacity measured and used?
Roughness	Is roughness measured and used?
Skid	Is skid measured and used?
Subjective Eval	Is a subjective rating entered and used?
Automated Input	Can data be imported directly from condition collection equipment?

STORING AND MANAGING	
Computerized	Is a computer required?
Powerful PC Required	Is a Pentium class PC required, Win95, NT?
Password Protection	Is password protection included?
Data Dictionary	Is a data dictionary provided?
Users Manual	Is a good users manual provided?
DB Manager	Is a data base manager used?
Inventory Feedback	Are there reports to display the inventory data?
Distress Reporting	Are there reports for the distress survey?
Condition Summary	Are there summary reports detailing the condition of sections?
Condition Prediction	Are there reports that project the condition to a future date?

IDENTIFYING SECTIONS NEEDING REPAIR	
Project Condition	How is condition projected into the future?
Trigger Values	
Single	Is a single trigger values used?
Multiple	Are multiple trigger values used?

Software Acronym

	Questions to be answered
Identify PM Based on:	
Interval	Is preventive maintenance based on years between treatments?
Type of Distress	Is PM based on type of distress?
Quantity of Distress	Is PM based on the quantity of distress?
ID Treatment Type	Does it list the treatment type?
List Sections Need M&R	Do you get a list of sections needing work?
Project Condition with and without Repair	Can you get the projected condition with and without repair?
Total Cost/YR	Do you get a total cost per year?
Needs for Pavement Class and Type of Treatment	Can you get the needs for a specific class or type of treatment?
Budgeting Reports	Are there budgeting reports?

PRIORITIZATION

Distress	Is prioritization based on type and quantity of distress?
Functional Class (FC)	Is prioritization based on class or priority?
Performance/Condition	Is prioritization based on condition?
Composite	Is prioritization based on a composite criteria?
First Cost	Is prioritization based on first cost?
EUAC	Is prioritization based on equivalent uniform annual cost?
B/C Ratio	Is prioritization based on benefit cost ratio?
Cost Effectiveness Analysis	Is prioritization based on cost-effectiveness analysis?
Select Candidate Sections	Does the program select candidate sections?
Multi-year Prioritization	Does it have multiple years or multi-year prioritization?
Force Repair of a Section to a Specific Year	Can you force a section to be repaired in a specific year?

IMPACT ANALYSIS

Overall Condition	Show impact of budget levels on overall condition?
Condition Category	Show impact of budget levels on condition by category?
Backlog of Needs	Show impact of budget levels on backlog of needs?
Deferred Funding	Show impact of budget levels on amount of deferred funding?
Stop-Gap Maint	Show impact of budget levels on amount of stop-gap?
Remaining Life	Show impact of budget levels on remaining life?

UNPAVED

Condition	Is there a condition measure for unpaved?
Prediction	Can the program predict or project condition?
Cost	Does it develop cost to repair?

TRAINING and SUPPORT

Training Classes	Are there regularly scheduled training classes?
Support	What kind of support is available?

CCPMS
Wm. M. Sampson
Assistant Director
512 Weil Hall
P.O. Box 116585
Gainesville, FL 32611-6585
E-Mail: BSAMP@CE.UFL.EDU
Website: HTTP://WWW-MCTRANS.CE.UFL.EDU/
PH. 352-392-0378 or PH. 800-226-1013
FAX 352-392-3224

CCPMS - Carson City Pavement Management System

Public.

CCPMS Suggested User Contacts:

Contact Wm. M. Sampson, P.E.
Assistant Director
352-392-0378 or 800-226-1013

CCPMS

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	
Functional Class (FC) /Priority	Y	-	
# Traffic Lanes			
Traffic Hist	Y	Y	AADT and Traffic Index
Projected Traffic	-	-	
Construction History	-	-	
Maint & Rehab Hist	Y	-	Overlay thicks, surface treats, maintenance
Layer Types	Y	-	Surface and base type and thickness, subgrade strength
Programmed Work	-	-	
Work in Progress	-	-	
GIS Interface	-	-	

CONDITION	Store	Sort/Analyze	Comment
Type	Y	CCPMS	Deducts for categories of extent, severity
Num AC	3	Y	
Num PCC	-	-	
Structural Capacity	Y	-	Deflection
Roughness	-	-	
Skid	-	-	
Subjective Eval	Y	Y	Ride quality acceptable - (Y/N)
Automated Input	-	-	

STORING AND MANAGING		Comment
Computerized	Y	
Powerful PC Required	-	
Password Protection	-	
Data Dictionary	-	
Users Manual	Y	
DB Manager	Y	dBase III (purchased separately)
Inventory Feedback	Y	
Distress Reporting	Y	
Condition Summary	Y	
Condition Prediction	-	

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	-	
Trigger Values		
Single	-	
Multiple	Y	Ride, distress type, traffic index

CCPMS

		Comment
Identify PM Based on:		
Interval	-	
Type of Distress	Y	Ride, distress type, traffic index
Quantity of Distress	-	
ID Treatment Type	Y	Ride, distress type, traffic index
List Sections Need M&R	Y	
Project Condition with and without Repair	-	
Total Cost/YR	-	Manually
Needs for Pavement Class and Type of Treatment	-	
Budgeting Reports	-	Cost for all treatments.

PRIORITIZATION		Comment
Distress	-	Condition score
Functional Class (FC)	-	Traffic
Performance/Condition	Y	Used as a factor
Composite	Y	Cost, AADT, Life, Condition score
First Cost	Y	Used as a factor
EUAC		-
B/C Ratio	Y	Cost/Life
Cost Effectiveness Analysis	-	
Select Candidate Sections	Y	
Multi-year Prioritization	-	
Force Repair of a Section to a Specific Year	-	

IMPACT ANALYSIS		Comment
Overall Condition	-	
Condition Category	-	
Backlog of Needs	-	Backlog is Total($) - budget ($)
Deferred Funding	-	
Stop-Gap Maint	-	
Remaining Life	-	

UNPAVED		
Condition	-	Does inventory
Prediction	-	
Cost	-	

TRAINING and SUPPORT		Comment
Training Classes	-	
Support	Y	By phone

LBPMS

Wm. M. Sampson
Assistant Director
512 Weil Hall
P.O. Box 116585
Gainesville, FL 32611-6585
E-Mail: BSAMP@CE.UFL.EDU
Website: HTTP://WWW-MCTRANS.CE.UFL.EDU/
PH. 352-392-0378 or PH. 800-226-1013
FAX 352-392-3224

LBPMS - Long Beach Pavement Management System

Public.

Simple structure.

Very little computer power needed.

Requires much user interaction.

Can enter additional fields including Legislative District, Traffic Index, Median Width, etc.

LBPMS Suggested User Contacts:

Contact Wm. M. Sampson, P.E.
Assistant Director
352-392-0378 or 800-226-1013

LBPMS

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	
Functional Class (FC) /Priority	Y	-	
# Traffic Lanes	Y	-	
Traffic Hist	Y	-	Traffic index
Projected Traffic	-	-	
Construction History	-	-	
Maint & Rehab Hist	-	-	
Layer Types	-	-	
Programmed Work	-	-	
Work in Progress	-	-	
GIS Interface	-	-	

CONDITION	Store	Sort/Analyze	Comment
Type	-	Long Beach	Deducts for categories of extent, severity
Num AC	5	Y	
Num PCC	3	Y	
Structural Capacity	-	-	
Roughness	-	-	
Skid	-	-	
Subjective Eval	-	-	Drainage, Roughness
Automated Input	-	-	

STORING AND MANAGING		Comment
Computerized	Y	
Powerful PC Required	-	IBM XT
Password Protection	-	
Data Dictionary	-	
Users Manual	Y	
DB Manager	Y	dBase III (purchased separately)
Inventory Feedback	Y	Whole database
Distress Reporting	-	
Condition Summary	Y	Worst to best scores
Condition Prediction	-	

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	-	
Trigger Values		
Single	-	
Multiple	Y	

LBPMS

		Comment
Identify PM Based on:		
Interval	-	
Type of Distress	-	
Quantity of Distress	-	Condition score
ID Treatment Type	Y	Category based on score
List Sections Need M&R	Y	
Project Condition with and without Repair	-	
Total Cost/YR		Y
Needs for Pavement Class and Type of Treatment	-	
Budgeting Reports	Y	Lists all sections needing repair

PRIORITIZATION		Comment
Distress	-	
Functional Class (FC)		-
Performance/Condition	-	
Composite	-	
First Cost	-	
EUAC		-
B/C Ratio	-	
Cost Effectiveness Analysis	-	
Select Candidate Sections	Y	Lists all sections needing repair
Multi-year Prioritization	-	
Force Repair of a Section to a Specific Year	-	

IMPACT ANALYSIS		Comment
Overall Condition	-	
Condition Category	-	
Backlog of Needs	-	
Deferred Funding	-	
Stop-Gap Maint	-	
Remaining Life	-	

UNPAVED		
Condition	-	
Prediction	-	
Cost	-	

TRAINING and SUPPORT		Comment
Training Classes	-	
Support	Y	By phone

MicroPAVER

American Public Works Association
2345 Grand Blvd., Suite 500
Kansas City, MO 64108-2641
PH. 816-472-6100
FAX 816-472-1610
E-Mail: PAVER@APWA.Net
Website: http://www.apwa.net/About/SIG/MicroPaver/

MicroPAVER Version 4.2- Pavement Management System

Public.

Adopted by APWA in 1979, many updates and changes since then.

Over 500 users in US, Canada, Europe, and Asia.

Supports English and metric.

Includes unpaved roads in analysis.

Contains Verify/Clean Database feature which scans database correcting minor entry errors and listing major errors for manual correction.

When entering a new section, a mandatory data entry block is displayed, specifically detailing the mandatory data.

Can analyze network condition for dates prior to first survey.

On-line help using F1 key and on-line user's manual.

New versions will include:	Analysis of IRI, Skid, and user-defined condition indexes	
Virtual sectioning	Effect of localized repair	Interactive annual work plan
Condition matrix	End-condition optimization	Project formulation
Programmed work	Project prioritization	EMS integration
LEEP integration	GIS maps as PAVER objects	Flexible report formats

MicroPAVER Suggested User Contacts:

Mr. Mike Black
Staff Engineer
City of Billings
510 N. Broadway
4th Floor
Billings, MT 59101-1126
406-657-8329

Mr. Greg Belancio
Registered Engineer
Washoe County, NV
P.O. Box 11130
Reno, NV 89520-0027
702-328-2052

Mr. Justin Rabidoux
City Engineer
City of Burlington
33 Kilburn Street
Burlington, VT 05402
802-863-9094

MicroPAVER Version 4.2

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	
Functional Class (FC) /Priority	Y	Y	Additional user defined sorting criteria
# Traffic Lanes	-	-	
Traffic Hist	Y	-	
Projected Traffic	Y	-	Same as historic traffic, also has growth field
Construction History	Y	-	
Maint & Rehab Hist	Y	-	
Layer Types	Y	-	
Programmed Work	Y	-	Minimal
Work in Progress	-	-	Minimal
GIS Interface	Y	Y	ArcView interface

CONDITION	Store	Sort/Analyze	Comment
Type			Corps of Engineers PCI
Num AC	19	Y	
Num PCC	19	Y	
Structural Capacity	Y	-	
Roughness	Y	-	
Skid	Y	-	
Subjective Eval	Y	-	
Automated Input	Y	Y	Accepts distress, profile and IRI data from two or three proprietary systems

STORING AND MANAGING		Comment
Computerized	Y	
Powerful PC Required	-	Preferred, uses Windows 3.1 or Windows 95
Password Protection	Y	
Data Dictionary	-	
Users Manual	Y	Distress manuals and on-line user's manual
DB Manager	Y	
Inventory Feedback	Y	
Distress Reporting	Y	
Condition Summary	Y	
Condition Prediction	Y	Many options available

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	Y	Straight Line or user developed Family Curves
Trigger Values		
Single	Y	
Multiple	Y	

MicroPAVER Version 4.2

		Comment
Identify PM Based on:		
Interval	Y	
Type of Distress	Y	Uses type of distress to exclude certain treatments
Quantity of Distress	-	
ID Treatment Type	Y	PM types, Localized, Major
List Sections Need M&R	Y	
Project Condition with and without Repair	Y	Separate reports
Total Cost/YR	Y	
Needs for Pavement Class and Type of Treatment	Y	
Budgeting Reports	Y	

PRIORITIZATION		Comment
Distress	-	
Functional Class	Y	
Performance/Condition	Y	
Composite	Y	Matrix based on functional class and PCI
First Cost	-	
EUAC	-	
B/C Ratio	-	
Cost Effectiveness Analysis	-	
Select Candidate Sections	Y	
Multi-year Prioritization	Y	
Force Repair of a Section to a Specific Year	-	

IMPACT ANALYSIS		Comment
Overall Condition	Y	
Condition Category	Y	
Backlog of Needs	Y	
Deferred Funding	Y	
Stop-Gap Maint	Y	
Remaining Life	-	

UNPAVED		
Condition	Y	All modules included
Prediction	Y	
Cost	Y	

TRAINING and SUPPORT		Comment
Training Classes	Y	5½ Hour video training included with purchase. 2 and 3 day courses offered three to four times annually
Support	Y	Unlimited annual via phone, fax, or E-mail

MTC PMS

Jennifer Cheng
Metropolitan Transportation Commission
Joseph P. Bort MetroCenter
101 Eighth Street
Oakland, CA 94607-4700
Website: http://www.mtcpms.org/
E-mail: JCHENG@MTC.DST.CA.US
PH. 510-464-7863
FAX 510-464-7848

MTC PMS - Metropolitan Transportation Commission Pavement Management System, Version 7.0

Public.

Windows based.

Budgeting module allows multiple budgeting scenarios.

Can allocate a percentage of funds to preventive maintenance and rehabilitation.

Prioritization is very flexible.

Updates condition based on maintenance and repair performed.

Well written user's manuals. Individual manuals for managers and computer users.

Allows access by GIS

On-line help using Windows protocols.

User can produce custom reports.

BAPMS Suggested User Contacts:

Mr. Michael Rybka
Public Works Department
Marion County
220 High Street NE
Salem, OR 97301-3670
503-588-5036

Mr. Brian Balbas
Public Works Department
Contra Costa County
2475 Waterbird Way
Martinez, CA 94553
510-313-7003

Mr. John Barron
Public Works Department
City of Fremont
37350 Sequoia Road
Fremont, CA 94537
510-791-4240

MTC PMS

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	
Functional Class (FC) /Priority	Y	Y	Additional sorting criteria
# Traffic Lanes	Y	-	
Traffic Hist	Y	Y	Traffic index, ADT
Projected Traffic	-	-	
Construction History	Y	-	
Maint & Rehab Hist	Y	-	
Layer Types	Y	-	
Programmed Work	-	-	
Work in Progress	-	-	
GIS Interface	-	-	Accessible by GIS

CONDITION	Store	Sort/Analyze	Comment
Type			Modified PCI
Num AC	7	Y	
Num PCC	7	Y	
Structural Capacity	-	-	
Roughness	-	-	
Skid	-	-	
Subjective Eval	-	-	
Automated Input	Y	Y	Using MTC format

STORING AND MANAGING		Comment
Computerized	Y	
Powerful PC Required	Y	Pentium
Password Protection	Y	
Data Dictionary	Y	In program
Users Manual	Y	
DB Manager	Y	MS Access (run time version)
Inventory Feedback	Y	1 Reports
Distress Reporting	Y	2 Reports
Condition Summary	Y	2 Reports
Condition Prediction	Y	1 Reports

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	Y	Curves provided by MTC, adjusted for observed conditions
Trigger Values		
Single	-	
Multiple	Y	By functional class, surface type, condition category

MTC PMS

		Comment
Identify PM Based on:		
Interval	Y	
Type of Distress	Y	User defined PCI range
Quantity of Distress	N	
ID Treatment Type	Y	
List Sections Need M&R	Y	
Project Condition with and without Repair	Y	
Total Cost/YR	Y	
Needs for Pavement Class and Type of Treatment	Y	
Budgeting Reports	Y	

PRIORITIZATION		Comment
Distress	-	
Functional Class (FC)	Y	
Performance/Condition	Y	
Composite	Y	FC, condition, effectiveness,
First Cost	-	
EUAC	Y	
B/C Ratio	-	
Cost Effectiveness Analysis	Y	
Select Candidate Sections	Y	
Multi-year Prioritization	Y	
Force Repair of a Section to a Specific Year	-	

IMPACT ANALYSIS		Comment
Overall Condition	Y	
Condition Category	Y	
Backlog of Needs	Y	
Deferred Funding	Y	
Stop-Gap Maint	Y	
Remaining Life	Y	

UNPAVED		
Condition	-	
Prediction	-	
Cost	-	

TRAINING and SUPPORT		Comment
Training Classes	Y	Scheduled regularly and on video tape
Support	Y	

PASER and PASERWARE

Steve Pudloski
Transportation Information Center
University of Wisconsin-Madison
432 North Lake Street
Madison, WI 53706
PH. 608-262-8707 or
PH. 800-442-4615
Website: http://www.engr.wisc.edu/industry/atwork/vol3/road.html
E-mail: pudloski@engr.wisc.edu

PASER and - PAvement Surface Evaluation and Rating and PASERWARE, Version 1.1

Public.

