Appendix D

MDOT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF AERONAUTICS AND FREIGHT SERVICES
AIRPORTS DIVISION

STATEWIDE PAVEMENT MANAGEMENT REPORT

PHASE ONE AND TWO AIRPORTS

AP Tech
APPLIED PAVEMENT TECHNOLOGY

providing engineering solutions to improve pavement performance

February 2008

STATEWIDE PAVEMENT MANAGEMENT REPORT
PHASE ONE AND TWO AIRPORTS

Prepared For:

Michigan Department of Transportation
Bureau of Aeronautics and Freight Services
Airports Division
2700 E. Airport Service Drive
Lansing, Michigan 48906-2171
517-335-9283

Prepared By:

Applied Pavement Technology, Inc.
115 W. Main Street
Urbana, Illinois 61801
217-398-3977
Project No. 2004-074-AM1

In Association With:

Mead and Hunt, Inc.
2605 E. Airport Service Drive
Lansing, Michigan 48906
517-321-8334

February 2008

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Project Background

Pavement management is a systematic process of monitoring and preserving pavement assets cost-effectively. An airport pavement management system (APMS) is a tool that facilitates the identification and prioritization of maintenance and rehabilitation (M&R) needs, the preparation of cost-effective repair programs, and the estimation of repair quantities. The APMS provides the fact-based information needed to make better decisions regarding the significant investment the airport pavements represent.

Applied Pavement Technology, Inc. (APTech), with assistance from Mead and Hunt, Inc. (M&H), was selected to update the Airport Pavement Management System (APMS) for the Michigan Department of Transportation, Bureau of Aeronautics (MDOT). The objective of implementing and updating a statewide APMS is to assist MDOT with the management of its system of airports. An APMS also helps individual airport management agencies understand the pavement maintenance and repair needs at their local facilities. An APMS can be used as a tool to identify system needs, make programming decisions for funding, provide information for legislative decision making, and assist local jurisdictions with planning decisions.

MDOT's APMS allows it to track the condition of airport pavements, thereby permitting it to estimate the optimal time to apply different levels of maintenance and rehabilitation (M&R). The importance of identifying not only the type of repair but also the optimal time of repair is illustrated in Figure 1. This figure shows that there is a point in a pavement's life cycle where the rate of deterioration increases. The financial impact of delaying repairs beyond this point can be severe.

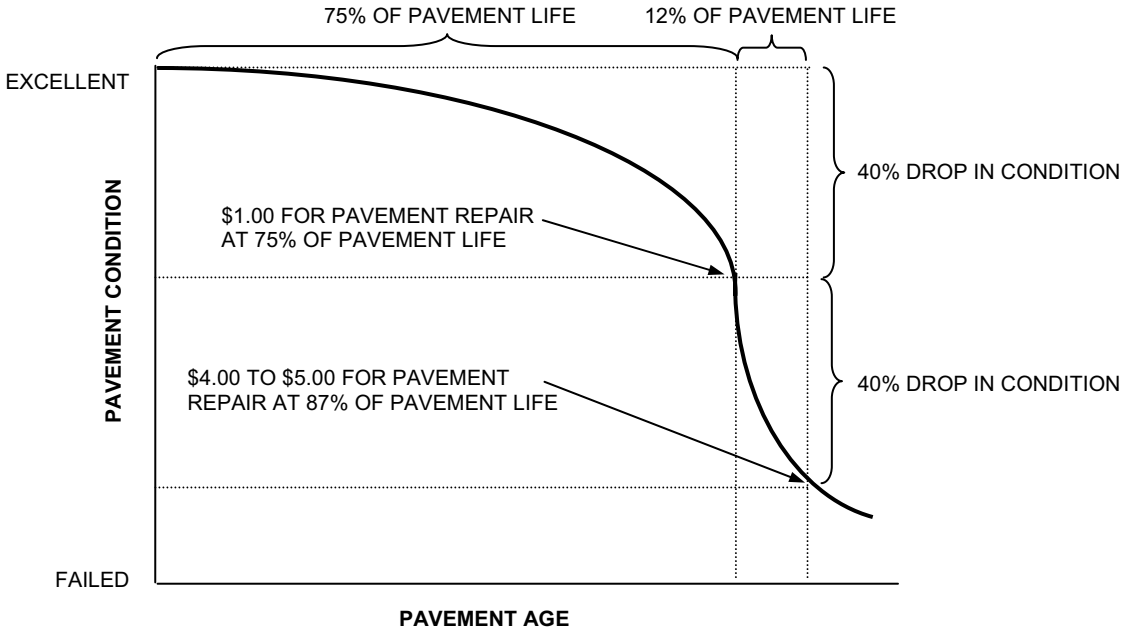

Figure 1. Pavement condition versus cost of repair.

MDOT monitors the condition of airport pavements and uses an APMS to plan for the M&R needs of the pavement infrastructure so it can advise and assist airports on methods to obtain optimal performance of their pavement. For example, the airports gain the necessary information to:

- Objectively monitor the condition of pavement system.
- Select more cost-effective M&R treatments.
- Extend pavement life through the application of preventive maintenance actions, such as crack sealing and joint sealing.
- Track the performance of selected treatments.
- Provide information needed to justify and secure funding.
- Show the impact of funding decisions.
- Assure best return on investment.
- Communicate pavement conditions and needs.
- Assist Michigan airports in meeting the requirements of Public Law 103-305.

The MDOT APMS enables the agency to oversee the pavement infrastructure at the airports in the state in an effective, efficient, and reliable manner. This in turn assists MDOT in being a good steward of the resources entrusted to them.

Scope of Work

The current project is divided into three phases comprised of updating approximately one third of the airports included in the system each year. The airports included in this project are listed in Table 1 according to the year of update. This report presents the results of the 2005 and 2007 inspection cycle.

APTech assessed the pavement conditions at project airports using the Pavement Condition Index (PCI) procedure – the industry standard in aviation for visually assessing the condition of pavements. During a PCI evaluation, inspectors walk over the pavement and identify visible signs of deterioration. Pavement defects are characterized in terms of type of distress, severity level of distress, and amount of distress. This information is then used to develop a composite index (PCI number) that represents the overall condition of the pavement in numerical terms, ranging from 0 (failed) to 100 (excellent). The PCI number is a measure of overall condition and is indicative of the level of work that will be required to maintain or repair a pavement. Further, the distress information provides insight into what is causing the pavement to deteriorate, which is the first step in selecting the appropriate repair.

Table 1. Michigan project airports.

2005 Airports (Phase 1)	2007 Airports (Phase 2)	2008 Airports (Phase 3)
Ann Arbor Municipal	Lenawee County	Sparta
Coleman A. Young Municipal	Owosso Community	Dowagiac Municipal
Bois Blanc Island[1]	Gratiot Community	Padgham Field
Grosse Ile Municipal	Flint - Bishop	Alpena County Regional
Battle Creek - W K Kellogg Regional	Roben - Hood	Atlanta Municipal
Toledo Suburban	Fitch H Beach	Antrim County
Dupont - Lapeer	Clare Municipal	Charlevoix Municipal
Marine City	Branch County Memorial	West Branch Community
Marlette Township	Oceana County Airport	Delta County
Midland - Jack Barstow	Evart Municipal	Frankfort Dow Memorial
New Hudson - Oakland Southwest	Gladwin	Meyers-Diver's Airport
Canton - Plymouth - Mettetal	Grand Haven Memorial Airpark	Sawyer
Oakland County International	Pellston Regional of Emmet County	Houghton County Memorial
Romeo State	Abrams Municipal	Harbor Springs
MBS International	Greenville Municipal	Ford
Sandusky City	Hastings Municipal	Gogebic County
Chippewa County International	Tulip City	Schoolcraft County
Cherry Capital	Roscommon County	Menominee - Marinette Twin County
Oakland - Troy	Livingston County	Luce County Hale
Linden - Price	Ionia County	Ontonagon County
	Kalamazoo County	Presque Isle County
	Mason County	Oscoda - Wurtsmith
	Manistee County Blacker	Mackinac County
	Brooks Field	Beaver Island
	Mason Jewett Field	Caro - Tuscola Area
	Mount Pleasant Municipal	Stambaugh Airport
	Muskegon County	Bay City - James Clements
	Jerry Tyler Memorial	
	South Haven Municipal	
	Three Rivers Municipal - Dr Haines	
	Mackinac Island Airport	

[1]Bois Blanc Island Airport was constructed in 2005. It is assumed that the pavement condition is excellent. This airport was not actually inspected during this project.

The PCI data from these inspections were used to update the MDOT APMS database and associated maps. The data were then analyzed to determine current pavement condition, predict future pavement condition, and develop M&R programs. The results of this analysis are presented in this statewide report. In addition to this report, individual reports were prepared for those airports inspected during this project.

SYSTEMS INVENTORY AND NETWORK DEFINITION

Introduction

The project began with a review of the existing inventory information for each of the airports. This information was used to update the pavement management database and associated maps as necessary to account for pavement-related work that had been undertaken since the last time (ranging from 1996 to 2002) MDOT had evaluated the airports. This chapter describes how the inventory portion of the APMS database was updated.

Systems Inventory Process

M&H conducted a records review to determine when and how the pavements at each of the project airports were constructed and subsequently rehabilitated. APTech then incorporated this information into the pavement management database. Data collected by others for Willow Run Airport, Capital City Airport, Gerald R. Ford International Airport, and a number of airports inspected in 2002 were included with the existing database. **The information presented in this report only includes data collected by APTech as part of this project**.

Network Definition

Using the inventory data, each project airport was divided into management units. This activity consists of creating an organizational hierarchy of all airport pavements within the pavement management database. The highest level is the *network*. In the Michigan database, each airport is an individual network. Each network is comprised of *branches*. In the airport setting, branches consist of distinct runways, taxiways, aprons, and any other pavement grouping that can be defined by a change in usage. Branches are further divided into *sections*. Sections are parts of the branch that share common attributes, such as the cross-section, traffic level, and performance. The forth subdivision or level is called a *sample unit*. Sample units are used during a pavement inspection.

Network definition maps identifying the location of all branches, sections, and sample units were prepared for each airport inspected and are provided in the individual airport reports.

Systems Inventory Results

The area of pavement included in the MDOT APMS database, separated by pavement surface type, is shown in Figure 2. Surface types are defined as follows: asphalt (AC), asphalt overlay on asphalt (AAC), portland cement concrete (PCC), and asphalt overlay on PCC (APC). Figure 3 shows the area of pavement separated by pavement use: apron, runway, taxiway, and T-hangar.