Pavement, shoulder, drainage, sidewalks, curb and gutter, etc. are inventoried and rated.

Rating manuals available for asphalt, concrete, and gravel pavements. Drainage manual will be available August 2000.

Very simple and easy to use. Easy to follow menu items.

Easy to follow menu items.

Many report options.

Multiple budgeting scenarios for up to 5 years.

Imports Wisconsin state local roads database.

PASER and RoadWare Suggested User Contacts:

Walt Raith
Transportation Planner
East Central Wisconsin
Regional Planning Commission
132 North Main Street
Menasha, WI 54952
414-751-4770
414-751-4771 Fax

Dave Beaster
Engineering Technician
Fond du Lac County Highway Commission
301 Dixie Street
P.O. Box 1234
Fon du Lac, WI 54936-1234
414-929-3485
414-929-3698 Fax

PASER and PASERWARE

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	Area calculated
Functional Class (FC) /Priority	Y	Y	
# Traffic Lanes	Y	-	
Traffic Hist	Y	-	
Projected Traffic	-	-	
Construction History	Y	-	
Maint & Rehab Hist	Y	-	
Layer Types	Y	-	
Programmed Work	-	-	Comment field
Work in Progress	-	-	Comment field
GIS Interface	-	-	ASCII or DB files

CONDITION	Store	Sort/Analyze	Comment
Type	Y	PASER	Overall (1-10) based on distress
Num AC	Y	13	
Num PCC	Y	19	
Structural Capacity	-	-	
Roughness	-	-	Comment field
Skid	-	-	Comment field
Subjective Eval	-	-	Comment field
Automated Input	-	-	

STORING AND MANAGING		Comment
Computerized	Y	
Powerful PC Required	N	486 for DOS, Windows version requires Pentium
Password Protection	-	
Data Dictionary	Y	
Users Manual	Y	Step by step instructions and screen examples
DB Manager	Y	DBase IV, Windows Access 2000
Inventory Feedback	Y	
Distress Reporting	-	
Condition Summary	Y	
Condition Prediction	Y	

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	Y	Programmed deterioration curves, can be adjusted
Trigger Values		
Single	-	Could have single
Multiple	Y	Depends on treatment

PASER and PASERWARE

		Comment
Identify PM Based on:		
Interval	-	
Type of Distress	-	Based on condition rating
Quantity of Distress	-	Based on condition rating
ID Treatment Type		
List Sections Need M&R	Y	
Project Condition with and without Repair	-	Could run twice
Total Cost/YR	Y	
Needs for Pavement Class and Type of Treatment	Y	
Budgeting Reports	Y	Many options, 5 year budget horizon

PRIORITIZATION		Comment
Distress	-	
Functional Class (FC)	Y	
Performance/Condition	Y	
Composite	Y	Functional class/condition rating
First Cost	-	
EUAC	-	
B/C Ratio	-	
Cost Effectiveness Analysis	-	
Select Candidate Sections	Y	
Multi-year Prioritization	-	
Force Repair of a Section to a Specific Year	Y	Manually

IMPACT ANALYSIS		Comment
Overall Condition	Y	
Condition Category	Y	
Backlog of Needs	Y	
Deferred Funding	-	
Stop-Gap Maint	-	
Remaining Life	-	

UNPAVED		
Condition	Y	1-5 Rating
Prediction	Y	
Cost	Y	

TRAINING and SUPPORT		Comment
Training Classes	Y	Videos also available
Support	Y	Phone

PMF

Wm. M. Sampson
Assistant Director
512 Weil Hall
P.O. Box 116585
Gainesville, FL 32611-6585
E-Mail: BSAMP@CE.UFL.EDU
HTTP://WWW-MCTRANS.CE.UFL.EDU/
PH. 352-392-0378 or PH. 800-226-1013
FAX 352-392-3224

PMF - Pavement Management Forecasting Model

Public.

Simple structure.

Very little computer power needed.

Automated spreadsheet leads user through analysis.

Budgeting tool for determining “appropriate” budget or impacts of budgets.

PMF - Suggested User Contacts:

Contact Wm. M. Sampson, P.E.
Assistant Director
352-392-0378 or 800-226-1013

PMF

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	-	-	
L, W, A	Y	Y	Enter total miles in network
Functional Class (FC) /Priority	-	-	
# Traffic Lanes	-	-	
Traffic Hist	-	-	
Projected Traffic	-	-	
Construction History	-	-	
Maint & Rehab Hist	-	-	
Layer Types	-	-	
Programmed Work	-	-	
Work in Progress	-	-	
GIS Interface	-	-	

CONDITION	Store	Sort/Analyze	Comment
Type	-	Y	Subjective
Num AC	-	-	
Num PCC	-	-	
Structural Capacity	-	-	
Roughness	-	-	
Skid	-	-	
Subjective Eval	-	Y	Number or percent miles in 4 categories
Automated Input	-	-	

STORING AND MANAGING		Comment
Computerized		Y
Powerful PC Required	-	IBM XT as a minimum
Password Protection	-	
Data Dictionary	-	
Users Manual	Y	
DB Manager	-	uses LOTUS 123 (can use EXCEL)
Inventory Feedback	-	
Distress Reporting	-	
Condition Summary	Y	By 4 categories
Condition Prediction	Y	User inputs number of years to change condition state (i.e., Excellent to Good =10yrs, Good to Fair=5yrs, etc)

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	Y	See above
Trigger Values		
Single	-	
Multiple	-	

PMF

		Comment
Identify PM Based on:		
Interval	-	
Type of Distress	-	
Quantity of Distress	-	Based on roads in “Good” condition
ID Treatment Type	-	
List Sections Need M&R	-	
Project Condition with and without Repair	-	
Total Cost/YR	Y	
Needs for Pavement Class and Type of Treatment	-	
Budgeting Reports	Y	Road condition by category and maintenance backlog

PRIORITIZATION		Comment
Distress	-	
Functional Class (FC)	-	
Performance/Condition	Y	Best first, worst first or percentage by category
Composite	-	
First Cost	-	
EUAC	-	
B/C Ratio	-	
Cost Effectiveness Analysis	-	
Select Candidate Sections	-	
Multi-year Prioritization	-	
Force Repair of a Section to a Specific Year	-	

IMPACT ANALYSIS		Comment
Overall Condition	-	
Condition Category	Y	Graph and table
Backlog of Needs	Y	Maintenance Backlog for 10 years
Deferred Funding	-	
Stop-Gap Maint	-	
Remaining Life	-	

UNPAVED		
Condition	-	
Prediction	-	
Cost	-	

TRAINING and SUPPORT		Comment
Training Classes	-	
Support	Y	Phone

PMS-ITRE

Tim Baughman
The Institute for Transportation Research and Education (ITRE)
North Carolina State University
Campus Box 8601
Raleigh, NC 27695-8601
E-Mail: TBB@UNITY.NCSU.EDU
PH. 919-515-8654
FAX 919-515-8898

PMS-ITRE - Pavement Management Software

Public.

AC pavements only.

User modifiable deducts

Direct and easy to understand.

Stores pavement history.

New version due in early 1997. The new version will be Windows based, have improved pavement distress measurements, and improved reporting capabilities.

PMS-ITRE Suggested User Contacts:

Mr. Doug Stevens
Street Superintendent
City of Sanford
P.O. Box 338
Sanford, NC 27330
919-775-8247

Mr. Layton Lamb
City of Charlotte
Street Maintenance Division
100 Otts Street
Charlotte, NC 28202
704-336-2930

Mr. Gary Mills
City Engineer
City of Wilson
P.O. Box 10
Wilson, NC 27894-0010
919-399-2200

PMS-ITRE

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	
Functional Class (FC) /Priority	Y	-	Uses 2 classes
# Traffic Lanes	-	-	
Traffic Hist	-	-	
Projected Traffic	-	-	
Construction History	Y	-	Stored only
Maint & Rehab Hist	Y	-	
Layer Types	Y	-	
Programmed Work	-	-	
Work in Progress	-	-	
GIS Interface	-	-	

CONDITION	Store	Sort/Analyze	Comment
Type			ITRE developed
Num AC	8	Y	
Num PCC	-	-	
Structural Capacity	-	-	
Roughness	-	-	
Skid	-	-	
Subjective Eval	-	-	
Automated Input	-	-	

STORING AND MANAGING		Comment
Computerized	Y	
Powerful PC Required	Y	XT or equivalent
Password Protection	Y	
Data Dictionary	-	
Users Manual	Y	
DB Manager	Y	Dbase using Clipper
Inventory Feedback	Y	1 Report
Distress Reporting	Y	1 Report
Condition Summary	Y	1 Report
Condition Prediction	-	Survey every other year

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	-	Uses current
Trigger Values		
Single	-	
Multiple	Y	User defined

PMS-ITRE

		Comment
Identify PM Based on:		
Interval	-	
Type of Distress	-	
Quantity of Distress	-	Condition
ID Treatment Type	Y	
List Sections Need M&R	Y	
Project Condition with and without Repair	-	
Total Cost/YR	Y	
Needs for Pavement Class and Type of Treatment	Y	
Budgeting Reports	Y	

PRIORITIZATION		Comment
Distress	-	
Functional Class (FC)	-	
Performance/Condition	Y	
Composite	-	
First Cost	-	
EUAC	-	
B/C Ratio	-	
Cost Effectiveness Analysis	-	
Select Candidate Sections	Y	
Multi-year Prioritization	-	
Force Repair of a Section to a Specific Year	-	

IMPACT ANALYSIS		Comment
Overall Condition	-	
Condition Category	-	
Backlog of Needs	-	
Deferred Funding	-	
Stop-Gap Maint	-	
Remaining Life	-	

UNPAVED		
Condition	-	
Prediction	-	
Cost	-	

TRAINING and SUPPORT		Comment
Training Classes	Y	Train during installation
Support	Y	Phone

RSMS99

David H. Fluharty
University of New Hampshire
Technology Transfer Center
38 College Road
Durham, NH 03824-3591
PH. 603-862-4348
E-Mail: Dave.Fluharty@UNH.EDU
Website: http://www.t2.unh.edu/pwms/rsms.html

RSMS99 - Road Surface Management System

Public.

Simple and easy to use.

Distress survey quick and easy.

Supports English and metric.

Windows based and Windows NT compatible.

Many repair options available for each section. User can add repair techniques.

Includes and analyzes unpaved roads.

RSMS99 Suggested User Contacts:

Contact Technology Transfer
Center In Your State (LTAP or T^2)

RSMS99

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	
Functional Class (FC) /Priority	Y	Y	Traffic level, importance
# Traffic Lanes	Y	Y	
Traffic Hist	-	-	
Projected Traffic	-	-	
Construction History	-	-	
Maint & Rehab Hist	Y	-	
Layer Types	Y	-	
Programmed Work	-	-	
Work in Progress	-	-	
GIS Interface	-	-	

CONDITION	Store	Sort/Analyze	Comment
Type	Y	Y	Pavement Condition Indicator
Num AC	7	Y	Categories of extent, severity
Num PCC	Y	-	User defined
Structural Capacity	-	-	
Roughness	Y	Y	Subjective only
Skid	-	-	
Subjective Eval	-	-	
Automated Input	-	-	

STORING AND MANAGING		Comment
Computerized	Y	
Powerful PC Required	-	Minimum of 486, Windows based
Password Protection	-	
Data Dictionary	-	
Users Manual	Y	
DB Manager	Y	Part of program
Inventory Feedback	Y	Easy to customize
Distress Reporting	Y	Distress and condition combined
Condition Summary	Y	
Condition Prediction	-	

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	-	Uses most recent survey
Trigger Values		
Single	-	
Multiple	Y	By distress type, severity

RSMS99

		Comment
Identify PM Based on:		
Interval	-	
Type of Distress	Y	
Quantity of Distress	Y	
ID Treatment Type	Y	
List Sections Need M&R	Y	
Project Condition with and without Repair	-	
Total Cost/YR	Y	
Needs for Pavement Class and Type of Treatment	Y	Using individual queries
Budgeting Reports	Y	

PRIORITIZATION		Comment
Distress	-	
Functional Class (FC)	Y	
Performance/Condition	Y	
Composite	Y	Traffic, Roughness, Condition, Importance
First Cost	-	
EUAC	-	
B/C Ratio	-	
Cost Effectiveness Analysi	-	
Select Candidate Sections	Y	
Multi-year Prioritization	-	
Force Repair of a Section to a Specific Year	-	

IMPACT ANALYSIS		Comment
Overall Condition	-	By repair type
Condition Category	-	
Backlog of Needs	-	
Deferred Funding	-	
Stop-Gap Maint	-	
Remaining Life	-	

UNPAVED		
Condition	Y	Seven distress types, categories of extent
Prediction	-	
Cost	Y	

TRAINING and SUPPORT		Comment
Training Classes	Y	
Support	Y	Phone and in-person

ARIA-PMS

Jerry Mohajeri or Richard Moore
MHM Associates, Inc.
Engineers/Planners
1920 Ridgedale Road
South Bend, IN 46614
PH. 219-291-4793
FAX 219-291-4800
Website: WWW.MHMAssociates.COM
E-mail: MHMAssoc@AOL.COM

ARIA-PMS - Automated Road Image Analyzer-Pavement Management System

Private.

Utilizes current state-of-the-art video image processing technology.

Automatically gathers and diagnoses condition data using ARIA equipment.

Distress data collection uses five lasers.

Integrated forward (right-of-way) and down looking cameras.

Down-looking camera synchronized with strobe lighting system.

Also stores shoulder, sidewalk, and drainage data.

ARIA-PMS Suggested User Contacts:

Mr. Bob McCoige
Assistant City Engineer
City of Goshen, Indiana
Engineering Department
302 South Fifth Street
Goshen, IN 46526
219-534-2600

Mr. Samuel Wolfe, P.E.
Toll Road Operations Engr
Indiana DOT
Toll Road Division
P.O. Box 1
Granger, IN 46530
219-674-8836

Mr. Eugene Shurte
Road Supervisor
LaPorte Co. Hwy Dept
1805 West 5th Street
LaPorte, IN 46350
219-362-2051

ARIA-PMS

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	
Functional Class (FC) /Priority	Y	Y	
# Traffic Lanes	Y	-	
Traffic Hist	-	-	
Projected Traffic	-	-	
Construction History	Y	-	
Maint & Rehab Hist	Y	-	
Layer Types	Y	-	
Programmed Work	-	-	
Work in Progress	-	-	
GIS Interface	-	-	

CONDITION	Store	Sort/Analyze	Comment
Type	Y	Y	Pavement rating - PCI
Num AC	Y	5	
Num PCC	Y	8	
Structural Capacity	-	-	
Roughness	Y	-	Visual display of Roughness Index/PCI
Skid	-	-	
Subjective Eval	-	-	
Automated Input	-	-	Outputs data

STORING AND MANAGING		Comment
Computerized	Y	
Powerful PC Required	N	486 Plus frame grabbing hardware
Password Protection	-	Can be added
Data Dictionary	-	
Users Manual	Y	
DB Manager	Y	Also uses LOTUS 123
Inventory Feedback	Y	
Distress Reporting	Y	
Condition Summary	Y	
Condition Prediction	Y	In LOTUS

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	-	Uses most recent
Trigger Values		
Single	-	
Multiple	Y	User modifiable decision tree

ARIA-PMS

		Comment
Identify PM Based on:		
Interval	-	
Type of Distress	Y	
Quantity of Distress	Y	
ID Treatment Type	Y	
List Sections Need M&R	Y	Lists all
Project Condition with and without Repair	Y	In LOTUS
Total Cost/YR	Y	In LOTUS
Needs for Pavement Class and Type of Treatment	Y	
Budgeting Reports	Y	In LOTUS

PRIORITIZATION		Comment
Distress	-	
Functional Class (FC)	Y	
Performance/Condition	Y	Could use others
Composite	-	
First Cost	-	
EUAC	-	
B/C Ratio	-	
Cost Effectiveness Analysis	-	
Select Candidate Sections	Y	
Multi-year Prioritization	Y	
Force Repair of a Section to a Specific Year	-	

IMPACT ANALYSIS		Comment
Overall Condition	Y	
Condition Category	-	
Backlog of Needs	-	Shows deficit not specific projects
Deferred Funding	-	
Stop-Gap Maint	-	
Remaining Life	-	

UNPAVED		
Condition	-	
Prediction	-	
Cost	-	

TRAINING and SUPPORT		Comment
Training Classes	-	
Support	Y	Phone or by contract

CartéGraph PAVEMENTview® Plus

Traci Meyers
CartéGraph Systems, Inc.
3600 Digital Drive
Dubuque, IA 52003
PH. 319-556-8120 or 800-688-2656
FAX 319-556-8149
E-Mail: Info@Cartegraph.COM
Web Site: Http://www.SKW-Inc.com and Http://www.CarteGraph.com

CartéGraph PAVEMENTview® Plus - Version 5

Private.