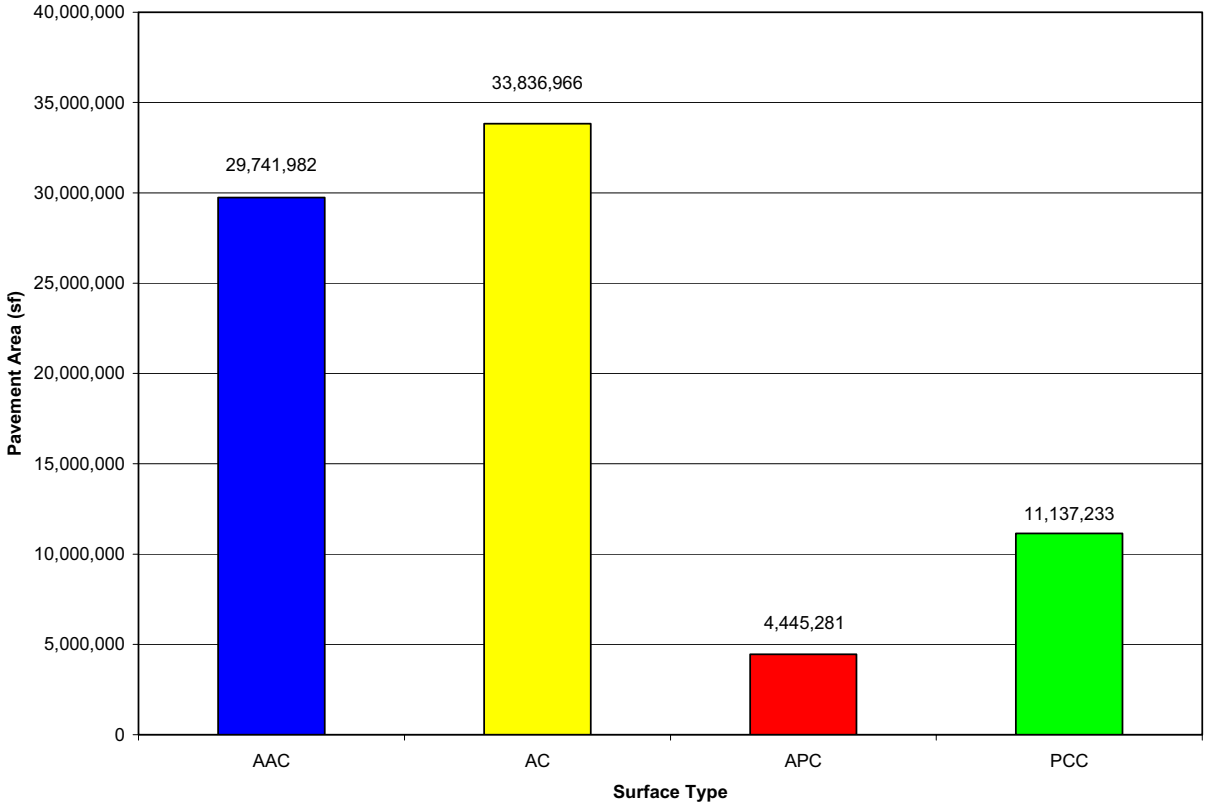

Figure 2. Pavement area by surface type.

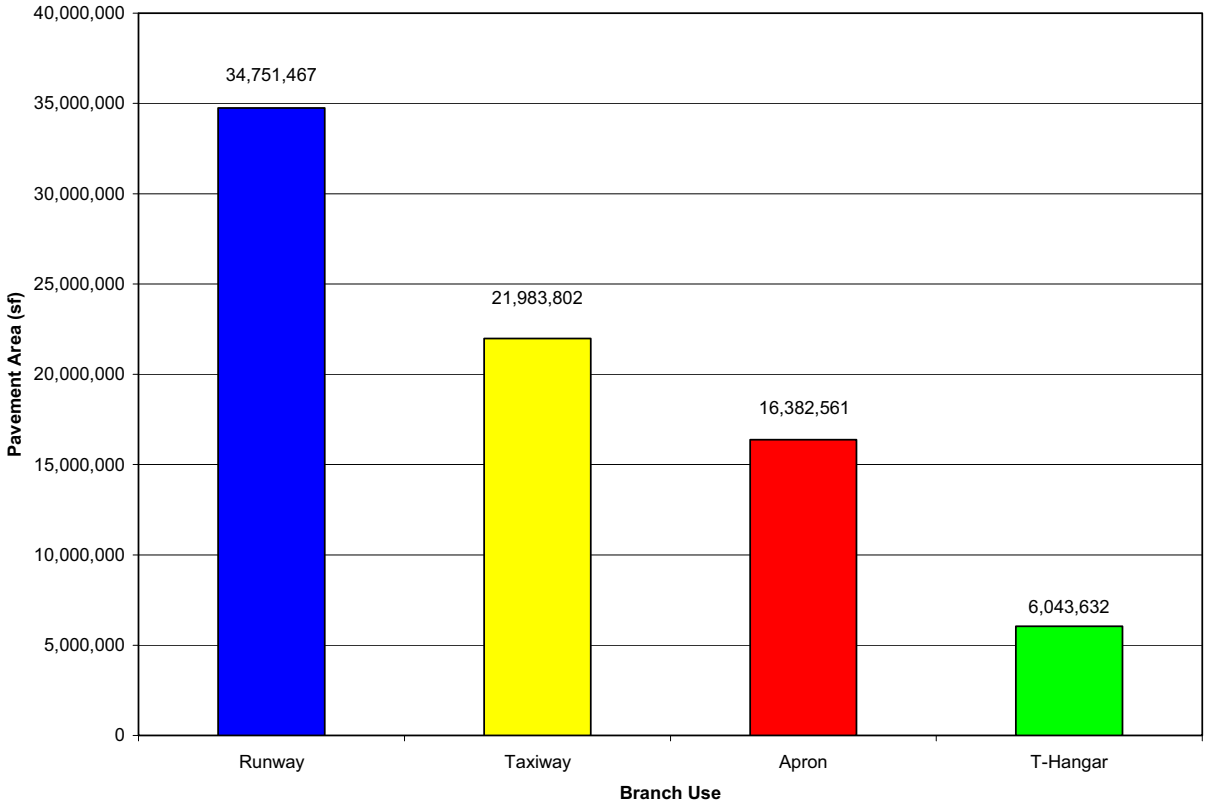

Figure 3. Pavement area by use.

PAVEMENT EVALUATION

APTech performed the pavement evaluations of project airports in different years, as identified in Table 1. Phase 1 airports were inspected between September and November of 2005, while phase 2 airports were inspected between July and September of 2007. These evaluations were conducted according to the PCI procedure. Phase 3 airport inspection is anticipated for the summer of 2008.

Pavement Condition Survey Procedure

The PCI methodology as documented in the following publications:

- The U.S. FAA Advisory Circular 150/5380-6B, *Guidelines and Procedures for Maintenance of Airport Pavements*. (A copy of this publication is located in Appendix A.)
- The U.S. FAA Advisory Circular 150/5380-7A, *Airport Pavement Management Program*. (A copy of this publication is located in Appendix A.)
- The American Society for Testing and Material Standard D5340, *Standard Test Method for Airport Pavement Condition Index Surveys*.

The PCI procedure is the standard used by the aviation industry to visually assess pavement condition. It was developed to provide a consistent, objective, and repeatable tool to represent the overall pavement condition. This methodology involves walking over the pavement, identifying the type and severity of distress present, and measuring the quantity of distress.

The PCI scale ranges from a value of 0 (representing a pavement in a failed condition) to a value of 100 (representing a pavement in excellent condition). In general terms, pavements above a PCI of 70 that are not exhibiting significant load-related distress will benefit from preventive maintenance actions, such as crack sealing and surface treatments. Pavements with a PCI of 40 to 70 may require major rehabilitation, such as an overlay. Often, when the PCI is less than 40, reconstruction is the only viable alternative due to the substantial damage to the pavement structure. Figure 4 illustrates how the appropriate repair type varies with the PCI of a pavement section. Figure 5 shows a series of pavement photographs with associated PCI values.

PCI		Condition
86 – 100		Preventive Maintenance
71 – 85		
56 – 70		Major Rehabilitation
41 – 55		
26 – 40		Reconstruction
11 – 25		
0 – 10		

Figure 4. PCI versus repair type.

Representative Pavement Surface	PCI	Representative Pavement Surface	PCI
	100		40
	60		5

Figure 5. Visual representation of PCI scale.