Windows interface.

On-line, context sensitive help.

User customizable data forms and libraries of typical assets.

Many user defined fields.

Includes ROW, shoulder, and median width, curb information, speed limit, etc.

Distress manual, including pictures, is on-line for easy review and customization.

Integrated reporting engine allows graphing of most data and reports that contain formulas, subtotals, and grouping.

Allows you to view an associated digital image, video, or other attached files for the current record.

History tracking allows the user to store all changes to the database, allowing you to track as asset over its entire lifetime. It even lets you "rollback" the database to a specific date to see the state of all of the database fields at that time.

Other modules for inventory and managing signs, traffic signals, sewer and water systems, bridges, pavement markings, and light assemblies. Utility modules include ability to obtain data from a GPS receiver or photos from a digital camera. Map module lets you view and manage assets on a map.

CartéGraph Suggested User Contacts:

Mike Nimblett
Merrimak Valley Planning Agency
160 Main Street
Haverhill, MA 01830
978-374-0519

Noel Forrester
City of Olathe
100 West Santa Fe
Olathe, KS 66051
913-393-6498

Dennis Owen
Tehama County
9380 San Benito Avenue
Gerber, CA 96035-9701
530-385-1462

CartéGraph PAVEMENTview® Plus - Version 5

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	Uses nodes linked to locations
L, W, A	Y	Y	
Functional Class (FC) /Priority	Y	Y	Functional class, but priority based on service, geometrics, structure, safety
# Traffic Lanes	Y	-	Can sort and query
Traffic Hist	Y	Y	
Projected Traffic	Y	Y	
Construction History	Y	Y	
Maint & Rehab Hist	Y	-	
Layer Types	Y	-	
Programmed Work	Y	Y	
Work in Progress	Y	Y	Can be shown with mapping software
GIS Interface	Y	Y	Using AutoCad, ARCView, and stand-alone

CONDITION	Store	Sort/Analyze	Comment
Type	Y	Y	PSR - Pavement Condition Rating from COE PCI using SHRP distress ID
Num AC		Y	User may create own distresses
Num PCC		Y	User may create own distresses
Structural Capacity	-	-	
Roughness	-	-	
Skid	-	-	
Subjective Eval	Y	Y	0-10 for Ride, Safety, Structural Adequacy
Automated Input	Y	Y	

STORING AND MANAGING		Comment
Computerized	Y	
Powerful PC Required	Y	Recommended Pentium, 16mB RAM, uses 80mB disk space, Windows, color printer
Password Protection	Y	
Data Dictionary	Y	Through Help function
Users Manual	Y	On-line help very easy and useful
DB Manager	Y	ODBC compliant
Inventory Feedback	Y	
Distress Reporting	Y	
Condition Summary	Y	
Condition Prediction	Y	Deterioration curves by pavement class

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	Y	
Trigger Values		
Single	Y	
Multiple	Y	Customizable decision trees

CartéGraph PAVEMENTview® Plus - Version 5

		Comment
Identify PM Based on:		
Interval	Y	Based on scheduled activities
Type of Distress	Y	
Quantity of Distress	Y	
ID Treatment Type	Y	
List Sections Need M&R	Y	
Project Condition with and without Repair	Y	
Total Cost/YR	Y	
Needs for Pavement Class and Type of Treatment	Y	
Budgeting Reports	Y	

PRIORITIZATION		Comment
Distress	Y	
Functional Class (FC)	Y	
Performance/Condition	Y	Best or worst first with additional criteria
Composite	Y	User defined
First Cost	Y	
EUAC	Y	All below are with Capital Improvement Module
B/C Ratio	Y	
Cost Effectiveness Analysis	Y	
Select Candidate Sections	Y	
Multi-year Prioritization	Y	
Force Repair of a Section to a Specific Year	Y	

IMPACT ANALYSIS		Comment
Overall Condition	Y	
Condition Category	Y	
Backlog of Needs	Y	
Deferred Funding	Y	
Stop-Gap Maint	Y	
Remaining Life	Y	Estimate of service life and remaining life

UNPAVED		
Condition	Y	
Prediction	Y	
Cost	Y	Can include as scheduled activity

TRAINING and SUPPORT		Comment
Training Classes	Y	For different modules
Support	Y	Phone and in person

CTL PMS

Dr. Osama Abdulshafi
College of Engineering
Ohio State University
2070 Neil Avenue
Columbus, OH 43210
E-Mail: ABDULSHAFI.1@MAGNUS.ACS.OHIO-STATE.EDU
PH. 614-292-7556
FAX 614-292-3780

CTL PMS - Pavement Management System

Private.

Based on concepts from "Road Surface Management for Local Governments", May 1985.

Includes unsurfaced roads in the analysis.

On-line help using F1 key.

Includes optional sorting fields (subdivision, state route number, shoulders, curb height, inlets, etc.)

Rather than entering budget and seeing effects, the number of years to "repair" the network is input and the cost calculated. If the cost is more than your budget, choose more years.

CTL PMS Suggested User Contacts:

Mr. Robert Bass
Highway Superintendent
Delhi Township
Cincinnati, OH 45238
513-922-3111

Mr. Bill Wilson
Anderson Township
7954 Beechmont Avenue
Cincinnati, OH 45230
513-474-5560

Mr. Charles Smith
Office of Physical Facilities,
Roads, and Grounds
The Ohio State University
160 A Central Service Building
2003 Millikin Road
Columbus, OH 43210-1268
614-292-0560

CTL PMS

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	
Functional Class (FC) /Priority	Y	Y	
# Traffic Lanes	Y	-	
Traffic Hist	Y	-	Current ADT, % trucks, Bus
Projected Traffic	Y	-	
Construction History	Y	-	
Maint & Rehab Hist	Y	-	
Layer Types	Y	-	Can store up to three layers.
Programmed Work	Y	Y	
Work in Progress	-	-	
GIS Interface	-	-	

CONDITION	Store	Sort/Analyze	Comment
Type			Calculates a PCI
Num AC	7	Y	By category, 1%-5%, 6-25, 26-50, 51-100
Num PCC	6	Y	By category
Structural Capacity	-	-	
Roughness	Y	-	Roughness Index
Skid	-	-	
Subjective Eval	-	-	
Automated Input	-	-	

STORING AND MANAGING		Comment
Computerized		Y
Powerful PC Required	-	
Password Protection	-	
Data Dictionary	-	
Users Manual	Y	
DB Manager	Y	FoxPro
Inventory Feedback	Y	1 Report
Distress Reporting	-	Report
Condition Summary	Y	1 Report
Condition Prediction	-	

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	Y	Projection based on user input of pavements changing categories
Trigger Values		
Single	Y	Based on condition, user modifiable
Multiple	-	

CTL PMS

		Comment
Identify PM Based on:		
Interval	Y	User specifies minimum to repair network
Type of Distress	-	
Quantity of Distress	-	Based on condition, user modifiable
ID Treatment Type	Y	Based on condition, user modifiable
List Sections Need M&R	Y	By strategy
Project Condition with and without Repair	Y	Projection based on user input
Total Cost/YR	Y	
Needs for Pavement Class and Type of Treatment	Y	
Budgeting Reports	Y	

PRIORITIZATION		Comment
Distress	-	
Functional Class (FC)	Y	
Performance/Condition	Y	
Composite	Y	ADT, maintenance rating (by user)
First Cost	-	
EUAC	-	
B/C Ratio	-	
Cost Effectiveness Analysis	-	
Select Candidate Sections	Y	
Multi-year Prioritization	Y	
Force Repair of a Section to a Specific Year	Y	

IMPACT ANALYSIS		Comment
Overall Condition	-	
Condition Category	-	
Backlog of Needs	Y	Needs are calculated based on number
Deferred Funding	-	of years to reach target condition
Stop-Gap Maint	-	
Remaining Life	-	

UNPAVED		
Condition	Y	7 distresses
Prediction	Y	Projection based on user input
Cost	Y	

TRAINING and SUPPORT		Comment
Training Classes	-	
Support	Y	Phone

dROADLOG

Robert P. Piane, P.E.
Deighton Associates Limited
112 King Street East
Bowmanville, Ontario, Canada L1C 1N5
PH. 905-697-2644
FAX 905-697-2645
E-mail: Staff@Deighton.com
Web Site: HTTP:\\WWW.Deighton.com

dROADLOG - Pavement Management System

Private.

Manual system.

English or metric.

Very easy to use and understand.

Includes unsurfaced roads.

dROADLOG Suggested User Contacts:

Robert Piane, P Eng.
Deighton Associates Limited
112 King Street East
Bowmanville, Ontario, Canada L1C 1N5
PH. 905-697-2644

dROADLOG

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	
Functional Class (FC) /Priority	Y	Y	Traffic level
# Traffic Lanes	Y	-	From drawing
Traffic Hist	-	-	
Projected Traffic	-	-	
Construction History	Y	-	
Maint & Rehab Hist	Y	-	
Layer Types	Y	-	
Programmed Work	Y	Y	
Work in Progress	Y	Y	
GIS Interface	-	-	

CONDITION	Store	Sort/Analyze	Comment
Type			Results only.
Num AC	-	Y	Rate 1-10
Num PCC	-	Y	
Structural Capacity	-	-	
Roughness	Y	Y	Rate 1-10
Skid	-	-	
Subjective Eval	Y	Y	
Automated Input	-	-	

STORING AND MANAGING		Comment
Computerized	-	
Powerful PC Required	-	
Password Protection	-	
Data Dictionary	-	
Users Manual	Y	
DB Manager	-	
Inventory Feedback	Y	Manually generated report
Distress Reporting	Y	Manually generated report
Condition Summary	Y	Manually generated report
Condition Prediction		-

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition		
Trigger Values		
Single	-	
Multiple	-	User decides

dROADLOG

		Comment
Identify PM Based on:		
Interval	-	User decides
Type of Distress	-	User decides
Quantity of Distress	-	User decides
ID Treatment Type	-	User decides
List Sections Need M&R	Y	All listed, user decides
Project Condition with and without Repair	-	
Total Cost/YR	Y	Manual calculation
Needs for Pavement Class and Type of Treatment	Y	Manual calculation
Budgeting Reports	Y	Manual calculation

PRIORITIZATION		Comment
Distress	-	
Functional Class (FC)	Y	
Performance/Condition	Y	
Composite	Y	Ride, cracking, maintenance cost
First Cost	-	
EUAC	-	
B/C Ratio	-	
Cost Effectiveness Analysis	-	
Select Candidate Sections	Y	Select from graph
Multi-year Prioritization	-	
Force Repair of a Section to a Specific Year	Y	Manually

IMPACT ANALYSIS		Comment
Overall Condition	-	
Condition Category	-	
Backlog of Needs	-	
Deferred Funding	-	
Stop-Gap Maint	-	
Remaining Life	-	

UNPAVED		
Condition	Y	Subjective
Prediction	-	
Cost	Y	Manual

TRAINING and SUPPORT		Comment
Training Classes	-	Videotape provided
Support	Y	Phone

dROAD/dTIMS

Robert P. Piane, P.E.
Deighton Associates Limited
112 King Street East
Bowmanville, Ontario, Canada L1C 1N5
PH. 905-697-2644
FAX 905-697-2645
E-mail: Staff@Deighton.com
Web Site: HTTP:\\www.Deighton.com

dROAD/dTIMS - Infrastructure Management Information System/ Total Infrastructure Management System

Private.

On-line help using F1 key.

Integrated automated mapping or export into AutoCAD.

Dynamic segmentation.

Graphing of past and future condition indices.

Excellent graphical display of budgeting information.

Videotapes on software usage provided (basic and advanced).

Either English or metric.

Includes unsurfaced roads.

Lots of capabilities, but requires lots of inputs.

dROAD/dTIMS Suggested User Contacts:

Mr. Roger Lyon-Surrey	Mr. John Weaver	Mr. Larry Nelson
State of Vermont	State of Indiana	City and County of Denver
802-828-2796	317-232-5359	720-913-4513

dROAD/dTIMS

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	
Functional Class (FC) /Priority	Y	Y	
# Traffic Lanes	Y	Y	
Traffic Hist	Y	Y	
Projected Traffic	Y	Y	User definable
Construction History	Y	Y	
Maint & Rehab Hist	Y	Y	
Layer Types	Y	Y	
Programmed Work	Y	Y	
Work in Progress	Y	Y	
GIS Interface	Y	Y	

CONDITION	Store	Sort/Analyze	Comment
Type			User defined indices
Num AC	Y	Y	User defined distresses
Num PCC	Y	Y	User defined distresses
Structural Capacity	Y	Y	
Roughness	Y	Y	
Skid	Y	Y	
Subjective Eval	Y	Y	
Automated Input	Y	Y	

STORING AND MANAGING		Comment
Computerized		Y
Powerful PC Required	Y	486 minimum, Pentium preferred
Password Protection	Y	Several levels
Data Dictionary	Y	Stores attribute names
Users Manual	Y	3, dTIMS manual is on-line
DB Manager	Y	dBase
Inventory Feedback	Y	User modifiable to many reports
Distress Reporting	Y	User modifiable to many reports
Condition Summary	Y	User modifiable to many reports
Condition Prediction	Y	

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	Y	Family curves
Trigger Values		
Single	Y	
Multiple	Y	Based on decision trees or incremental cost analysis

dROAD/dTIMS

		Comment
Identify PM Based on:		
Interval	Y	Can be configured
Type of Distress	Y	
Quantity of Distress	Y	
ID Treatment Type	Y	Based on decision trees or incremental cost analysis
List Sections Need M&R	Y	
Project Condition with and without Repair	Y	
Total Cost/YR	Y	
Needs for Pavement Class and Type of Treatment	Y	
Budgeting Reports	Y	User modifiable to many reports

PRIORITIZATION		Comment
Distress	Y	User definable
Functional Class (FC)	Y	
Performance/Condition	Y	
Composite	Y	User definable
First Cost	-	
EUAC	Y	
B/C Ratio	Y	Incremental cost analysis or remaining life
Cost Effectiveness Analysis	Y	
Select Candidate Sections	Y	
Multi-year Prioritization	Y	
Force Repair of a Section to a Specific Year	Y	

IMPACT ANALYSIS		Comment
Overall Condition	Y	
Condition Category	Y	
Backlog of Needs	-	Shows impact of funding level
Deferred Funding	Y	Shows impact of funding level
Stop-Gap Maint	Y	User defined
Remaining Life	Y	Based on performance

UNPAVED		
Condition	Y	User indices
Prediction	Y	
Cost	Y	

TRAINING and SUPPORT		Comment
Training Classes	Y	Training during installation, User groups
Support	Y	Phone and videotape

DSS

Wayne Seiler
ERES Consultants - A Division of Applied Research Associates, Inc.
505 West University Avenue
Champaign, IL 61820-3915
PH. 217-356-4500
FAX 217-356-3088
E-Mail: WSeiler@ARA.COM
Website: WWW.ERESNet.COM

DSS - Decision Support System for Pavements, Version 2.5

Private.

Windows based.

English or Metric.

Automated link to GIS software (ArcView, MapInfo).

Many sorting criteria and user fields.

Also stores additional infrastructure information (signs, drainage, utilities, ROW width, shoulder information, speed limits, etc.).

User's manual is easy to read and follow. Also has on-line version.

Hand-held field distress data collection system.

Includes unpaved roads in analysis.

DSS Suggested User Contacts:

Mr. Robert Schron
City of Livonia
33000 Civic Center Drive
Livonia, MI
313-466-2561

Ms. Gretel Varney
City of Portland
Department of Public Works
389 Congress Street, Room 103
Portland, ME 04101
207-874-8834

Mr. Larry Fudurich
City of Peoria
8850 North 79th Avenue
Peoria, AZ 85345
207-874-8834

DSS

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	
Functional Class (FC) /Priority	Y	Y	
# Traffic Lanes	-	-	
Traffic Hist	Y	-	AADT, daily ESAL, etc.
Projected Traffic	Y	Y	
Construction History	Y	Y	
Maint & Rehab Hist	Y	-	
Layer Types	Y	-	
Programmed Work	Y	Y	
Work in Progress	Y	Y	
GIS Interface	Y	Y	Mapinfo, ArcView

CONDITION	Store	Sort/Analyze	Comment
Type	Y	Y	PCI, windshield, subjective, user defined
Num AC		Y	Can store as many as survey method
Num PCC		Y	requires
Structural Capacity	-	-	
Roughness	-	-	Subjective only
Skid	-	-	
Subjective Eval	Y	Y	
Automated Input	Y	Y	

STORING AND MANAGING		Comment
Computerized	Y	
Powerful PC Required	Y	Needs Windows, minimum of 486
Password Protection	Y	Can control ability to change data
Data Dictionary	Y	
Users Manual	Y	Easy to follow, also on-line help
DB Manager	Y	
Inventory Feedback	Y	Also user customizable reports
Distress Reporting	Y	Also user customizable reports
Condition Summary	Y	Also user customizable reports
Condition Prediction	Y	Also user customizable reports

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	Y	User developed family curves
Trigger Values		
Single	Y	
Multiple	Y	

DSS

		Comment
Identify PM Based on:		
Interval	Y	
Type of Distress	Y	
Quantity of Distress	Y	
ID Treatment Type	Y	
List Sections Need M&R	Y	
Project Condition with and without Repair	Y	
Total Cost/YR	Y	
Needs for Pavement Class and Type of Treatment	Y	
Budgeting Reports	Y	Many

PRIORITIZATION		Comment
Distress	-	
Functional Class (FC)	Y	
Performance/Condition	Y	
Composite	Y	Surface type, functional class
First Cost	-	
EUAC	-	
B/C Ratio	Y	
Cost Effectiveness Analysis	Y	
Select Candidate Sections	Y	
Multi-year Prioritization	Y	
Force Repair of a Section to a Specific Year	Y	Sections identified for repair removed from analysis

IMPACT ANALYSIS		Comment
Overall Condition	Y	
Condition Category	Y	
Backlog of Needs	Y	Lists sections, doesn't summarize total
Deferred Funding	Y	
Stop-Gap Maint	-	
Remaining Life	-	

UNPAVED		
Condition	Y	Windshield, PCI, URCI, other
Prediction	Y	
Cost	Y	

TRAINING and SUPPORT		Comment
Training Classes	Y	During installation, yearly User's Groups
Support	Y	With maintenance agreement, 1 site visit/year

Dynatest PMS

Frank Holt
Business Development
Dynatest Consulting Inc.
Production & Support Center
Route 6, Box 1510
PO Box 337
Starke Florida 32091
Website: http://www.dynatest.com/software/roadpms.htm
E-Mail: FHolt@dynatest.com

Dynatest PMS - Dynatest Pavement Management System

Private.

User's manual very complete and easy to use.

Can store contractor data.

Can add user-defined fields.

Can enter section-specific notes.

Prioritization includes user costs which incorporate vehicle maintenance costs, and are related to roughness by a modified HDM III World Bank model.

Many display and plotting options.

Dynatest PMS Suggested User Contacts:

Scott Gartin	Peter Hogan	Carl Hoehler
Alaska DOT	Manchester City Council	City of Johannesburg
1-907-269-6244	+161 908 5758	South Africa
Fax: +1-907-269-6231	Fax +161 908 5780	Tel +2711 493 7122
scott_gartin@dot.state.ak.us	p.hogan@notes.manchester.gov.uk	or +2782 893 9303

Dynatest PMS

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	Also uses milepoints
Functional Class (FC) /Priority	Y	-	
# Traffic Lanes	N	-	
Traffic Hist	Y	Y	With ESAL's calculates remaining life
Projected Traffic	-	-	
Construction History	Y	Y	
Maint & Rehab Hist	Y	Y	
Layer Types	Y	Y	
Programmed Work	Y	Y	
Work in Progress	Y	Y	
GIS Interface	Y	Y	

CONDITION	Store	Sort/Analyze	Comment
Type	-	-	Uses IRI and rut depth
Num AC	-	-	Rut depth
Num PCC	-	-	
Structural Capacity	Y	Y	
Roughness	Y	Y	
Skid	Y	-	
Subjective Eval	-	-	
Automated Input	Y	Y	FWD data, profile, visual, and friction

STORING AND MANAGING		Comment
Computerized	Y	
Powerful PC Required	Y	
Password Protection	Y	
Data Dictionary	-	
Users Manual	Y	
DB Manager	Y	Access 97
Inventory Feedback	Y	
Distress Reporting	-	
Condition Summary	-	
Condition Prediction	-	

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	-	
Trigger Values		
Single	Y	
Multiple	Y	Least cost and best treatment

Dynatest PMS

		Comment
Identify PM Based on:		
Interval	-	
Type of Distress	-	
Quantity of Distress	Y	Roughness and rut depth
ID Treatment Type	Y	
List Sections Need M&R	Y	
Project Condition with and without Repair	-	
Total Cost/YR	Y	
Needs for Pavement Class and Type of Treatment	Y	Run separately
Budgeting Reports	Y	Flexible options

PRIORITIZATION		Comment
Distress	-	
Functional Class (FC)	-	
Performance/Condition	Y	Through user costs
Composite	Y	User costs, agency costs, and capital costs
First Cost	Y	
EUAC	-	
B/C Ratio	Y	
Cost Effectiveness Analysis	Y	
Select Candidate Sections	Y	
Multi-year Prioritization	Y	
Force Repair of a Section to a Specific Year	Y	

IMPACT ANALYSIS		Comment
Overall Condition	-	
Condition Category	-	
Backlog of Needs	Y	As difference between budget and capital costs
Deferred Funding	-	
Stop-Gap Maint	-	
Remaining Life	Y	

UNPAVED		
Condition	-	
Prediction	-	
Cost	-	

TRAINING and SUPPORT		Comment
Training Classes	-	
Support	Y	Phone, e-mail, and on-site

IBOS

Clarence Dewald
VEMAX Management Inc.
211- 9333 50th Street
Edmonton, Alberta, Canada T6B 2L5
PH: 780-463-9501
FAX 780-565-4809
E-Mail: Support@VEMAX.com
Website: WWW.Vemax.COM

IBOS - Integrated Budget Optimization System

Private.

English or Metric.

Complete suite of integrated software tools for total asset management.

DataViewer is an OLAP (In Line Analytical Processing) tool used to analyze the data captured for, or produced by, other systems.

Software is very configurable, and customizable for each agency.

Includes bridges.

Ability to graphically display many items, many pre-programmed graphs.

Data entry fields for inventory and condition collection are user definable. There are no restrictions on what is collected or how it is measured.

Manuals are provided as an electronic help file in addition to hard copy.

IBOS Suggested User Contacts:

Gord King
Dir. Preservation Services
Saskatchewan Highways
and Transportation
3rd Floor 1288 Central Ave.
Prince Albert, SK, Canada
S6V 6G1
PH. 306-953-3509

Carl Weibe
Dir Asset Management
Manitoba Highway &
Govt Services
17th Floor 215 Gary St.
Winnipeg, MB, Canada
R3C 3Z1
PH (204) 945-4912

Doug Drever
Infrastructure Department
City of Saskatoon
222-3rd Avenue North
Saskatoon, SK, Canada
S7J 0J5
PH (306) 975-2826

IBOS

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	
Functional Class (FC) /Priority	Y	Y	
# Traffic Lanes	Y	Y	
Traffic Hist	Y	-	
Projected Traffic	Y	-	
Construction History	Y	-	
Maint & Rehab Hist	Y	-	
Layer Types	Y	-	
Programmed Work	Y	Y	
Work in Progress	Y	Y	
GIS Interface	-	-	

CONDITION	Store	Sort/Analyze	Comment
Type	Y	Y	Defined by the agency
Num AC	Y	6	Defined by the agency
Num PCC	Y	6	Defined by the agency
Structural Capacity	Y	-	Used as a modifier to survival curves
Roughness	Y	Y	
Skid	Y	Y	
Subjective Eval	Y	-	Can be used
Automated Input	Y	Y	Any distress information collected through automated means can be imported

STORING AND MANAGING		Comment
Computerized		Y
Powerful PC Required	Y	Win 95, 98 or NT
Password Protection	-	
Data Dictionary	-	
Users Manual	Y	
DB Manager	Y	
Inventory Feedback	Y	
Distress Reporting	Y	
Condition Summary	Y	
Condition Prediction	Y	

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	Y	Strategic PMS uses transitional probabilities, Tactical PMS uses survival curves
Trigger Values		
Single	-	
Multiple	Y	Distress type, severity, extent and roughness

IBOS

		Comment
Identify PM Based on:		
Interval	-	
Type of Distress	Y	
Quantity of Distress	Y	
ID Treatment Type	Y	
List Sections Need M&R	Y	
Project Condition with and without Repair	Y	Requires separate runs
Total Cost/YR	Y	
Needs for Pavement Class and Type of Treatment	Y	Using sorting options
Budgeting Reports	Y	

PRIORITIZATION		Comment
Distress	Y	Condition state
Functional Class (FC)	Y	Separate models for each class
Performance/Condition	Y	Optimizes least cost to achieve desired condition or best condition for desired budget.
Composite	Y	
First Cost	-	
EUAC	Y	
B/C Ratio	Y	
Cost Effectiveness Analysis	Y	Project level analysis
Select Candidate Sections	Y	
Multi-year Prioritization	Y	
Force Repair of a Section to a Specific Year	Y	

IMPACT ANALYSIS		Comment
Overall Condition	Y	
Condition Category	Y	
Backlog of Needs	-	
Deferred Funding	-	
Stop-Gap Maint	-	Indirectly. Maintenance Management System calculates routine maintenance based on condition and level of service.
Remaining Life	-	

UNPAVED		
Condition	Y	In Maintenance Management System
Prediction	Y	In Maintenance Management System
Cost	Y	In Maintenance Management System

TRAINING and SUPPORT		Comment
Training Classes	Y	Offer one week “test drive” to simulate business cycle
Support	Y	On site, phone, E-Mail, Website

LVR

Dr. Ali Roohanirad
LVR Technology Management
P.O. Box 333
Independence, MO 64051
PH. 816-350-2248
FAX 816-373-7902

LVR - Low Volume Road Pavement Management System

Private.

On-line help using F1 key.

Designed for low volume roads.

Designed for Flexible, Chip Seal, Cold-Mix, and Gravel roads.

Different distresses for different low volume pavement types (cold-mix, chip seal, gravel, flexible).

Windows and non-Windows programs available.

Collect and store information on sidewalks and curb and gutter.

Users guide details method of managing pavements manually.

Two Manuals - Field Condition Survey and Reference Guide. Ref Guide explains concepts and criteria on how to develop a low volume road pavement management system.

LVR Suggested User Contacts:

Dr. Ali Roohanirad
Traffic and Maintenance Engineer
Jackson County, MO
105 North Main
Independance, MO 64050
816-881-4447

Tom Shafer
City Administrator
City of Elk Grove
Elk Grove, MO
816-605-4012

Ron Fulken
Jackson Co. Parks Department
Lee Summit, MO
816-795-8200

LVR-PMS

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	
Functional Class (FC) /Priority	Y	Y	
# Traffic Lanes	Y	-	
Traffic Hist	Y	-	ADT
Projected Traffic	Y	Y	Uses projected traffic
Construction History	Y	Y	
Maint & Rehab Hist	Y	-	
Layer Types	Y	Y	Uses CBR
Programmed Work	Y	Y	
Work in Progress	Y	Y	
GIS Interface	Y	Y	Through database

CONDITION	Store	Sort/Analyze	Comment
Type			PCI, Pavement Ride Quality
Num AC	12	Y	8 for cold mix, 7 for chip seal
Num PCC	-	-	
Structural Capacity	-	-	
Roughness	-	-	Inferred from distress
Skid	-	-	
Subjective Eval	-	-	
Automated Input			

STORING AND MANAGING		Comment
Computerized		Y
Powerful PC Required	-	486 with Windows
Password Protection	Y	
Data Dictionary	-	
Users Manual	Y	
DB Manager	Y	RBase
Inventory Feedback	Y	
Distress Reporting	Y	
Condition Summary	Y	
Condition Prediction	Y	

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	Y	
Trigger Values		
Single	-	
Multiple	Y	User modifiable decision trees

LVR-PMS

		Comment
Identify PM Based on:		
Interval	Y	
Type of Distress	Y	
Quantity of Distress	Y	Also pavement type
ID Treatment Type	Y	
List Sections Need M&R	Y	
Project Condition with and without Repair	Y	
Total Cost/YR	Y	
Needs for Pavement Class and Type of Treatment	Y	
Budgeting Reports	Y	

PRIORITIZATION		Comment
Distress	Y	
Functional Class (FC)	Y	
Performance/Condition	Y	
Composite	Y	
First Cost	-	
EUAC	-	
B/C Ratio	-	
Cost Effectiveness Analysis	Y	
Select Candidate Sections	Y	
Multi-year Prioritization	Y	
Force Repair of a Section to a Specific Year	Y	

IMPACT ANALYSIS		Comment
Overall Condition	Y	
Condition Category	Y	
Backlog of Needs	Y	
Deferred Funding	Y	
Stop-Gap Maint	Y	Allocate percentage to Stop-Gap
Remaining Life	Y	For individual sections

UNPAVED		
Condition	Y	7 distress types
Prediction	Y	
Cost	Y	

TRAINING and SUPPORT		Comment
Training Classes	Y	
Support	Y	Phone

PIMS

G. Scot Gordon, P.E.
CTL Thompson, Inc.
1971 West 12th Avenue
Denver, CO 80204
PH. 303-825-0777
FAX 303-825-4252
Website: HTTP://CTLT.COM
E-Mail:Denver@CTLT.COM

PIMS - Pavement Information Management System and Database for Windows, Version 2.5

Private.

Windows based.

Includes graphical display of last eight condition ratings and deterioration curve.

Separate module available for multiple year budgeting analysis.

PIMS Suggested User Contacts:

Mr. Louis Gabos, P.E.
Routt County, Colorado
Court House Annex
Box 3598
Steamboat Springs, CO 80447
303-879-0108

Mr. Eugene Lesperance
City of Henderson
Public Works Quality Control
140 Water Street
Henderson, NV 89015
702-565-2337

Mr. Craig Faessler
City of Littleton
2255 W. Berry Ave.
Littleton, CO 80165
303-795-3865

PIMS

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	Area calculated
Functional Class (FC) /Priority	Y	-	
# Traffic Lanes	Y	Y	
Traffic Hist	Y	-	ESAL's
Projected Traffic	-	-	
Construction History	Y	Y	
Maint & Rehab Hist	Y	-	
Layer Types	Y	-	
Programmed Work	-	-	Comment field
Work in Progress	-	-	Comment field
GIS Interface	Y	Y	ArcView Link

CONDITION	Store	Sort/Analyze	Comment
Type	Y	Y	PCI using SHRP Distresses
Num AC	Y	13	
Num PCC	Y	16	
Structural Capacity	Y	-	
Roughness	Y	-	Subjective
Skid	Y	-	Subjective
Subjective Eval	-	-	
Automated Input	-	-	

STORING AND MANAGING		Comment
Computerized	Y	
Powerful PC Required	Y	Windows based
Password Protection	Y	Life cycle curves and cost coefficients
Data Dictionary	-	
Users Manual	Y	
DB Manager	Y	
Inventory Feedback	Y	
Distress Reporting	Y	
Condition Summary	Y	
Condition Prediction	Y	Programmed curve with modifiable end point

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	-	Uses current condition
Trigger Values		
Single	-	User selects
Multiple	Y	User selects PCI levels for repair type

PIMS

		Comment
Identify PM Based on:		
Interval	-	PCI or user selects
Type of Distress	-	User selects
Quantity of Distress	-	User selects
ID Treatment Type	Y	Many repair types
List Sections Need M&R	Y	
Project Condition with and without Repair	Y	
Total Cost/YR	Y	
Needs for Pavement Class and Type of Treatment	Y	With budgeting module
Budgeting Reports	Y	

PRIORITIZATION		Comment
Distress	-	
Functional Class (FC)	-	
Performance/Condition	Y	
Composite	-	
First Cost	Y	
EUAC	-	
B/C Ratio	-	
Cost Effectiveness Analysis	Y	Cost/Life
Select Candidate Sections	Y	
Multi-year Prioritization	Y	
Force Repair of a Section to a Specific Year	Y	Manually

IMPACT ANALYSIS		Comment
Overall Condition	Y	Impact of budget level on overall condition
Condition Category	-	
Backlog of Needs	-	
Deferred Funding	-	
Stop-Gap Maint	-	
Remaining Life	-	

UNPAVED		
Condition	Y	6 Distresses
Prediction	Y	
Cost	Y	

TRAINING and SUPPORT		Comment
Training Classes	-	
Support	Y	Phone

PMS 4.0

Dr. Chhote L. Saraf, P.E.
Director of Pavement Evaluation Services
Resource International
281 Enterprise Drive
Westerville, OH 43081
PH. 614-885-1959
FAX 614-885-341
Website: HTTP://www.ResourceInternational.com
E-Mail:Saraf@ResourceInternational.com

PMS- Pavement Management System Version 4.0

Private.