Appendix B identifies the distress types considered during a PCI inspection and the likely cause of each distress type. It should be noted that a PCI value is based on visual signs of pavement deterioration and does not provide a measure of structural capacity.

Areas Inspected

By evaluating a statistically selected number of sample units, an estimate of a section's condition can be obtained. Table 2 shows the sampling rate that MDOT specified for this project. In addition, areas exhibiting unusual distress or condition were inspected as additional sample units in accordance with the procedure. The section PCI is extrapolated from the PCI values of the sample units that are inspected within a section.

Table 2. Inspection sampling rate.

PCC Pavements		AC Pavements	
N[1]	n[2]	N[1]	n[2]
1 — 3	all	1 — 3	all
4	3	4	3
5 — 7	4	5 — 9	4
8 — 10	5	10 — 20	5
11 — 16	6	21 — 30	6
17 — 28	7	31 — 70	7
29 — 64	8	>70	10%, but ≤ 17
65 — 90	9		
> 90	10%, but ≤ 32		

[1]N = the total number of sample units in the section.
[2]n = the number of sample units to be inspected.

Additional Data Collected

During the field PCI inspections, the survey crew photographed typical pavement conditions at each airport site. These photos were incorporated into the individual airport reports.

Pavement Evaluation Results

After the visual distress data were collected and entered into the MDOT APMS database, the PCI for each section was calculated and the types of distress present were analyzed. PCI distress types are characterized as load-related (such as alligator cracking and shattered slabs), climate/durability-related (such as weathering [climate-related] and D-cracking [durability-related]), and other (distress types that cannot be attributed solely to load or climate/durability). Understanding the cause of distress helps in selecting a rehabilitation alternative that corrects the cause and thus eliminates its recurrence.

Appendix C lists the PCI value for each section, as well as the percentage of distress identified that can be attributed to load, climate, or a combination of these factors. Detailed distress data are available in the individual airport reports and the pavement management database.

Figures 6 and 7 show how the area-weighted PCI varies by surface type and use.

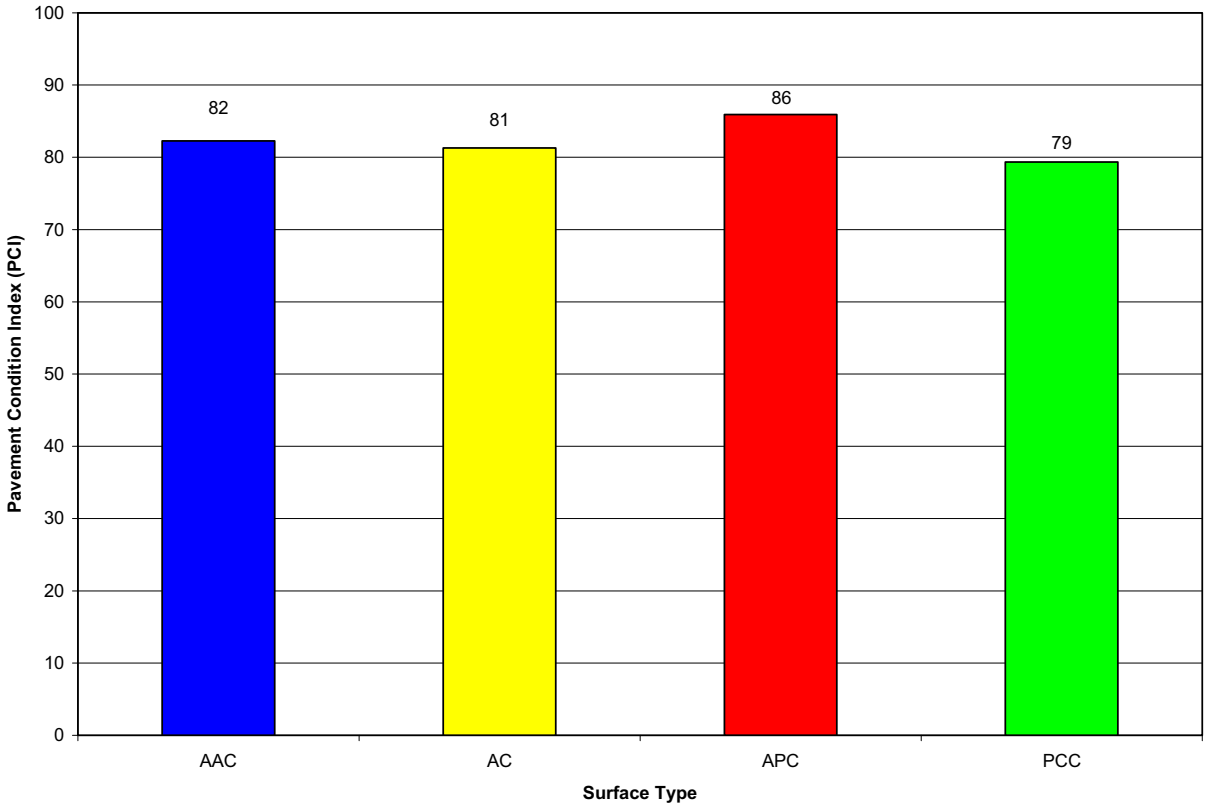

Figure 6. Area-weighted PCI by surface type.

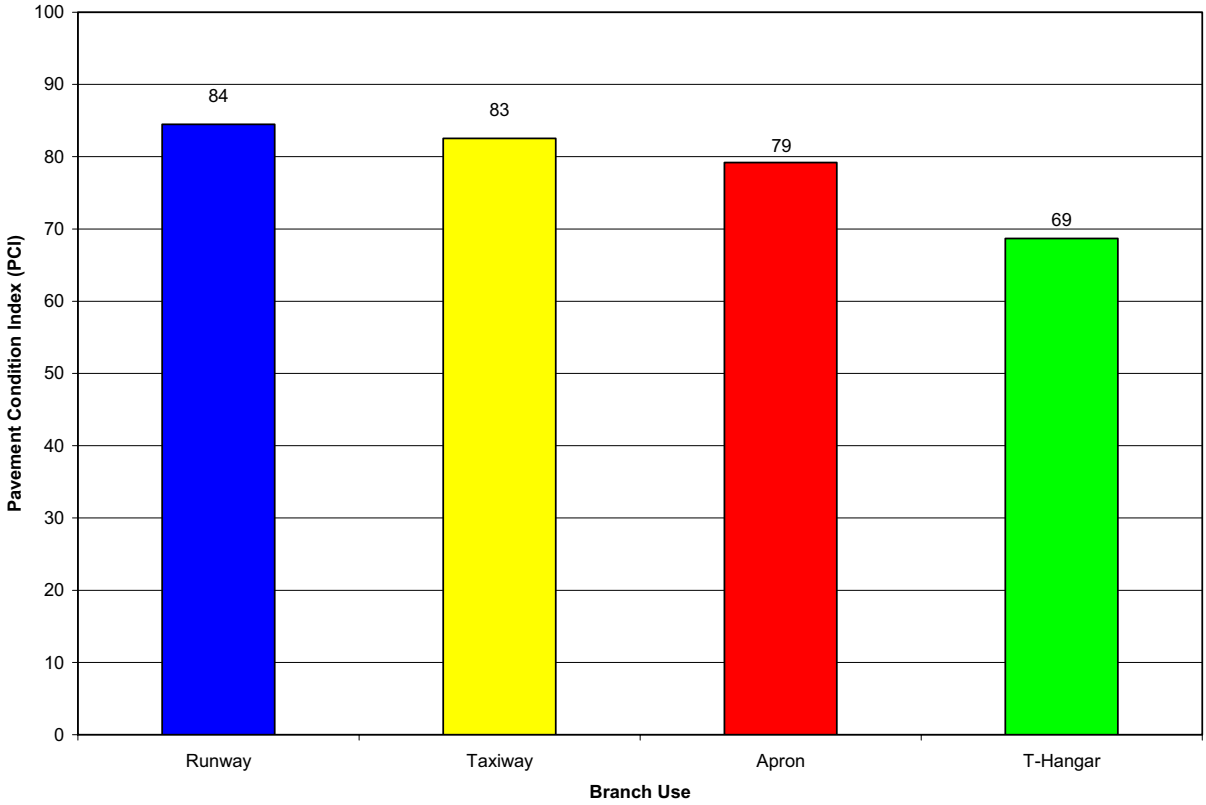

Figure 7. Area-weighted PCI by branch use for all airports.

Figure 8 shows the projected 2008 distribution of pavement conditions (PCI versus pavement area) for the airports included in phase 1 and 2. In this figure, preventive maintenance refers to activities such as patching, crack sealing, and joint resealing, while major rehabilitation includes overlays.

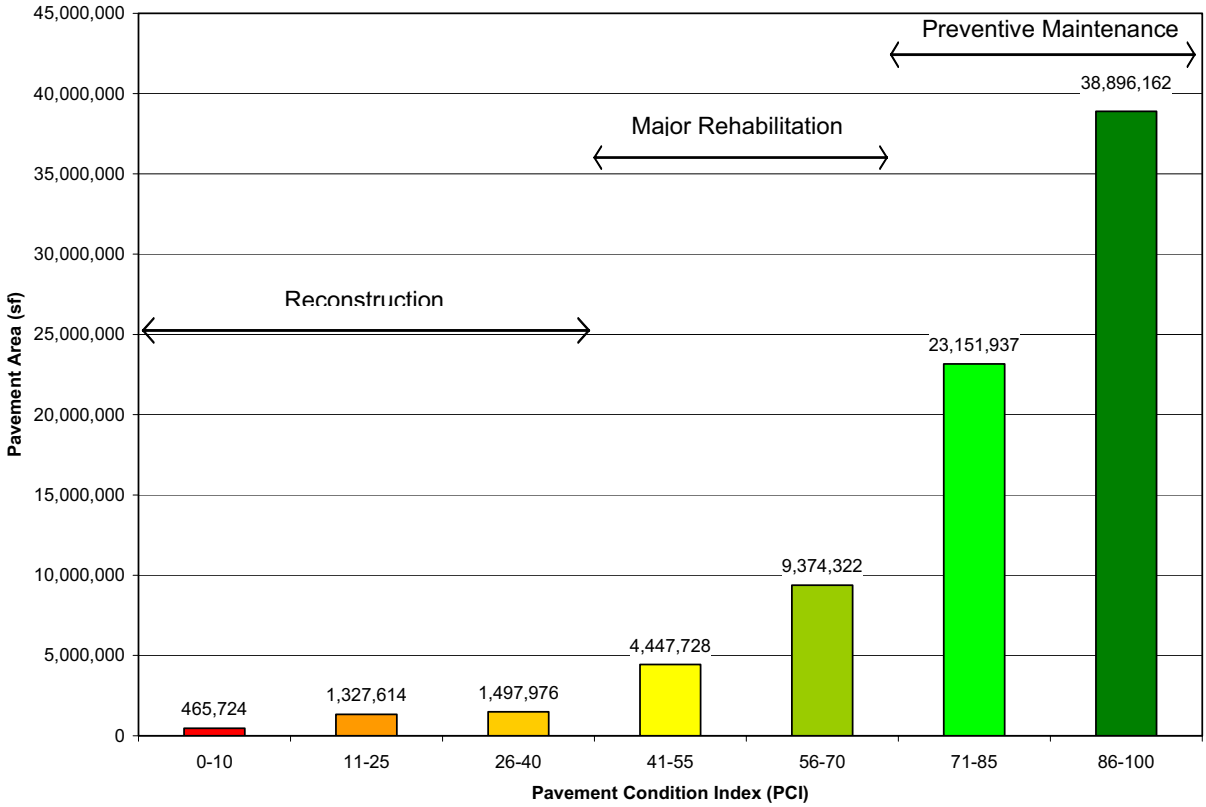

Figure 8. Condition distribution.

MICRO PAVER CUSTOMIZATION

Background

As part of this project, the APMS software (Micro PAVER) used by MDOT was modified to reflect the State's conditions and needs. The calibration can be broken down into the following areas:

- Database-Related
- Performance Modeling
- Maintenance Policies and Pavement Repair Unit Costs

Each of these areas is addressed under separate headings in this chapter.

Database-Related

Micro PAVER permits the user to define many database fields to meet specific requirements. This calibration occurs at three levels: the network level, the branch level, and the section level.

Network Level Calibration

There are 50 networks in the database included with phases 1 and 2 of this project – one for each airport. The network identifier for each is the airport's FAA three letter identifier. The network name is the full airport name, including the associated city, such as Price's Airport, Linden. In addition, there are user-definable fields available for use at the network level. The following user-definable fields have been assigned at the network level:

- Airport tier level.
- Congressional district the airport is located in.
- Whether the airport is a primary airport or not.
- State site ID.
- Site number.
- Ownership (Public-PU, Private-PR, or Military-MR).
- NPIAS classification.
- Region (Bay, Grand, Metro, North, Southwest, Superior, University).