Additional packages available for GIS, skid, roughness, deflection data, and graphics.

Context sensitive on-line help with F1 key.

Suggests FWD analysis based on structural factors.

Network version available.

Lists optional and required data.

Sidewalk, curb, shoulders, drainage, ROW width, and text can be entered can be entered.

Hand held field data collection equipment available to record pavement condition.

English and metric.

PMS 4.0 Suggested User Contacts:

Uzair A. Asadullah
Transportation Engineer
EDATA
Ohio One Building
Suite 400
25 E. Boardman Street
Youngstown, OH 44503
330-746-7601

Mr. Brian D. McPherson
Jackson County Engineer
3062 Clary Road
Jackson, OH 45640
740-286-4130

Mr. David Buesking
Public Works/Storm Water
Utility Director
City of Forest Park
1201 W. Kemper Road
Forest Park, OH 45240
513-595-5258

PMS-4.0

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	
Functional Class (FC) /Priority	Y	Y	
# Traffic Lanes	Y	-	
Traffic Hist	Y	-	ESAL or ADT during inventory
Projected Traffic	-	-	
Construction History	Y	-	
Maint & Rehab Hist	Y	-	
Layer Types	Y	-	
Programmed Work	Y	Y	
Work in Progress	Y	-	
GIS Interface	Y	-	Separate interface package

CONDITION	Store	Sort/Analyze	Comment
Type	Y	Y	PCR weighted deduct
Num AC	13/14	Y	14 for composite
Num PCC	12	Y	
Structural Capacity	-	-	Suggests structural evaluation based on distress type. Separate module
Roughness	Y	-	Separate module
Skid	Y	-	Separate module
Subjective Eval	Y	Y	
Automated Input	Y	Y	

STORING AND MANAGING		Comment
Computerized	Y	
Powerful PC Required	Y	Pentium 90, Windows 95 or NT
Password Protection	-	
Data Dictionary	-	
Users Manual	Y	
DB Manager	Y	Visual FoxPro
Inventory Feedback	Y	
Distress Reporting	Y	
Condition Summary	Y	
Condition Prediction	-	In next version

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	Y	By distress group
Trigger Values		
Single	Y	
Multiple	Y	Fixed

PMS-4.0

		Comment
Identify PM Based on:		
Interval	-	
Type of Distress	Y	Based on condition
Quantity of Distress	Y	Category of extent
ID Treatment Type	Y	Multiple, user modifiable
List Sections Need M&R	Y	Lists all
Project Condition with and without Repair	-	
Total Cost/YR	Y	
Needs for Pavement Class and Type of Treatment	Y	
Budgeting Reports	Y	

PRIORITIZATION	Comment	
Distress	Y	
Functional Class (FC)	Y	
Performance/Condition	Y	PCR group
Composite	Y	
First Cost	-	
EUAC	-	
B/C Ratio	-	
Cost Effectiveness Analysis	-	
Select Candidate Sections	-	
Multi-year Prioritization	-	
Force Repair of a Section to a Specific Year	Y	Also force repair type.

IMPACT ANALYSIS		Comment
Overall Condition	-	
Condition Category	-	
Backlog of Needs	-	
Deferred Funding	-	
Stop-Gap Maint	-	
Remaining Life	-	

UNPAVED		
Condition	-	
Prediction	-	
Cost	-	

TRAINING and SUPPORT		Comment
Training Classes	-	By request
Support	Y	Phone

PMSPro 2000

Didrik A. Voss, P.E.
Pavement Engineers
15226 12th Drive SE
Mill Creek, WA 98012-3082
PH. 425-337-5222
FAX 425-337-6084
E-Mail DAVoss@PvmtEngr.COM
Website: WWW.PvmtEngr.Com

PMSPro 2000 - PMSPro Pavement Management Program

Private.

Windows based.

Infrastructure files store characteristics of nineteen (19) different features along the street, including Approaches, Bike Facilities, Walks, Wheelchair Ramps, etc. Information is stored by address and can be geocoded in a GIS map.

Uses English or Metric units.

Many user modifiable fields.

Can use different condition rating methods. Up to eight distresses can be defined for each surface type.

User definable surface types.

Can manage multiple pavement networks.

Can import data files to update database.

Project and network level analysis.

Separate field data collection program.

User definable (adhoc) report program module.

PMSPro 2000 Suggested User Contacts:

Mr. Dennis Dowdy
City Engineer
25 West Main
Auburn, WA 98001-4998
253-931-3010

Mr. Jeff Jensen
City of Bainbridge Island
692 Highway 305 N.E.
Bainbridge Isle, WA 98110
206-842-2016

Mr. Andy Girst
Utilities Engineer
Parks and Recreation Commission
Washington State
PO Box 42670
Olympia, WA 98504-2670
360-902-8624

PMSPro 2000

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	
Functional Class (FC) /Priority	Y	Y	Traffic Class based on ESAL
# Traffic Lanes	Y	-	
Traffic Hist	Y	Y	Calculates design KESAL
Projected Traffic	Y	Y	Overall or based on classification
Construction History	Y	Y	
Maint & Rehab Hist	Y	-	
Layer Types	Y	Y	Compares SN to design SN
Programmed Work	-	-	
Work in Progress	-	-	
GIS Interface	Y	Y	MapPMS for ARCView, MapPMS for MapInfo

CONDITION	Store	Sort/Analyze	Comment
Type	Y	Y	Pavement Engineers PCR, Step PCR, COE PCI, others
Num AC	8	Y	User definable
Num PCC	8	Y	User definable
Structural Capacity	Y	-	Can enter back-calculated moduli
Roughness	Y	Y	User defined
Skid	-	-	
Subjective Eval	-	-	Could enter as user distress
Automated Input	Y	Y	Only from PMSPro 2000 distress survey

STORING AND MANAGING		Comment
Computerized	Y	
Powerful PC Required	Y	Uses Windows
Password Protection	Y	Network manager module
Data Dictionary	-	
Users Manual	Y	
DB Manager	Y	FoxPro
Inventory Feedback	Y	View and print
Distress Reporting	Y	
Condition Summary	Y	
Condition Prediction	Y	User defines curves

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	Y	
Trigger Values		
Single	-	
Multiple	Y	PCR, surface type and traffic/functional class

PMSPro 2000

		Comment
Identify PM Based on:		
Interval	-	
Type of Distress	Y	
Quantity of Distress	Y	Condition rating
ID Treatment Type	Y	User modifiable decision trees
List Sections Need M&R	Y	
Project Condition with and without Repair	Y	
Total Cost/YR	Y	
Needs for Pavement Class and Type of Treatment	Y	Using data filters
Budgeting Reports	Y	

PRIORITIZATION		Comment
Distress	-	
Functional Class (FC)	Y	
Performance/Condition	Y	Worst first or best first
Composite	-	
First Cost	-	
EUAC	-	
B/C Ratio	Y	
Cost Effectiveness Analysis	-	
Select Candidate Sections	Y	
Multi-year Prioritization	Y	
Force Repair of a Section to a Specific Year	-	

IMPACT ANALYSIS		Comment
Overall Condition	Y	
Condition Category	Y	
Backlog of Needs	Y	
Deferred Funding	-	
Stop-Gap Maint	-	
Remaining Life	-	

UNPAVED		
Condition	Y	
Prediction	Y	
Cost	Y	

TRAINING and SUPPORT		Comment
Training Classes	-	By request
Support	Y	Phone

RAMSModel

Iain Davidson
Managing Director
Road Asset Management Systems Pty Ltd
PO Box 196
Burpengary, Queensland 4505 Australia
E-Mail rams@hotkey.net.au
PH. 617-3888-1141
FAX 617-3888-5373

RAMSModel - Road Roughness and Rutting Modelling Software

Private.

Metric.

Filters determine when rehabilitation has taken place using roughness filters.

Includes and uses subgrade data in the analysis.

Can combine district level databases.

Provides quick visualization of network roughness trends through analysis of raw roughness data.

RAMSModel Suggested User Contacts:

Mr Andrew Golding,
Manager, Asset Management;
Roads Strategy Branch, Main Roads
Queensland
andrew.c.golding@mainroads.qld.gov.au
Tel: +617 3224 7272
Fax: +617 3404 3833

Mr Alan Bell
Director, Pavement Asset Management
Transport Technology Division, Main Roads
Queensland
information@transtec.dmr.qld.gov.au
Tel: +617 3834 2274
Fax: +617 3834 2065

RAMSModel

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	
Functional Class (FC) /Priority	Y	Y	
# Traffic Lanes	Y	Y	Can assign % trucks, % ADT by lane
Traffic Hist	Y	Y	Can extrapolate backwards
Projected Traffic	Y	-	
Construction History	Y	Y	
Maint & Rehab Hist	Y	Y	
Layer Types	Y	Y	
Programmed Work	Y	Y	
Work in Progress	Y	Y	
GIS Interface	-	-	

CONDITION	Store	Sort/Analyze	Comment
Type			Uses roughness and rutting
Num AC	4	Y	Also imports alligator, longitudinal and transverse cracking, and rutting
Num PCC	4	Y	
Structural Capacity	-	-	
Roughness	Y	Y	
Skid	-	-	
Subjective Eval	-	-	
Automated Input	Y	Y	Accepts batch file in proper format

STORING AND MANAGING		Comment
Computerized	Y	
Powerful PC Required	N	
Password Protection	N	
Data Dictionary	N	
Users Manual	Y	
DB Manager	Y	
Inventory Feedback	-	
Distress Reporting	Y	
Condition Summary	Y	Many options
Condition Prediction	Y	Roughness and rutting

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	Y	Roughness and rutting
Trigger Values		
Single	Y	
Multiple	Y	Roughness and rutting

RAMSModel

		Comment
Identify PM Based on:		
Interval	-	
Type of Distress	Y	Roughness and rutting
Quantity of Distress	Y	Roughness and rutting
ID Treatment Type	-	
List Sections Need M&R	-	
Project Condition with and without Repair	-	
Total Cost/YR	-	
Needs for Pavement Class and Type of Treatment	-	
Budgeting Reports	-	

PRIORITIZATION		Comment
Distress	-	
Functional Class (FC)	-	
Performance/Condition	-	
Composite	-	
First Cost	-	
EUAC	-	
B/C Ratio	-	
Cost Effectiveness Analysis	-	
Select Candidate Sections	-	
Multi-year Prioritization	-	
Force Repair of a Section to a Specific Year	Y	

IMPACT ANALYSIS		Comment
Overall Condition	Y	Many options and plots
Condition Category	Y	Many options and plots
Backlog of Needs	-	
Deferred Funding	-	
Stop-Gap Maint	-	
Remaining Life	Y	

UNPAVED		
Condition	Y	Roughness and rutting
Prediction	Y	
Cost	-	

TRAINING and SUPPORT	Comment
Training Classes	-
Support	Y

RoadManager *2000* ™

Gordon Daring, P.E.
Vanasse Hangen Brustlin, Inc.
54 Tuttle Place
Middletown Connecticut 06457
E-Mail Software@VHB.COM
Website: http://www.VHB.com
PH. 800-927-4363
FAX 860-632-7879

RoadManager *2000* ™, Version 2.0

Private.

English or metric.

ArcView® interface.

Includes gravel and unpaved roads in analysis.

RSMS, MTC, IMS, and MicroPAVER data can be imported.

Many user definable classifications including surface type, indices, deduct points, deterioration parameters, etc.

Module to inventory and evaluate data related to sidewalks, trees, signs, pavement markings, signals, drainage and utility structures, guide rails, street lights, and street opening permits.

RoadManager *2000*™ is a module of the Asset Management System, Infrastructure *2000*™ software, which includes WorkManager *2000*™, EquipmentManager *2000*™, PermitManager *2000*™, RM-AV *2000*™, and the RoadManager *2000*™

On-line help using F1 key.

Road Manager *2000* ™ Suggested User Contacts:

Mr. Paul Taylor, Jr
Engineering Department
City of Boston
City Hall Plaza, Room 714
Boston, MA 02201
617-635-2481

Mr. Bob Pryzby
Director of Public Works
City of Prairie Village
3535 Somerset Drive
Prairie Village, KS 66208-5180
913-385-4655

Mr. Rick DeMello
Town Engineer
Town of Yarmouth
1146 Route 28
Yarmouth, MA 02664
508-398-2231

RoadManager *2000* ™

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	
Functional Class (FC) /Priority	Y	Y	Class by AADT
# Traffic Lanes	Y	-	
Traffic Hist	Y	-	AADT
Projected Traffic	-	-	
Construction History	Y	-	
Maint & Rehab Hist	Y	-	
Layer Types	Y	-	
Programmed Work	Y	Y	
Work in Progress	-	-	
GIS Interface	Y	Y	ArcView

CONDITION	Store	Sort/Analyze	Comment
Type	Y	Y	Computes base, surface index, PCI, RCI.
Num AC	Y	Y	User defined distresses for each
Num PCC	Y	Y	surface type
Structural Capacity	-	-	
Roughness	Y	Y	Subjective or estimated index
Skid	Y	-	
Subjective Eval	Y	Y	Drainage, traffic safety, sidewalk, etc.
Automated Input	Y	Y	

STORING AND MANAGING		Comment
Computerized	Y	
Powerful PC Required	Y	Pentium, 32Mb RAM minimum, Windows, NT, 95, or 98
Password Protection	Y	Optional
Data Dictionary	Y	On-line
Users Manual	Y	Step by step instructions
DB Manager	Y	Xbase
Inventory Feedback	Y	
Distress Reporting	Y	
Condition Summary	Y	
Condition Prediction	Y	

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	Y	User Defined
Trigger Values		
Single	-	
Multiple	Y	Unlimited, but default is 7

		Comment
Identify PM Based on:		
Interval	Y	Deterioration parameters
Type of Distress	Y	
Quantity of Distress	Y	
ID Treatment Type	Y	Customized to user preferences
List Sections Need M&R	Y	
Project Condition with and without Repair	Y	Network condition, not section
Total Cost/YR	Y	
Needs for Pavement Class and Type of Treatment	Y	
Budgeting Reports	Y	Multiple plans can be calculated and analyzed

PRIORITIZATION		Comment
Distress	-	
Functional Class (FC)	Y	
Performance/Condition	Y	
Composite	Y	Condition range for class
First Cost	Y	Ascending or descending
EUAC	-	
B/C Ratio	Y	Benefit
Cost Effectiveness Analysis	-	
Select Candidate Sections	Y	
Multi-year Prioritization	Y	
Force Repair of a Section to a Specific Year	Y	

IMPACT ANALYSIS		Comment
Overall Condition	Y	
Condition Category	Y	
Backlog of Needs	Y	
Deferred Funding	-	
Stop-Gap Maint	-	
Remaining Life	-	

UNPAVED		
Condition	Y	Store and analyze user defined distresses.
Prediction	-	
Cost	Y	

TRAINING and SUPPORT	Comment	
Training Classes	-	
Support	Y	Phone and on-site

Visual/PMS™

Stuart Hudson
Texas Research and Development Incorporated
2602 Dellana Lane
Austin, TX 78746
E-Mail SHudson@TRDI.COM
Web Site HTTP:\\WWW.TRDI.COM
PH. 512-327-4200
FAX 512-328-7246

Visual/PMS™ - Visual/PMS™ Pavement Management System, Version 4.0

Private.

Windows based.

English or Metric.

Visual display of structural cross section thickness along the road.

Can be configured to "lock" agency defaults so that only values appropriate to this agency are displayed.