Branch Level Calibration

Within a network are branches. A branch is a single entity that serves a distinct function; runways, taxiways, aprons, and t-hangars are branches. In Micro PAVER, the user is able to customize the branch identifier and the branch name. In addition, there are user-definable fields available for use at the branch level. The Michigan Micro PAVER system has been customized at the branch level as follows:

- The branch identifier starts with *RW* for runways, *TW* for taxiways, *A* for aprons, and *TH* for T-Hangar taxilanes. The branch identifier is completed as follows: 1) for runways, the orientation of the runway is used (for example, *RW927*), 2) for taxiways, TWA, TWB, and so on are used, and 3) for aprons, ATERM, A01, and so on are used. The branch identifier is then finished using a two-letter code specific to each airport. This naming protocol allows for consistency and facilitates the sorting and reporting of data.

- The branch name is a clear description of the branch (for example, *Runway 10-28, Taxiway A, Terminal Apron*).

- One user field at the branch level was used to identify whether the pavement was inspected by APTech or not.

Section Level Calibration

A section is a subdivision of a branch. In Micro PAVER, the user is able to customize the section identifier, the from/to descriptors, the use, and the surface type. In addition, there are user-definable fields available for use at the section level. The Michigan system has been customized at the section level as follows:

- The Aircraft design category associated with the pavement.

Performance Modeling

Micro PAVER uses performance models to predict pavement condition into the future. It is possible within Micro PAVER to develop database-specific performance models using actual pavement condition data. The prediction of the future condition of each pavement section is performed using its position relative to its performance model, as shown in Figure 9.

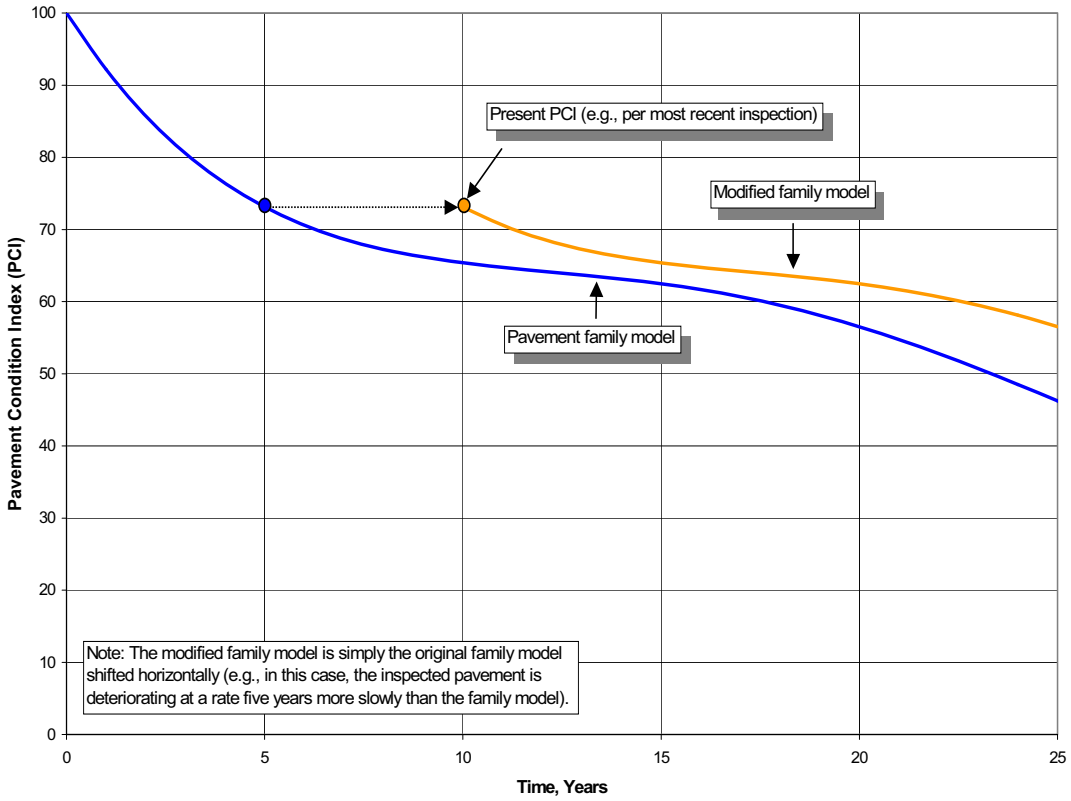

Figure 9. Performance model application.

Performance characteristics such as surface type, pavement use (runway, taxiway, apron, and t-hangar), rank, geographic region, maximum allowable load, and so on were investigated to determine their impact on pavement performance. Twenty three pavement performance models were selected for final use in the MDOT APMS.

Maintenance Policies and Pavement Repair Unit Costs

M&H worked with MDOT to develop the maintenance policies and unit costs for pavement maintenance and rehabilitation actions at the state level for each of the repair types identified for major rehabilitation and localized maintenance. Appendix D presents the maintenance policies and unit cost information currently stored in the MDOT APMS. Please note that the maintenance policies and unit costs reflect statewide averages and may require adjustment to reflect specific conditions at individual airports.

PAVEMENT MAINTENANCE AND REHABILITATION PROGRAM

Introduction

Micro PAVER was used to develop a maintenance and rehabilitation (M&R) program for all airports in the MDOT APMS database. This software program identifies those pavement sections that have high enough PCI values for preventive maintenance actions, such as crack sealing and joint resealing, to be cost-effective. In addition, it also identifies those sections where major rehabilitation is warranted.

Analysis Process

Micro PAVER was used to determine the pavement maintenance and rehabilitation needs under an unlimited budget scenario. While an unlimited funding scenario is not realistic, the results of this type of analysis identify all of the work required to meet management goals, as determined by MDOT. The impact of the work recommended, in terms of area-weighted average condition, is then presented as a basis for comparison.

The work types considered for this analysis are:

- Localized preventive maintenance for pavements with conditions higher than their determined critical PCI values.
- Overlay (pavements with PCI values greater than 40, but less than their critical PCI values).
- Reconstruction (pavements with PCI values less than 40).

For each year of the analysis, Micro PAVER applies the performance models (described previously under the performance modeling paragraph) and estimates the future condition of the pavement sections. If a section falls below the "critical PCI" value, major rehabilitation is recommended during that year. MDOT set the critical PCI values shown in Table 3.

Table 3. Critical PCI values.

Design Category	Runway	Taxiway	Apron
A	60	50	50
B	60	50	50
C	65	55	55
D	70	60	55

If the section is above the critical PCI value, localized preventive maintenance may be recommended for that year. After the treatment had been selected for the pavement section based upon its predicted PCI value and the criteria listed above, its cost is calculated using unit cost figures stored in Micro PAVER.

Analysis Approach

The analysis was run for a five-year period with a start date of October 1, 2008 and an inflation factor of three percent. The unit costs developed by M&H, and presented in Appendix D, were used during the analysis. These costs are presented for 2006. The costs were inflated by three percent annually to determine the appropriate unit cost for 2008. An unlimited funding scenario was used during the analysis.

During the first year of the analysis localized preventive maintenance quantities and costs are estimated using extrapolated PCI distress quantities and the maintenance policies developed with cooperation with MDOT. Additionally, in an effort to identify the cost of future maintenance, crack sealing quantities are calculated for year 2010 based on the total quantity of all distress types for which crack sealing is identified as the appropriate corrective action. Finally, the analysis was modified by removing preventive maintenance for pavements where major M&R is subsequently recommended within two years. **Note: estimated crack sealing quantities have not been included in the analysis for airports inspected during phase 1 of this project in 2005 due to the extended period of time that has elapsed since the inspection. It is believed that these estimates would be unreliable and not take into consideration any maintenance that has occurred in the interim.**

A summary of the analysis results are shown in Table 4 and depicted in Figure 10. The projected 2008 condition for all airports included in phase 1 and 2 is 78.1. The analysis shows that approximately $92.0 million is recommended to bring all of the pavements up to the minimum condition level identified by MDOT. If these recommendations are completed, the overall 2012 condition for all airports included in phase 1 and 2 is expected to be 81.9, compared to 70.6 if no money is spent on repairs.

Table 4. Unlimited funding scenario summary.

Year	Preventive Maintenance ($)	Major M&R ($)	Total Recommended ($)
2008	$2,706,775	$57,833,746	$60,540,521
2009	$0	$6,365,990	$6,365,990
2010	$729,052	$3,868,604	$4,597,656
2011	$0	$3,497,168	$3,497,168
2012	$0	$16,979,005	$16,979,005
Total	**$3,435,827**	**$88,544,513**	**$91,980,340**

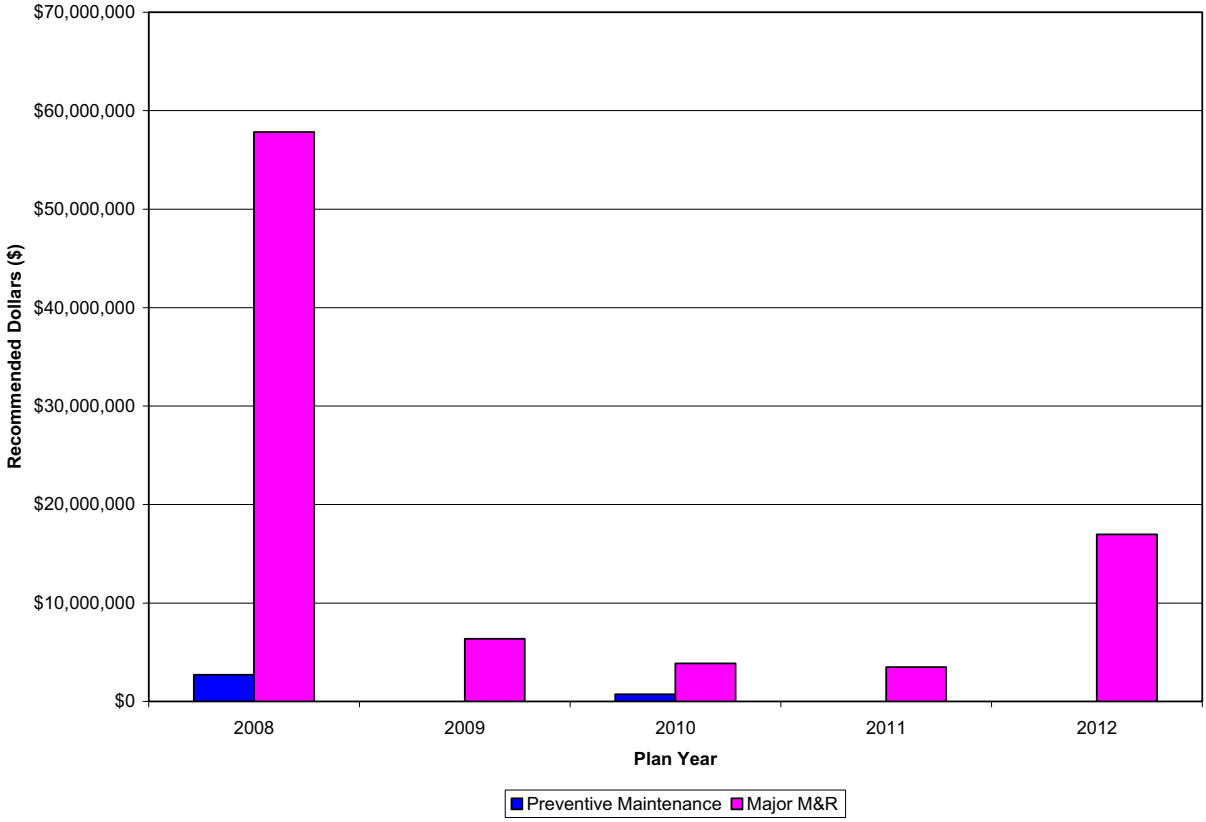

Figure 10. Unlimited funding scenario.

GENERAL MAINTENANCE RECOMMENDATIONS

It is the responsibility of the owners of the airport to perform general maintenance activities, as well as to immediately correct any situation that poses a safety hazard. In addition to the specific maintenance actions presented in Appendix E of the individual reports, it is recommended that the following strategies be considered for prolonging pavement life:

1. Conduct an aggressive campaign against weed growth through timely herbicide applications. Vegetation growing in pavement cracks is very destructive and significantly increases the rate of pavement deterioration.

2. Implement a periodic crack sealing and joint sealing program. Keeping water and debris out of the pavement system through sealing cracks and joints is a proven method for cost-effectively extending the life of the pavement system.