Dynamic segmentation applicable to condition, traffic, inventory, structure, etc.

Multiple location referencing methods, GIS interface, and all inventory items and attributes tied to user specified location referencing.

Many user-defined fields which can be used in prioritization, decision analysis, incremental benefit cost analysis, probabilistic optimization, and performance analysis.

Can be configured for stand alone or as client/server.

Many ways to summarize data.

Visual/PMS™ Suggested User Contacts:

Mr. Cole Mullis
Oregon DOT
Pavements Unit
800 Airport Road
Salem, OR 97310

Mr. Dick Clark
Montana DOT
2701 Prospect Avenue
P.O. Box 201001
Helena, MY 59620-1001

Mr.Hugh Doyen
Engineering Services Division
Aramco Services Co-Saudi Aramco
9009 West Loop South
Houston, TX 77096-1799

Visual/PMS™

INVENTORY AND PROJECT HISTORY	Store	Sort/Analyze	Comment
ID	Y	Y	
L, W, A	Y	Y	Uses milepoints for location control
Functional Class (FC) /Priority	Y	Y	
# Traffic Lanes	Y	Y	Used for lane miles and summary statistics
Traffic Hist	Y	Y	With ESAL's calculates remaining life
Projected Traffic	Y	Y	Traffic growth rate
Construction History	Y	Y	
Maint & Rehab Hist	Y	Y	
Layer Types	Y	Y	Structural number, can use defaults
Programmed Work	Y	Y	
Work in Progress	Y	Y	
GIS Interface	Y	Y	ArcView

CONDITION	Store	Sort/Analyze	Comment
Type	Y	Y	User defined
Num AC	Any	Y	User defined
Num PCC	Any	Y	User defined
Structural Capacity	Y	Y	Effective SN/ future traffic = remain life
Roughness	Y	Y	IRI and Ride Index converted to 1-100
Skid	Y	Y	
Subjective Eval	Y	Y	User defined
Automated Input	Y	Y	Easily configurable to any fomrat

STORING AND MANAGING		Comment
Computerized	Y	
Powerful PC Required	Y	Pentium, 16MB RAM
Password Protection	Y	Multiple access levels allowed
Data Dictionary	Y	
Users Manual	Y	On-line and hard copy. Menu item sensitive help key
DB Manager	Y	
Inventory Feedback	Y	Several SQL standard RDBMS, Oracle preferred.
Distress Reporting	Y	
Condition Summary	Y	
Condition Prediction	Y	Historical family curves or user estimates based on treatment, index, and determining influences

IDENTIFYING SECTIONS NEEDING REPAIR		Comment
Project Condition	Y	
Trigger Values		
Single	Y	
Multiple	Y	User developed decision trees

Visual/PMS™

		Comment
Identify PM Based on:		
Interval	Y	
Type of Distress	Y	
Quantity of Distress	Y	
ID Treatment Type	Y	
List Sections Need M&R	Y	
Project Condition with and without Repair	Y	
Total Cost/YR	Y	
Needs for Pavement Class and Type of Treatment	Y	
Budgeting Reports	Y	Many options and capabilities

PRIORITIZATION		Comment
Distress	Y	Dependant on setup
Functional Class (FC)	Y	
Performance/Condition	Y	
Composite	Y	
First Cost	-	Can simulate effects using B/C ratio
EUAC	-	
B/C Ratio	Y	
Cost Effectiveness Analysis	Y	
Select Candidate Sections	Y	
Multi-year Prioritization	Y	
Force Repair of a Section to a Specific Year	Y	

IMPACT ANALYSIS		Comment
Overall Condition	Y	Also graphical presentation
Condition Category	Y	
Backlog of Needs	Y	
Deferred Funding	Y	
Stop-Gap Maint	Y	By user adjustment of performance model
Remaining Life	Y	

UNPAVED		
Condition	-	Inventory only
Prediction	-	
Cost	-	

TRAINING and SUPPORT		Comment
Training Classes	-	
Support	Y	Phone, E-Mail, Web page, FTP site, and in person

Pavement Management
Data Collection Equipment

DISCLAIMER

The contents of this report reflect the views of the author, who is responsible for the opinions, findings, and conclusions presented herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration and are not an endorsement of any of the equipment or devices listed herein. This report does not constitute a standard, specification, or regulation. Additionally, this report is not intended for construction, bidding, or permit purposes. Mr. Thomas J. Freeman, P.E., was the Principal Investigator for the project.

1.0 Catalog of Profile Equipment

1.1 Introduction

This equipment catalog was developed to assist state, county, and local agencies in learning about pavement management hardware. This catalog was intended to be similar to the “Pavement Management Software Catalog” developed for the FHWA by the Texas Transportation Institute.

In order to develop this catalog, a request was sent out to some of the known providers of pavement management equipment who were asked to provide documentation on their system, answer a questionnaire, and a provide a list of three users. Not all of the providers submitted their information for review and other providers were not even aware of the request. Therefore, this catalog is not meant to be an exhaustive review of all pavement management hardware, but is instead intended to illustrate the types of packages available.

The following descriptions of each hardware package follow this format. Items were included because the data was considered important or because the technique is important to the effective use of pavement management. The first page has contact information, a listing of interesting or unique features, and contact information for three users.

The second page has a column for comments or for indicating whether a data item was included. This format is used to differentiate between the uses of the data. A "Y" indicates that the software uses or performs the indicated task. A "-" is a negative response. In order to receive a positive response, the equipment must accomplish the task relatively easily and must be performed within the software program. No attempt is made to rank the system on a best to worst basis. Each system may have instances where it will best meet the needs of the agency. Instead, the systems are arranged in alphabetical order.

1.2 Example

The format for the evaluation is:

Equipment Acronym
Contact Person
Company Name
Address
Phone
FAX
E-Mail Address
Web Site or Other Information

Acronym - Name of Equipment Hardware and Software Version

In this area, some of the interesting and unique features and capabilities of the software are noted. Particular attention is given to features not included in the detailed list of items considered necessary or desirable.

In addition, please answer these two specific questions.

1. Equipment vendor, service provider, or both.

2. Collect and report in English, Metric, or both.

Suggested User Contacts:

The equipment provider was asked to provide no more than three contacts of people or agencies using this version of their equipment.

Name	Name	Name
Title	Title	Title
Address	Address	Address
Agency	Agency	Agency
Phone or FAX	Phone or FAX	Phone or FAX

Equipment Acronym

GENERAL	Is the following provided:
Speed/Sampling Rate	What is the rate of data collection for typical data collection speeds?
Location Referencing	How is the location determined (DMI, GPS, other)
GIS Interface	Is there a built-in link to a GIS or automated mapping?
Video Logging	Is video logging provided?
Processing	Is data processed real-time or post-processed?

MEASUREMENT INFORMATION	How is the following conducted:
Sensor Type	Laser, sonic, optical, infrared, other?
Number of Sensors	How many sensors?
File Size/Mile	How large are the data files?
Resolution	What is the smallest size deviation or that can be measured?
ASTM E-950:	
Repeatability	What is the repeatability and accuracy according to ASTM
Accuracy	E-950?
Certified	Is a current certificate available?
Cross Slope	Is cross slope provided?
Texture	Is texture noted or measured?
Feature Marking	Can bridges, culverts, intersections, etc., be marked?

RUTTING	Comment:
Rut Measurements	Is rutting measured? How?
Sensor Type	Laser, sonic, optical, accelerometer, infrared, other?
Number of Sensors	How many sensors?
File Size/Mile	How large are the data files?
Resolution	What is the smallest rut that can be measured?
ASTM E-950	
Repeatability	What is the repeatability and accuracy according to ASTM
Accuracy	E-950?
Certified	Is a current certificate available?
Straight Edges	What analysis straightedge can be used?
Length, Width	How is the length and width reported?

OUTPUT	Comment:
Data Format	In what format is the data provided?
Ride Indexes Supported?	What ride indexes are provided?
Raw Data	Are raw plots provided?
Filtered	What filters are available and how are they used?
Localized Areas	Are areas of localized problems identified?
Compliant With:	Is the data compliant with the AASHTO provisional standards?
AASHTO Provisional Standards	
ASTM E-950	Is the data compliant with the ASTM E-950?
Other Integrated Services	Is other data collected and reported?

ARAN - Automatic Road Analyzer

Gil Boettcher
Roadware Group Inc.
P.O. Box 520 / 147 East River Road
Paris, Ontario N3L 3T6 Canada
Phone: 1-800-828-2726
FAX: 519-442-3680
E-Mail Address: info@Roadware.com
Web Site: www.Roadware.com

ARAN - Automatic Road Analyzer

The ARAN can output in either Metric or English units.

Roadware provides equipment and data collection services.

Roadware is a multinational company with over 30 years of highly specialized experience in infrastructure information business. Roadware's mission is to provide premium quality information gathering services, products, and support to infrastructure organizations throughout the world.

Roadware's ARAN - Automatic Road Analyzer - is a specially modified vehicle that houses an extensive set of computers, digital video equipment and sensors including lasers, fiber optic gyroscopes, accelerometers, ultrasonic sensors and other advanced technology subsystems.

ARAN can perform 36 different measurements with very high accuracy while traveling at normal highway speeds. This accuracy, modularity, and flexibility has earned Roadware its position as the worldwide leader in the industry.

Suggested User Contacts:

Ms. Janice Arellano
Supervisor
Commonwealth of Pennsylvania
Department of Transportation
Bono Annex Building
907 Elmerton Avenue
Harrisburg, PA 17110
TEL.: (717) 787-7294

Mr. Said Ismail
Pavement Management Engineer
Louisiana Highway Dept.
8900 Jimmy Wedell
Baton Rouge, LA 70807
(225) 274-4172

Jim Kennedy
Federal Highway Administration
Central Federal Lands, Highway Division
555 Zang Street, Suite 259
Lakewood, CO 80228
(303) 716-2023

ARAN - Automatic Road Analyzer

GENERAL	Comment:
Speed/Sampling Rate	The ARAN is capable of collecting data while traveling at highway speeds
Location Referencing	DMI as a bare minimum, GPS, and DGPS are optional
GIS Interface	Yes
Video Logging	Yes
Processing	Real-time

MEASUREMENT INFORMATION	Comment:
Sensor Type	The ARAN uses lasers for profile, roughness and rutting, and also uses ultrasonic for rutting, Optical Gyros, Accelerometers, Inertial Measurement Unit, digital video, DMI
Number of Sensors	Depends on the measurement system you are referring to
File Size/Mile	Depends on the types of data collected in addition to whether pavement and ROW video is collected
Resolution	Pavement distresses in the range of 2-3mm are measurable
ASTM E-950:	
Repeatability	Yes
Accuracy	Yes
Certified	Yes
Cross Slope	Yes
Texture	Yes
Feature Marking	Yes

RUTTING	Comment:
Rut Measurements	Yes
Sensor Type	Laser or Ultrasonic
Number of Sensors	Up to 37
File Size/Mile	Less than 6kb/mile
Resolution	1mm
ASTM E-950	
Repeatability	Yes
Accuracy	Yes
Certified	Yes
Straight Edges	Wire
Length, Width	3 mm typically, 1mm is technically possible

ARAN - Automatic Road Analyzer

OUTPUT	Comment:
Data Format	ASCII
Ride Indexes Supported	Yes, RCI, IRI
Raw Data	Yes
Filtered	Highend and Lowpass
Localized Areas	Yes
Compliant With:	
AASHTO Provisional Standards	Yes
ASTM E-950	Yes
Other Integrated Services	Complete Digital Videologging using 1300 x 1030 Pixel cameras, and providing a three-camera panoramic view of the road and roadside features. Automated distress detection, evaluation and classification using Roadware's "WiseCrax" software. Asset inventory capability using Roadware's "Surveyor" software, which allows the operator to make measurements of roadside features from digital video. Surveyor has the capability to provide asset offset, width, condition, location (linear and DGPS), and a description of type (e.g. Signs/Traffic/Stop Sign).

ARIA

Jerry H. Mohajeri, P.E.
MHM Associates, Inc.
1920 Ridgedale Road
South Bend, IN 46614
Phone: 219-291-4793
Fax: 219-291-4800
E-mail Address: MHMAssoc@AOL.COM
Web Site: WWW.MHMAssociates.COM

ARIA - (Automated Road Image Analyzer)

MHM Associates is both a vendor and a service provider.

Automated Road Image Analyzer (ARIA) vehicle captures pavement surface video and uses STADI-3/STADI-6 to digitize and then analyze captured images for cracking distress extent and severity.

STADI-3/STADI-6 software, 32-Bit Windows 95/98 program developed, used and sold by MHM Associates, Inc. The STADI-3 program captures pictures (slides) and saves them to a file. These digital slides can be copied to a CD-ROM for review and/or processing. Picture size is 640 x 240 and 640 x 480 pixel resolution.

STADI-6 software accesses the picture database and retrieves each digital picture for crack detection and quantification. The resulting cracking extent is along with roughness data is used pavement condition assessment.

STADIT software group includes LaserCom and RufScan Software for collection of laser sensor data and for measuring and interpreting road profile.

Data is collected in Metric or English format (user selected).

Suggested User Contacts:

Prof. Young Chan Suh, PhD
Han Yang University,
Traffic Engineering Department
Seoul, Korea
Phone: 011-822-869-2111
Asia Commerce Co. Ltd
Mr. Charles Ahn
Phone:011-822-538-1736
Fax: 011-822-568-6993

Dr. Shin Wu
North Carolina Department of Transportation
P.O. Box 25201
Raleigh, NC 27611
Pavement Engineer
Phone: 919-250-4094
Fax: 919-250-4098

Mr. Samuel Wolfe, P.E.
Operations Engineer
Indiana Department of Transportation -
Toll Road Division
P.O. Box 1
Granger IN, 46530
Phone: 219-674-8836
Fax: 219-675-0286

ARIA

GENERAL	Comment:
Speed/Sampling Rate	50 MPH (80 Km) / 250 +/- samples per second typical data collection speeds are 50 to 55 MPH
Location Referencing	DMI
GIS Interface	Optional - not interfaced to automated mapping
Video Logging	High resolution video logging is provided
Processing	Data is post-processed

MEASUREMENT INFORMATION	Comment:
Sensor Type:	Laser
Number of Sensors:	5 to 7 sensors
File Size/Mile	1 to 1.2 MB
Resolution	2 mm
ASTM E-950:	
Accuracy	Data is compliant with the ASTM E-950
Certified	Certification not available
Cross Slope:	-
Texture:	-
Feature Marking:	Bridges, culverts, intersections, etc. can be marked.

RUTTING	Comment:
Rut Measurements:	Rutting measured is by five-point method in asphalt pavements
Sensor Type:	Laser
Number of Sensors:	5 Sensors
File Size/Mile:	1.2 to 1.4 MB
ASTM E-950	
Resolution:	3 to 4 mm
Accuracy :	Data is compliant with the ASTM E-950
Certified;	Certification not available
Straight Edges:	-
Length, Width:	Maximum rut depth for each .1 Km (.06 mile). Stratification of rut depth is reported

OUTPUT	Comment:
Data Format:	-
Ride Indexes Supported:	IRI and Ride Number
Raw Data	Raw data plots are provided
Filtered	Low Pass filter, High Pass filter, plots provided
Localized Areas	Areas of localized problems are identified
Compliant With:	
AASHTO Provisional Standards	Yes
ASTM E-950	Yes
Other Integrated Services	Yes, Curb data and roadside hardware inventory

CGH Pavement Engineering, Inc. - Laser Profilers

Gaylord Cumberledge
Gaylord@cgh-pavement.com
CGH Pavement Engineering, Inc.
4913 Gettysburg Road
Mechanicsburg, PA 17055
Phone: (717) 691-7625
Fax: (717) 691-8211
E-mail: info@CGH-Pavement.COM
Web Site: WWW.CGH-Pavement.COM

CGH Pavement Engineering, Inc. - Laser Profilers

CGH Pavement Engineering offers full range services for pavement management.

Data can be reported in both English and metric.

Laser Profilers - CGH Pavement Engineering, Inc. survey vehicles are equipped with ASTM Class 1 South Dakota Type Road Profilers. Profile measurements are used to produce any roughness statistic, such as the International Roughness Index (IRI), and also to estimate rut depth and faulting. CGH's profilers were manufactured by International Cybernetics Corporation, and use *16khz or 32khz Selcom lasers* combined with accelerometers and a Distance Measuring Instrument to collect profile data for each wheel path. Each survey vehicle contains an IBM compatible, Pentium computer with a 6-GB hard drive and a 100-MB ZIP disk backup system for

Automated Distress Data Collection - Equipped with a digital imaging system consisting of a 2,000-pixel digital line scan camera, illumination system, and computerized controller. The line scan camera is set to continuously record a pavement width of 4.4-m (14.5-ft) for pavement distress analysis. Both automated and/or semi-manual distress analysis can be performed.