3. Ensure that dirt does not build up along the edges of the pavements. This can create a "bathtub" effect – reducing the ability of water to drain away from the pavement system.

4. Closely monitor heavy equipment movement, such as construction equipment, emergency equipment, and fueling equipment, to make sure it is only operating on pavement designed to accommodate the heavy loads this type of equipment often applies. Failure to restrict heavy equipment to appropriate areas may result in the premature failure of airport pavements.

Public Law 103-305

Public Law 103-305 states that after January 1, 1995, airport sponsors must provide assurances or certifications that an airport has implemented an effective airport pavement maintenance management system (PMMS) before the airport will be considered for funding of pavement replacement or reconstruction projects. To be in full compliance with the Federal law, the PMMS must include the following components at a minimum: pavement inventory, pavement inspections, record keeping, information retrieval, and program funding.

By undertaking a statewide APMS, MDOT has provided the general aviation airports in Michigan with an excellent basis for meeting the requirements of this law. The airports now have a complete pavement inventory and a detailed inspection. To remain in compliance with the law, the airports will also need to undertake monthly drive-by inspections of pavement conditions and track pavement-related maintenance activities.

Appendix A, which contains copies of FAA AC 150/5380-6B and AC 150/5380-7A, provide further information on pavement inspection using PCI and airport pavement management. Specifically, Appendix A of AC 150/5380-6B outlines the requirements of a PMMS to satisfy FAA Grant Assurance 11.

PAVEMENT MANAGEMENT PROGRAM UPDATE REQUIREMENTS

System Upkeep Guidelines

The following is a list of APMS components that require periodic update.

1. Micro PAVER Software. MDOT should maintain a current subscription with its Micro PAVER distribution center. Micro PAVER subscriptions must be renewed annually.

2. Inventory Data. It is important that the Micro PAVER inventory database be updated to reflect changes to the pavement network (e.g. the addition of new pavement areas or the rehabilitation or maintenance of existing pavement areas). New work history data should be entered into the database as soon as possible so as to take advantage of construction records (e.g. as-built plans, pavement material properties recorded during construction, etc.). If rehabilitation projects alter the sections, or if new sections are added to the network, parts of the APMS should be modified:

    a. Maps (e.g. maps depicting network, branch, section, and sample unit definitions as well as work history information).
    b. Database network definition (e.g. the hierarchy of the database).
    c. Work history data (e.g. records of maintenance and rehabilitation [M&R] activities should be entered into the database).
    d. Last construction dates (e.g. Major [structural] M&R activities should be entered as such in the database).
    e. Surface type (e.g. if a M&R activity changes the surface type of a pavement section, then those changes should be reflected in the database).
    f. Section area (e.g. if a M&R activity modifies the dimensions of a pavement section, the new pavement section dimensions should be recorded).
    g. Pavement family assignments (e.g. M&R activities may require that certain pavement sections be assigned to new family models).

3. Condition Data. Condition inspection data (e.g. PCI, roughness, structural capacity, and so on) must be current and reflect existing pavement conditions. When using Micro PAVER, it is particularly important that PCI inspection data be current. *Micro PAVER uses PCI data for all analyses, and lack of current PCI data will result in erroneous analyses.* The frequency of inspections to collect condition data is dependent upon agency policy, available staffing (e.g. if condition inspections are performed by agency staff), funding, and facility. It is highly recommended that inspections are conducted at least every 3 years.

4. Pavement Performance Models. The pavement performance models developed using Micro PAVER should be updated whenever new performance data (e.g. PCI inspection data) become available.

5. Unit Cost Data. Unit cost data for maintenance and repair (M&R) activities should be reviewed on a regular schedule so that budget estimates accurately represent anticipated costs. The data should be updated at least annually.

6. "Cost by condition" Data. Micro PAVER uses "cost by condition" data to estimate future M&R expenditures. For determining the cost of future M&R, Micro PAVER simply predicts the condition (e.g. PCI) of a pavement section based on the pavement deterioration model assigned to that section. Micro PAVER then assigns a cost for repair of that section based on the cost by condition table. Consequently, it is important that cost by condition values are representative of anticipated M&R costs.

7. Maintenance Policies. Maintenance policies should be reviewed periodically to determine whether maintenance strategies reflect actual practices.

Feedback Loop

A feedback loop should be established as historical data are collected to verify pavement design assumptions being used for new design, rehabilitation, planning, or life cycle cost analysis. This loop consists of periodically comparing the pavement M&R recommendations made by the program, the condition predictions made by the program, and the costs for M&R estimated by the program with actual project data as work is conducted and as new inspections are performed.

Training Courses

It is important to obtain the education and training necessary to effectively use the APMS. At a minimum, annual refresher training courses should be provided to users of the APMS on topics including the conduct of the PCI procedure and the use of the Micro PAVER software. If a new release of the Micro PAVER software is obtained that contains significantly new features, users of the APMS should attend a training course on the new version of the software.

SUMMARY

Applied Pavement Technology, Inc. (APTech), with assistance from Mead and Hunt, Inc. (M&H), was selected to update the Airport Pavement Management System (APMS) for the Michigan Department of Transportation, Bureau of Aeronautics (MDOT). The objective of implementing and updating a statewide APMS is to assist MDOT with the management of its system of airports. An APMS also helps individual airport management agencies understand the pavement maintenance and repair needs at their local facilities. An APMS can be used as a tool to identify system needs, make programming decisions for funding, provide information for legislative decision making, and assist local jurisdictions with planning decisions.

This report presents the results of this update to the MDOT APMS for the airports included in phase 1 and 2 of the project. Following is a summary of the findings of this study:

- The overall pavement area of the 50 phase 1 and 2 airports, the 16 airports inspected in 2002, and the 3 airports inspected by others included in the MDOT APMS database is 124,459,917 square feet.

- The projected 2008 condition of the entire APMS system (totaling 64 airports) is an area-weighted PCI value of 71.3 and the pavement system averages 15.7 years of age. The condition of the 50 airports included in phase 1 and 2 of this project is an area-weighted PCI value of 78.1 and averaging 14.0 years of age.

- If no funding is provided for pavement maintenance or rehabilitation, the pavement system will experience a slow but steady decline in condition, with an anticipated PCI of 70.6 by 2012 for the airports included in phase 1 and 2 of this project.

- If all maintenance and rehabilitation projects were to be funded at the airports an approximate total of $92.0 million would be needed over the next five years.