Automated Distress Data Collection - Equipped with a 35-mm camera. The film imaging technology collects continuous, high-resolution 35-mm film images of the pavement surface at highway speeds during nighttime hours. The survey vehicles are equipped with a boom-mounted 35-mm slit camera, electronic controller, and custom illumination system. The electronic controller synchronizes the film speed to the speed of the vehicle so that there is no loss in resolution with changes in vehicle speed. The 35-mm film camera is set to cover a pavement width of 4.9-m (16-ft) for pavement distress analysis. Semi-manual distress analysis is performed

Suggested User Contacts:

Rick Bennett, PE
New York State
Dept. of Transportation
Pavement Management Engr
(518) 457-1965

Trenton Clark, PE
Virginia Department
of Transportation
Pavement Management Engr
(804) 840-7559

Jerry Blackwelder, P.E.
North Carolina DOT
(919) 250-4094

CGH Pavement Engineering, Inc. - Laser Profilers

GENERAL	Comment:
Speed/Sampling Rate	Continuous at prevailing traffic speeds.
Location Referencing	Both DMI and GPS references can be used.
GIS Interface	No built-in link is used, but data can be custom processed for uploading.
Video Logging	Available for the digital system and profiling.
Processing	Data is collected and post processed.

MEASUREMENT INFORMATION	Comment:
Sensor Type	Lasers
Number of Sensors	3 or 5
File Size/Mile	As needed for operation.
Resolution	-
ASTM E-950:	
Repeatability	Y
Accuracy	<5%
Certified	-
Cross Slope	Y
Texture	Y
Feature Marking	Y

RUTTING	Comment:
Rut Measurements	Y
Sensor Type	Lasers
Number of Sensors	3 or 5
File Size/Mile	As Needed
Resolution	-
ASTM E-950	Y
Repeatability	-
Accuracy	-
Certified	-
Straight Edges	No
Length, Width	-

OUTPUT	Comment:
Data Format	-
Ride Indexes Supported	Raw profile, IRI, PI, etc
Raw Data	Y
Filtered	Y
Localized Areas	Y
Compliant With:	
AASHTO Provisional Standards	Y
ASTM E-950	Y
Other Integrated Services	Full range of pavement related services.

Dynatest Model 5051 Mk II RSP

Robert C. Briggs, PE
Dynatest Consulting, Inc.
Route 6, Box 1510
Starke, FL 32091-4406
Phone: (904) 964-3777
Fax: (904) 964-3749
E-mail: RBriggs@Dynatest.COM
Web Site: http://WWW.Dynatest.COM

Dynatest Model 5051 Mk II RSP - Road Surface Profiler

The Dynatest Model 5051 Mk II RSP is a "modular" product line of vehicle mounted, highway speed pavement roughness and profile measurement systems. The product line consist "L" (Laser displacement sensor) versions which are state-of-the-art, laser-based longitudinal & transverse pavement profile and roughness measurement test systems. Capabilities of the "L" series ranges from single-wheel path longitudinal profile, through a standard "South Dakota Profiler" configuration, up to an 11 laser (or more, 21 maximum) "high-end" longitudinal and transverse profile measuring system. All versions include "real time" IRI (International Roughness Index) and RN (Ride Number) calculations "on the fly".

Flexible vehicle layout and sensor mounting configurations are available, including roughness measurement system bumper mounted "rut bar". The standard Model 5051 Mk II RSP test system includes high speed "PC board-mounted" matching electronic registration hardware and software for automatic recording and data processing. The systems are virtually vehicle independent, i.e., may be used on a wide range of available vehicles

Equipment vendor or service provider.

English or Metric data storage, display and screen formats.

Suggested User Contacts:

Vermont Agency of Transportation
Pavement Management Section
National Life Building
Drawer 33
Montpelier, VT 05633-5001
Tel: 802 828-3527
Fax: 802 828-2024

Alaska DOT & PF
Materials & Research Division
5850 E. Tudor Road
Anchorage, AK 99507-1225
Tel: 907 269-6200
Fax: 907 269-6201

Universidad de Costa Rica
Laboratorio Nacional de Materiales y Modelos Estructurales
Oficina de Suministros
Ciudad de la Investigacion
Cuidad Universersitaria Rodrigo Facio
San Pedro de Montes de Oca
San Jose, Costa Rica
Tel: +506 253-4911

Dynatest Model 5051 Mk II RSP

GENERAL	Comment:
Speed/Sampling Rate	Operates at highway speeds up to 70 mph (115km/h). 16000 displacement measurements per second or 0.08" (2 mm) between readings at 70 mph (115km/h). 32,000 acceleration samples per second
Location Referencing	Wheel mounted DMI encoder. Optional GPS (differential enabled optional)
GIS Interface	Yes
Video Logging	Integrated Mandli Video Systems as option
Processing	Included software "IMPLEX" for Import, Plotting / special post processing and Export of collected data

MEASUREMENT INFORMATION	Comment:
Sensor Type	Laser Triangulation Displacement Sensor
Number of Sensors	Flexible configurations, up to 21 possible.
File Size/Mile	Dependent on configuration and reporting interval (number of lasers, test parameters, options)
Resolution	± 2 mil (0.05mm)
ASTM E-950:	
Repeatability	Meets or exceeds ASTM E-950 requirements
Accuracy	Meets or exceeds ASTM E-950 requirements
Certified	Yes
Cross Slope	Crossfall, grade, and radius of curvature available.
Texture	Optional. 32 kHz or 62.5 kHz sampling rate. Provides macrotexture data as MPD or RMS values
Feature Marking	Included

RUTTING	Comment:
Rut Measurements	Stringline method (Real time)
Sensor Type	Laser Triangulation Displacement Sensor
Number of Sensors	Up to 3
File Size/Mile	Variable depending on data reporting interval
Resolution	± 1% of the measured value or ± 0.003g
ASTM E-950	
Repeatability	Meets or exceeds ASTM E-950 requirements
Accuracy	Meets or exceeds ASTM E-950 requirements
Certified	Yes (ASTM and Complies with the Requirements of Texas Department of Transportation Test Method Tex-1001-S)
Straight Edges	Stringline rut calculation
Length, Width	Rutting (right, left and full lane) reporting interval is user selectable between 1" (25mm) and 1 mile (1,609m). Measuring width with 5 or more lasers is typically 10 or 11 ft.

Dynatest Model 5051 Mk II RSP

OUTPUT	Comment:
Data Format	Data file type is: SEQUENTIAL UASCII Text File (Line lengths vary). Each line is prefixed by a 'Line-ID-Number' which is the 'key' to the contents of the line
Ride Indexes Supported	Real-time IRI, Ride Number both right, left and center and half-car Indices. Includes post-processed California profilograph output capability.
Raw Data	ASCII Code
Filtered	Can set select a longitudinal profile filter length of up to at least 100 m (330 ft.). "Rut" reporting interval shall be selectable.
Localized Areas	-
Compliant With:	
AASHTO Provisional Standards	Yes
ASTM E-950	Yes (Also Tex-1001-S), World Bank Technical Paper #46 - “Guidelines for Conducting and Calibrating Road Roughness Measurements”
Other Integrated Services	Video, Geometric Data, Differential Global Positioning, Bituminious Leveling and California Profilograph Output.

LRMS

John Laurent / Michel Arsenault
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2740, Einstein
Sainte-Foy (Quebec) G1P 4S4
Canada
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FAX : 418-657-7009
E-Mail Sales.LRMS@INO.CA
HTTP WWW.INO.CA/EN/Syst_et_compo/LRMS.ASP

LRMS - **L**aser **R**ut **M**easurement **S**ystem
Processing tasks include calibration and corrections due to the roll of the inspection vehicle.

Rut analysis algorithms have been developed for automatic measurement of short and wide radius ruts and for measurement of rut depth.

Has been used by the Quebec Ministry of Transport, on a continuous basis, for the past four years.

To date, over 100,000 kilometres of roads have been surveyed using this technology.

LRMS Key Features:
- Real-time data acquisition and processing on board the inspection vehicle
- Operation in normal day light or night time conditions
- Short integration times for minimal image blur at maximum inspection speeds
- A library of C/C++ functions for easy use
- Rut width measurements for both short and wide radius ruts
- Proven performance on more than 100,000 km of roads
- Inspection speeds up to 100 km/h

LRMS Benefits:
- Immediate and precise detection and characterization of rutting conditions
- Optimization of road maintenance funds
- Improvement of safety due to better road pavement maintenance

LRMS Suggested User Contacts:

Mr. Paul Harbin
Vice-president
Roadware Group
147, Est River Road
Paris (Ontario) N3L 3T6
Canada
519-442-2264

Mr. Guy Tremblay
Department Head
Quebec Ministry of Transport
930, Chemin Ste-Foy, 5e
Quebec (Québec) G1S 4X9
Canada
418-643-1131

Mr. Gilles Bertrand
President
CRCAC
3420, Boul. St-Joseph Est
Montreal
H1X 1W6
Canada
514-255-1700

LRMS

GENERAL	Comment:
Speed/Sampling Rate	25 profiles/s or 1 profile/m at 90 km/h. The maximum sampling rate is 25 profiles per second. We get 1 profile every meter at 90 km/h.
Location Referencing	Each profile is time stamped and can be synchronized by user application with other location referencing equipment like GPS.
GIS Interface	-
Video Logging	All video images are available and can be saved if required by user application. This could slow down the sampling rate.
Processing	Profile data is always processed in real-time to get real geometric coordinates. Rut data can be processed in real-time or post-processed.

MEASUREMENT INFORMATION	Comment:
Sensor Type	2 high power, infrared, pulsed, custom made laser line projectors.
Number of Sensors	2. Each one can measured up to 2 meters of a road lane.
File Size/Mile	10 kB / full profile Each 4-meter profile can have up to 1280 measured points given by 2 4-byte float values.
Resolution	0.6 mm The LRMS can measure z-axis deviation (along rut depth axis) with a 0.6 mm resolution at the beginning of the 500 mm working range. This resolution is 1.6 mm at the end of the 500 mm working range.
ASTM E-950:	
Repeatability	N/A. The LRMS is not intended for longitudinal profile measurement.
Accuracy	N/A The LRMS is not intended for longitudinal profile measurement. However, according to INO's quality control procedure, the 3σ accuracy is about 1 mm in the Z axis (depth) and 6 mm in the X axis (width).
Certified	N/A. The LRMS is not intended for longitudinal profile measurement
Cross Slope	The LRMS can record cross slop measurement but this feature is still under development.
Texture	N/A. The LRMS is not intended for longitudinal profile measurement.
Feature Marking	N/A. The LRMS is not intended for longitudinal profile measurement.

LRMS

RUTTING	Comment:
Rut Measurements	LRMS uses two separate 3D laser profilers located in the rear of the vehicle, each responsible for the measurement of either the left or right side rut. Each laser profiler is composed of a high-power laser line projector and a special camera to measure deformations of the laser line profile.
Sensor Type	2 high power, infrared, pulsed, custom made laser line projectors.
Number of Sensors	2. Each can measured up to 2 meters of a road lane.
File Size/Mile	8 bytes /rut section Left and right rut sections are described in terms of rut depth and rut width, each given by a 4-byte float value.
Resolution	2 mm Even though LRMS computes rut depth with a sub-millimeter resolution, ruts smaller than 2 mm should not be considered.
ASTM E-950	
Repeatability	N/A The LRMS is not intended for longitudinal profile measurement.
Accuracy	N/A The LRMS is not intended for longitudinal profile measurement. However, according a comparison study conducted by INO and the Quebec Ministry of Transport, the LRMS can measure rut depth with an mean error smaller than 0,8 mm compared to manual rut bar measurements.
Certified	N/A The LRMS is not intended for longitudinal profile measurement.
Straight Edges	N/A The LRMS is not intended for straight edges analysis.
Length, Width	Width is in mm; Length is user-defined The rut depth and width are reported in millimeters. Rut length can be determined by user application according a user-defined longitudinal process.

OUTPUT	Comment:
Data Format	LRMS is provided with a Windows NT/2000 DLL that can be used to control the hardware and get access to the profile and/or rut data.
Ride Indexes Supported	N/A. LRMS is not intended for ride index measurement.
Raw Data	Raw image /Raw profile data User can have access to raw image and raw profile data. The raw profile information is given in terms of image pixel data, without any calibration.
Filtered	A median filter can be applied in real-time on raw profiles. This operation filters small artifacts.
Localized Areas	User-defined. Localized areas can be identified by user application.
Compliant With:	
AASHTO Provisional Standards	LRMS has not been tested yet by the AASHTO.
ASTM E-950	LRMS is not intended for longitudinal profile measurement.
Other Integrated Services	User-defined Other integrated services can be provided by user application.

SPIRIT Laser Profilometry Equipment

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Frederick G. Clerk FIEAust (Managing Director)
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Fax: +61 3 9565 9779
E-Mail Diaze@HRL.COM.AU
Website WWW.Amskan.COM

SPIRIT Laser Profilometry Equipment

Equipment vendor.

Units feature new Amskan designed laser measurement systems with extremely high acquisition bandwidth and data reporting abilities.

High sampling speeds and laser bandwidth.

Data from lasers and accelerometer units acquired and converted to digital format as close to the source as possible, providing the highest quality of data.

Powerful real-time processing provides on-line results and measurement feedback to the operators.

Data is presented in a variety of user selectable forms, with imperial or metric options available.

Amskan can provide customised reporting to suit local authorities.

Suggested User Contacts:

Claudio Fuentes
Index SA
Angel Guarello 1305
7140592 San Miguel
Santiago de Chile
Chile
562 521 5283
562 521 5261
gauss@cmet.net

SPIRIT Laser Profilometry Equipment

GENERAL	Comment:
Speed/Sampling Rate	30 to 120km/hr (18.6 to 74.5 miles/hour). Sample interval is configurable. Standard reporting is 25mm. Optional texture measurement lasers can sample at better than 1mm intervals.
Location Referencing	Optional GPS system. GIS links can be provided as an option.
GIS Interface	Optional links to client specified GIS systems such as MapInfo.
Video Logging	Can be provided.
Processing	Data is processed real time and on-line presentation of the data is provided.

MEASUREMENT INFORMATION	Comment:
Sensor Type	Elevation measuring lasers, two or more accelerometers used to provide an inertial reference. High resolution optical encoder provides distance measurement.
Number of Sensors	Standard options are 1, 3, 13 lasers including side projecting units. Amskan can customise systems to clients requirements.
File Size/Mile	Full data storage option approximately 5 to 10 Mb/mile. File size is dependent on format requested.
Resolution	Better than 0.1 mm vertical resolution.
ASTM E-950:	
Repeatability	Equipment and the laser units have been designed to meet the
Accuracy	requirements of ASTM E-950.
Certified	
Cross Slope	N/A
Texture	Texture is measured and calculated according to E1845 or, optionally, to sandpatch equivalence.
Feature Marking	User definable one touch event recording is available, with comment fields inserted into recorded data files.

RUTTING	Comment:
Rut Measurements	13 laser and above systems measure rutting.
Sensor Type	Laser based, with accelerometer inertial correction.
Number of Sensors	13 or 21 lasers are typical options for rutting. Amskan can customize solutions for particular applications.
File Size/Mile	Approximately 5Mb/mile raw data, reduced reporting data size dependent on client requirements.
Resolution	Vertical resolution of laser units are better than 0.1 mm.
ASTM E-950	
Repeatability	Each system will be tested and validated to ASTM E-950 where required.
Accuracy	
Certified	-
Straight Edges	Selectable straight edges can be applied, ie., 2 and 3m straight edges.
Length, Width	Length can be reported as percentage over interval within categorized rut depth ‘bins’. Other reporting techniques can be accommodated.

SPIRIT Laser Profilometry Equipment

OUTPUT	Comment:
Data Format	Data is provided in the ERD format designed by the University of Michigan and used by the commonly available RoadRuf software analysis package. Reporting files can be developed to suit particular road authorities.
Ride Indexes Supported	Inbuilt software calculates IRI wheel path and lane, NAASRA lane. Other ride indexes are available on request.
Raw Data	Raw elevation data is provided, and can be plotted real-time and post processed using software provided.
Filtered	Selectable filters can be applied to raw data to examine wave numbers of interest.
Localized Areas	IRI values over user selectable section length can be automatically calculated to identify local areas of high roughness. Other features such as 'bump and grind' can be provided upon request.
Compliant With:	
AASHTO Provisional Standards	Not determined.
ASTM E-950	Not determined.
Other Integrated Services	Amskan is able to provide a customized solution to the clients requirements. This can include incorporation of additional data measurement equipment.

2.0 Catalog of Ground Penetrating Radar Equipment

2.1 Introduction

This hardware catalog was developed to assist state, county, and local agencies in learning about pavement management hardware. For the initial effort, ground penetrating radar equipment was selected. This catalog was intended to be similar to the "Pavement Management Software Catalog" developed for the FHWA by the Texas Transportation Institute.

In order to develop this catalog, a request was sent out to most of the known providers of ground penetrating radar who were asked to provide documentation on their system, answer a questionnaire, and a provide a list of three users. Not all of the providers submitted their software for review and other providers were not even aware of the request. Therefore, this catalog is not meant to be an exhaustive review of all ground penetrating hardware, but is instead intended to illustrate the types of packages available.

The following descriptions of each ground penetrating radar hardware package follow this format. Each item to be evaluated was because the data was considered important or because the technique is important to the effective use of pavement management. The first page has contact information, a listing of interesting or unique features, and contact information for three users.

The second age has a column for indicating whether a data item was collected and stored, a column to indicate whether it is used in the analysis, and a column for comments. The third page uses the analyze and comment columns only. This format is used to differentiate between the uses of the data. A "Y" indicates that the software uses or performs the indicated task. A "-" is a negative response. In order to receive a positive response, the software must accomplish the task relatively easily and must be performed within the software program. No attempt is made to rank the system on a best to worst basis. Each system may have instances where it will best meet the needs of the agency. Instead, the systems are arranged in alphabetical order.

2.2 Example

The format for the evaluation is:

Equipment Acronym
Contact Person
Company Name
Address
Phone
FAX
E-Mail Address
Web Site or Other Information

Acronym - Name of Equipment Hardware and Software Version

In this area, some of the interesting features and capabilities of the software were noted. Particular attention was given to features not included in the detailed list of items considered necessary or desirable.

Equipment vendor or service provider.

English or Metric.

Suggested User Contacts:

The equipment provider was asked to provide no more than three contacts of people or agencies using this version of their equipment.

Name	Name	Name
Title	Title	Title
Address	Address	Address
Agency	Agency	Agency
Phone or FAX	Phone or FAX	Phone or FAX

Equipment Acronym

GENERAL	Is the following provided:
ID	How is an individual run identified?
Lane Number	Lane identification
Length	What is the maximum length of a single run?
Width	What is the width surveyed?
Speed	What is the speed of data collection (identify sampling rate for speed quoted)?
Location Referencing	How is the location determined (DMI, GPS, Other)
GIS Interface	Is there a built-in link to a Geographic Information System or Automated mapping?
Video Logging	Is video logging provided?

LAYER DATA	Is the following provided:
Layer Types	Information on individual layers (thickness, type, etc.)?
Calibration Method	How is thickness calibrated?
Maximum Depth-AC	What is the maximum thickness that can be determined in full depth AC pavement?
Maximum Depth-AC/Gran	What is the maximum thickness that can be determined in an AC/granular base pavement
Maximum Depth-PCC	What is the maximum thickness that can be determined in full depth PCC pavement?
Maximum Depth-AC/PCC	What is the maximum thickness that can be determined in an AC/PCC pavement?
Structural Capacity	Is structural number determined?
Accuracy	What is the accuracy or resolution of layer thicknesses?
Thinnest Layer	What is the thinnest layer that can be determined in an AC, AC/Gran, PCC, AC/PCC pavement?

TRAINING and SUPPORT	
Training Classes	Are there regularly scheduled training classes?
Support	What kind of support is available?

OUTPUT	
Data Format	In what format is the data provided?
Raw Data	Are raw plots provided?
Filtered	Are filtered plots provided showing thicknesses and a legend?
Average Layer Thickness	Is an average thickness for a section provided?
Pavement Thickness Profile	Is a pavement thickness profile provided?
Problem Areas	Are potential problem areas identified?
Compliant With AASHTO Provisional Standards	Is the data compliant with the AASHTO provisional standards?
Other Integrated Services	Is other data collected and reported (IRI, etc.)?

DECAR

Elaine Gampp, Office Manager or
Kenneth Maser, President
Infrasense, Inc.
14 Kensington Rd., Arlington, MA 02476
Phone: 781-648-0440
Fax: 781-648-1778
E-Mail: info@infrasense.com
Website: www.infrasense.com

DECAR - **DE**ck **C**ondition **A**ssessment using **R**adar

Service and software provider.

Windows-based GPR data analysis software program for computing deterioration of bridge decks and for determining depth of reinforcement.

Data for one bridge is analyzed from the main survey analysis screen.

Output includes overlay thickness, depth of reinforcement, concrete dielectric properties, and a module to compute concrete deterioration calculations based on SHRP C-101 is available.

Output is provided both as standard ASCII text files and as files that can be plotted using standard graphic programs. The graphic output is a threshold contour plot showing potential areas of deteriorated concrete based on either concrete dielectric, concrete attenuation, or a combination of the two.

Suggested User Contacts:

Dong-Sick Bang
Managing Director for Engineering
Korea Highway Corporation
293-1Kumto-Dong
Songnam-Si, Kyonggi-Do
Seoul, Korea 461-380
+8 202 234-8241

Doria L. Kutrubes
President, Sr Geophysicist
Radar Solutions
International–RSI
51 Riverview Avenue
Waltham, MA 02453-3819
781-891-4492
radar@world.std.com

Alan Rawson
Chief, Bureau of Materials
and Research
New Hampshire Department
of Transportation
Stickney Ave
Concord, NH 03302
(603) 271-1660

DECAR

GENERAL	Comment
ID	In data file header
Lane Number	In data file header
Length	Any
Width	Coverage width per antenna per pass ranges from 12 to 18 inches. Dual antenna surveys cover two widths. For condition and rebar depth surveys, data from multiple parallel passes are used to produce a plan view contour plot. The parallel passes are usually 3 feet apart (wheelpaths, centerline, and lane boundaries).
Speed	20 to 50 mph
Location Referencing	DMI, corrected to bridge plans
GIS Interface	Not presently
Video Logging	Optional, but available

LAYER DATA	Comment:
Layer Types	Asphalt and concrete overlays, concrete cover, deck thickness
Calibration Method	Equipment is calibrated using standard tests. Core data can supplement but is not required
Maximum Depth-AC	not applicable to bridge decks (see PAVLAYER)
Maximum Depth-AC/Gran	not applicable to bridge decks (see PAVLAYER)
Maximum Depth-PCC	Approximately 12"
Maximum Depth-AC/PCC	not applicable to bridge decks (see PAVLAYER)
Structural Capacity	no
Accuracy	±5%
Thinnest Layer	1 inch

TRAINING and SUPPORT	Comment
Training Classes	Can be arranged, contact office manager.
Support	Email and telephone support are available.

OUTPUT	Comment
Data Format	ASCII file, line plots, and contour plots
Filtered	Yes
Average Layer Thickness	Yes
Pavement Thickness Profile	Provided for overlays and rebar depth
Problem Areas	Identified on contour plots
Compliant With AASHTO Provisional Standards	Yes
Other Integrated Services	No

PAVLAYER®

Elaine Gampp, Office Manager or
Kenneth Maser, President
Infrasense, Inc.
14 Kensington Rd., Arlington, MA 02476
Phone: 781-648-0440
Fax: 781-648-1778
E-Mail: info@infrasense.com
Website: www.infrasense.com

PAVLAYER® - **PAV**ement **LAY**er **E**valuation using **R**adar

Service and software provider.

English units

Provides subsectioning. Divides pavement into homogeneous subsections for analysis (in conjunction with color display software).

Preprocessing includes bandpass filtering, end reflection removal, surface reflection alignment, waveform averaging, background removal, antenna height calibration; and surface reflection.

Locates and tracks interfaces in the radar data on a regular distance interval set by user.

Computes dielectric constants and thickness of up to four pavement layers.

Batch Processing in one of two modes:

1. Continuous processing that provides ASCII report and plot files,
2. Discrete point processing that provides ASCII thickness and homogeneous sections reports, and accompanying "feature" plots

Suggested User Contacts:

Dong-Sick Bang
Managing Director for Engineering
Korea Highway Corporation
293-1Kumto-Dong
Songnam-Si, Kyonggi-Do
Seoul, Korea 461-380
+8 202 234-8241

Doria L. Kutrubes
President, Sr Geophysicist
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Alan Rawson
Chief, Bureau of Materials
and Research
New Hampshire Department
of Transportation
Stickney Ave
Concord, NH 03302
603-271-1660

PAVLAYER®

GENERAL	Comment
ID	In data file header
Lane Number	In data file header
Length	Any
Width	Coverage width per antenna per pass ranges from 12 to 18 inches. Dual antenna surveys cover two widths. For condition and rebar depth surveys, data from multiple parallel passes are used to produce a plan view contour plot. The parallel passes are usually 3 feet apart (wheelpaths, centerline, and lane boundaries).
Speed	20 to 50 mph
Location Referencing	DMI, corrected to bridge plans
GIS Interface	Not presently
Video Logging	Optional, but available

LAYER DATA	Comment:
Layer Types	Asphalt, concrete, base
Calibration Method	Internally calibrated; supplemental cores can be used, but not required
Maximum Depth-AC	36 inches
Maximum Depth-AC/Gran	30 inches
Maximum Depth-PCC	12 inches
Maximum Depth-AC/PCC	18 inches
Structural Capacity	No
Accuracy	± 5-10%
Thinnest Layer	1 inch

TRAINING and SUPPORT	Comment
Training Classes	Can be arranged, contact office manager.
Support	Email and telephone support are available.

OUTPUT	Comment
Data Format	ASCII file, line plots, and contour plots
Filtered	Yes
Average Layer Thickness	Yes
Pavement Thickness Profile	Yes
Problem Areas	Yes
Compliant With AASHTO Provisional Standards	Yes
Other Integrated Services	-

PENETRADAR IRIS

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E-Mail: Sales@Penetradar.com or Techinfo@Penetradar.com
Website: www.Penetradar.com

PENETRADAR IRIS - **I**ntegrated **R**adar **I**nspection **S**ystem

Equipment manufacturer and service provider.

Additional versions include IRIS-L, a lower cost version housed in a transportable desktop enclosure that can be installed in most vehicles, and IRIS-P, a single radar system that can be used for stand-alone applications.

Can utilize up to four air-coupled or ground-coupled antennas simultaneously, with real-time digital data acquisition and real-time data display, for maximum inspection coverage.

Suggested User Contacts:

Dr. Tony Maslewic
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Transportation
1201 Wilson Avenue
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Ph: 416-235-4689

Dr. Gerry Clemena
Virginia Transportation
Research Council
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University Station
Charlottesville, VA 22903
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Dr. Tommaso Pagnoni
Autostrade, Italy
c/o Seding srl
Servizi di Ingeneria
Via Nomentana 323
00162 Roma, Italy
Fax: 3906-855-2681

PENETRADAR IRIS

GENERAL	Comment
ID	Data files identify radar pass number. Up to four passes per file
Lane Number	Can be included in file name
Length	Unlimited. Data stored in real-time on hard disk. With (4) radars, 100Hz scan rate and vehicle at 50MPH, maximum length of run is 850 miles with 40GB HD, 1700 miles for 80GB HD, etc.
Width	Minimum width is 18 inches, typical width is 36 inches. Up to 40 radar passes can be combined in parallel, in mapping software for a total width of 60 feet (for individual pass width of 18 inch) and 120 feet (for individual pass width of 36 inch).
Speed	Any, but typically 50MPH. Spacing depends on scan rate. For 50 MPH, 100Hz-1.3 scan/ft, 50Hz, 0.66scan/ft, 25Hz, 0.33 scan/ft
Location Referencing	DMI or GPS
GIS Interface	-
Video Logging	Surface cameras, single or multiple, or infrared

LAYER DATA	Comment
Layer Types	Type predicted from dielectric properties
Calibration Method	Software calibrated. Core or design plan information can be included to back-calculate dielectric.
Maximum Depth-AC	Air-coupled - 1m total depth. Ground coupled - 2m total depth
Maximum Depth-AC/Gran	Air-coupled - 1m total depth. Ground coupled - 2m total depth
Maximum Depth-PCC	Air-coupled - 1m total depth. Ground coupled - 2m total depth
Maximum Depth-AC/PCC	Air-coupled - 1m total depth. Ground coupled - 2m total depth
Structural Capacity	-
Accuracy	Top layer $\pm$ 5%, without core calibration, $\pm$ 1% with calibration 2nd layer $\pm$ 5% with calibration, 3rd layer $\pm$ 10% with calibration
Thinnest Layer*	1.0 ns Air-coupled antenna, 2.5cm in PCC, 3cm in AC 0.75ns Air-coupled antenna, 1.25cm in PCC, 1.5cm in AC

* - Using signal processing enhancement

TRAINING and SUPPORT	
Training Classes	Included with equipment purchase
Support	1 year warranty on equipment included, extended warranty available. Phone support at no cost.

PENETRADAR IRIS

OUTPUT	
Data Format	Tabular text and ASCII format showing X-Y locations and layer thicknesses. Graphical format in color 2D, 3D, profile and plan view maps, color contour maps
Raw Data	Provided. Both analog and digital GPR output available, including data files
Filtered	Yes. Color contour thickness plots provided with many options
Average Layer Thickness	Yes, including running average, average over user defined sections, etc.
Pavement Thickness Profile	Yes, color 2D, 3D, profile and plan view maps
Problem Areas	Yes. Voids, high moisture, delaminations, scaling, debonding
Compliant With AASHTO Provisional Standards	Yes
Other Integrated Services	Video, infrared thermography (IRT)

ROAD RADAR™

Dr. Darel Mesher Ph. D., P. Eng / Mr. Ewing Kung, P. Eng
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Website: www.rrl.com

ROAD RADAR™ - ROADRADAR™

Equipment provider and service provider.

English or Metric.

Patented.

Combines two synchronized radar systems (air launched high-resolution radar antenna and surface-coupled multi-channel radar).

Suggested User Contacts:

Craig Hilborne
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Director
Engineering &
Airport Construction
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(403) 735-1200

Monty Frederiksen
Manager Paving Projects
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Nelson, BC V1L 5S4
B C Ministry of Highways
(250) 354-6406

ROAD RADAR™

GENERAL	Comment:
ID	ID entry sets up filename by highway and lanes
Lane Number	As part of filename
Length	Maximum length of run is 124 miles
Width	Radar footprint of 18" with the ability to concatenate survey lines (with post processing) to generate a 3 dimensional plan map view
Speed	System is speed independent, max speed is 60mph
Sampling Rate	Operator programmable. Typically Urban 10-24", bridge decks 0.6-1.2", highways >30"
Location Referencing	DMI
GIS Interface	Not linked, but coordinates can be encoded into the data
Video Logging	Combined downward looking and right-of-way

LAYER DATA	Comment
Layer Types	Qualitative material types
Calibration Method	Internal. No cores needed
Maximum Depth-AC	6.5 feet
Maximum Depth-AC/Gran	6.5 feet
Maximum Depth-PCC	6.5 feet
Maximum Depth-AC/PCC	6.5 feet
Structural Capacity	-
Accuracy	± 5%
Thinnest Layer	1.2 - 1.4" for normal roadway materials

TRAINING and SUPPORT	Comment
Training Classes	Yes
Support	Full support

OUTPUT	Comment
Data Format	Graphical plots and tabular data. If provided, can be overlaid on AutoCAD drawings
Raw Data	Provided
Filtered	Yes, as noted
Average Layer Thickness	Yes, in tabular form
Pavement Thickness Profile	Yes. Annotated color graphic layer thickness plots. Includes all detected structural layers overlayed with structural subsurface anomalies and surface landmarks (streets, etc.) noted during the field survey.
Problem Areas	Rutting, debonding, delamination, and sub-surface material variation
Compliant With AASHTO Provisional Standards	-
Other Integrated Services	IRI, rut, GPS, FWD, forward looking and full roadway video, detailed crack analysis.

For more information:

Office of Asset Management
Federal Highway Administration, HIAM-10
U.S. Department of Transportation
400 Seventh Street, SW
Washington, DC 20590

TELEPHONE: 202-366-1341
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Notice:

The United States Government does not endorse products or manufacturers. Any trade or manufacturers' names that appear herein are included solely because they are considered essential to the objective of this document.

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